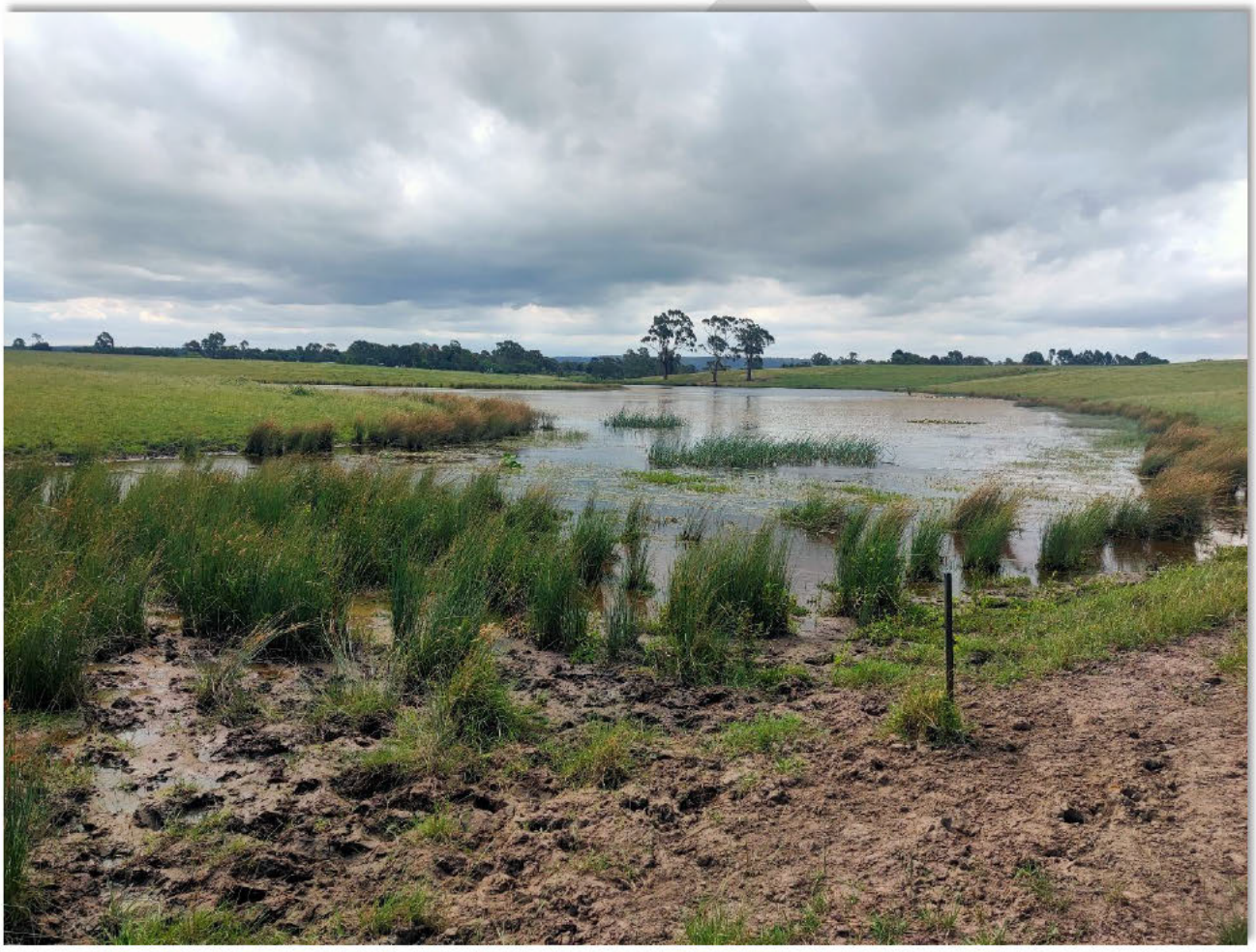
TARGETED AVIFAUNA SURVEYS
BOYD'S CREEK WETLANDS
5483 & 5495 PRINCES HIGHWAY
TRARALGON



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Thanks to Kathy Himbeck for the mapping within this document and review of this report.

Cover photo: Looking north across Boyd's Creek wetland, from edge of study area adjacent to the Princes Highway.

CONTENTS

1. BACKGROUND

1.1. INTRODUCTION

In October 2022, Indigenous Designs commissioned Wildlife & Ecology to undertake a targeted avifauna assessment of Boyd's Creek and associated wetlands at 5483 & 5495 Princes Highway, Traralgon, hereafter referred to as 'Boyd's Creek wetlands'. This assessment is to compliment Indigenous Design's Ecological Assessment of the same site, which is planned for a residential housing development.

The objectives of this project are outlined below.

- Undertake a desktop assessment for the Boyd's Creek and associated wetlands for avifauna (both aquatic and terrestrial) utilising database searches and the Ecological Assessment prepared by Indigenous Design (2022);
- Undertake a habitat assessment of the Boyd's Creek and associated wetlands for State or Commonwealth (including Treaties) listed avifauna identified through the desktop assessment and Ecological Assessment;
- Review and update the likelihood-of-occurrence of avifauna species based on the field assessment of habitat suitability and the likelihood-of-occurrence assessment criteria outlined in this report;
- Provide recommendations for legislative implications or additional survey work requirements for avifauna with a "Moderate" or "High" likelihood-of-occurrence; and
- Provide recommendations for habitat improvement and creation around these wetlands.

1.2. STUDY AREA AND SURROUNDING CONTEXT

The Boyd's Creek wetlands are located approximately 160km to the south-east of Melbourne, immediately north of the Princes Freeway and 4.5km south-west of Traralgon (Figure 1). It is situated within the Latrobe City Council local government area and the West Gippsland Catchment Management Area.

The extent of the study area, approximately 10.4ha, is within private property at 5483 and 5495 Princes Highway Traralgon. The boundaries of this private property are along the Princes Highway, bordering properties on Northern Avenue to the west, Easterly Drive and Beau Vista Drive to the north and Regan Rd and Bradford Drive to the east.

The majority of the private property which the study area is within is almost entirely cleared of trees with the exception exotic trees planted along the drive and around the domestic zone of residence. There are five scattered trees across the property which are described in Section 3.1. Outside of the domestic zone, the remainder of the property is used for cattle grazing.

The largest wetland is situated along Boyd's Creek with the inflow from under the Princes Highway and outflow, towards Wades Creek, along the northern boundary of the property.

Within a 5km radius surrounding of the Boyd's Creek wetlands, there are a number of wetlands such as the Traralgon Railway Reservoir Conservation Reserve, a number of other creeks that flow into Wades Creek, before flowing onto the Latrobe River approximately 4.5km north of the study area, and farm dams, all of which provide habitat for both common and threatened avian wetland species.

1.3. LITERATURE REVIEW

Relevant literature and online databases were reviewed prior to the field assessment to obtain information on known ecological values associated with the study site, including the following:

- The DELWP NatureKit (DELWP 2022a) for the location of threatened avifauna records within proximity to the study site;
- The Victorian Biodiversity Atlas (VBA) for previously documented records of flora and fauna in the locality (DELWP 2022b);
- The Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) Protected Matters Search Tool (PMST) for Matters of National Environmental Significance (MNES) listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC) (DCCEEW 2022a);
- Aerial photography of the study site;
- eBird Australia (eBird 2022), an on-line database maintained by The Cornell Lab of Ornithology at Cornell University, New York. This database collects observations from birders worldwide and is maintained by local partner conservation organisations. eBird provides a rich data source for basic information on bird abundance and distribution, that are rarely lodged with the VBA.
- The Ecological Assessment of 5483 & 5495 Princes Highway, Traralgon (Indigenous Design 2022).

Figure 1. Extent of the Study Area Boyd's Creek wetlands, 5483 & 5495 Princes Highway, Traralgon.

2. LEGISLATION

ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999

The EPBC Act is the primary Commonwealth legislation for environment protection. Under the EPBC Act, an action will require approval from the Commonwealth Environment Minister if it is likely to have a potential significant impact on a Matter of National Environmental Significance (MNES) and it is not subject to certain specified exceptions.

Matters of National Environmental Significance trigger the Commonwealth's environmental assessment and approval responsibilities. The matters that are most relevant to this study site and immediate surrounds are: nationally listed threatened species, migratory species protected under international agreements and the Commonwealth marine environment.

If a project is likely to have a potential significant impact on an MNES, a referral to the Commonwealth Minister for the Environment is required. If the Minister considers it likely that a proposed action may have a significant impact on MNES, the action may be considered 'controlled' and requires a detailed assessment and the granting of a permit to proceed.

Bilateral Migratory Bird Agreements

For over 30 years, Australia has played an important role in international cooperation to conserve migratory birds in the East Asian - Australasian Flyway (the Flyway), entering into bilateral migratory bird agreements with Japan in 1974 (JAMBA), China (CAMBA) in 1986 and most recently the Republic of Korea (ROKAMBA) in 2007. Each of these agreements provides for the protection and conservation of migratory birds and their important habitats, protection from take or trade except under limited circumstances, the exchange of information, and building cooperative relationships (DCCEEW 2022b).

Birds listed on the annexes to these three agreements, together with those on Appendices I or II of the Bonn Convention, must also be placed on the migratory species list under the EPBC Act (DCCEEW 2022b).

Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention) (CMS)

As an environmental treaty under the aegis of the United Nations Environment Programme, CMS provides a global platform for the conservation and sustainable use of migratory animals and their habitats. CMS brings together the States through which migratory animals pass, the Range States, and lays the legal foundation for internationally coordinated conservation measures throughout a migratory range (UNEP 2019).

As the only global convention specializing in the conservation of migratory species, their habitats and migration routes, CMS complements and co-operates with a number of other international organizations, NGOs and partners in the media as well as in the corporate sector (UNEP 2019).

FLORA AND FAUNA GUARANTEE (AMENDMENT) ACT 2019

The *Flora and Fauna Guarantee (Amendment) Act 2019,* which replaced the *Flora and Fauna Guarantee Act 1988* on July 1 2021, is the primary State legislation for the protection of biodiversity, native plants, native animals and ecological communities on land and in water. Species and ecological communities can be listed as threatened under the Act based on assessments by an independent Scientific Advisory Committee. Threatening processes may also be listed.

Plants, animals and other organisms are listed under the FFG (A) Act for a number of reasons including to protect them from threats to their continued survival, and are listed under Section 10 of the Act (DELWP 2022c).

Following the changes in this Amendment Act, species are now considered for listing as threatened under the FFG (A) Act in accordance with the intergovernmental Common Assessment Method (CAM). The CAM adopts the categories and criteria of the International Union for the Conservation of Nature (IUCN) Red List of threatened species. Species will now be listed under the FFG Act in the following categories of threat:

- extinct
- extinct in the wild
- critically endangered
- endangered
- vulnerable
- conservation dependent

Key elements of the previous listing process are retained, such as public nomination and assessment by the Scientific Advisory Committee (SAC). There are no changes to the listing of threatened communities or processes.

A transitional process was undertaken to bring Victoria's existing FFG Act Threatened List and DELWP advisory lists in line with the CAM. This was overseen by the Conservation Status Assessment Project team (DELWP 2022d), resulting in an updated FFG Act threatened list being released in October 2021 and updated in September 2022 (DELWP 2022c).

WILDLIFE ACT 1975

The *Wildlife Act 1975* is the primary Victorian legislation for protecting and managing fauna in Victoria. This Act covers indigenous vertebrate species (except declared pest species), invertebrate species listed under the *Flora and Fauna Guarantee Act 1988* and some introduced game species but does not apply to fish defined under the *Fisheries Act 1995*. Its main aims are the protection and conservation of wildlife, prevention of wildlife taxa becoming extinct in Victoria and to regulate the activities of persons engaged in activities concerning or relating to wildlife.

3. SURVEY METHODOLOGY

3.1. DESKTOP SURVEY

The Victorian Biodiversity Atlas (DELWP 2022b) was queried for all avifauna species, including those of conservation significance (listed under the EPBC Act and FFG (A) Act), recorded within a 5km radius of the study site.

The EPBC Act Protected Matters Search Tool (DCCEEW 2022a) was also queried to determine if any protected fauna related matters were likely to occur in the vicinity of the study site.

eBird Australia (eBird 2022), an on-line database maintained by The Cornell Lab of Ornithology at Cornell University New York, was also investigated for local sightings.

The results of the VBA search are provided in Appendix A. The results of the eBird and PMST searches are included in the 'likelihood of occurrence' table found in Appendix B.

3.1. HABITAT ASSESSMENTS

The habitat assessment of the various habitat types identified within the study area (Figure 1) was undertaken on-site by Principal Zoologist [redacted] on 7 December 2022. Due to a La Nina spring weather pattern with good rains, the assessment was deferred until the weather had warmed up and less water was across the environment. With large quantities of water in the environment across Victoria and interstate, wetland bird numbers were not concentrated in permanent wetlands, so conducting targeted surveys for these birds in spring was considered to potentially compromise the results of these surveys. This is especially true for the Latham's Snipe and their habitat preferences for shallow water with muddy edges.

The entire study area was assessed, recording areas of potential habitat for threatened species. All potential habitat was described, mapped and photographed.

Observations were also made of any fauna currently present within the study area using a number of different techniques including: incidental sightings of birds as they flew overhead or moved between different patches of habitat; extended stationary observations, scanning the water and shoreline of the wetlands and listening for calls.

3.2. SURVEY LIMITATIONS

Zoological surveys commonly fail to record all individuals present in a study site due to reasons that include: survey time constraints, survey timing, fauna movement patterns, the migratory behaviour of some species, recent rainfall across the wider landscape and the relative obscurity of some species. For these reasons it is certain that some avian species that frequent these wetlands, and the study area as a whole, from time to time, were not recorded during the site visit on 7 December 2022.

3.3. LIKELIHOOD OF OCCURRENCE

A "likelihood-of-occurrence" for each threatened species was determined based on criteria detailed in Table 1, along with the habitat requirements of the species compared to the habitat assessed on-site, number of records within the 5km buffer and the date of the most recent record.

Avifauna species that are listed under either the EPBC Act or FFG (A) Act that were identified as occurring within a 5km buffer of the Study Area, have had their 'Likelihood of Occurrence' within the study area determined using the criteria set out in Table 1 below.

Table 1: Criteria used for assessing the "Likelihood-of-Occurrence" of avifauna species

Likelihood of Occurrence	Code	Criteria
High	H1	Known resident in the area based on site observations, database records or expert advice
	H2	Recent reputable records (within 5 years) of the species in the local area e.g. VBA, eBird
	H3	The study site wetlands contain the species' preferred habitat
Moderate	M1	The species is likely to visit the area regularly (i.e. at least seasonally)
	M2	Previous reputable records of the species in the local area e.g. VBA within the last 20 years
	M3	The study site contains some characteristics of the species' preferred habitat
Low	L1	The species is likely to visit the area occasionally or opportunistically whilst en route to more suitable sites
	L2	There are only limited or historical records of the species in the local area (i.e. more than 20 years old)
	L3	The study site contains few or no characteristics of the species' preferred habitat
Negligible	N1	No previous records of the species in the local area; or
	N2	Previous records of the species in the local area (eg VBA) but > 30 years old
	N3	The species may fly over the area when moving between areas of more suitable habitat
	N4	Out of the species' range
	N5	No suitable habitat present
	N6	Species regionally extinct

The above likelihood-of-occurrence criteria is similar to that used by Indigenous Design (2022) with their ratings of Present, High and Moderate correlating to High and Moderate in the above table, while Low and Unlikely correlate with our Low and Negligible.

4. RESULTS

4.1. DESKTOP REVIEW

Following the desktop review of the VBA database (DELWP 2022b), 162 avifauna species had been recorded within the 5km buffer of the study area (Appendix A). From the VBA search, along with those species listed on the PMST search (DCCEEW 2022a) and eBird database records (2022), a total of 33 avian species listed as being threatened in Victoria on the FFG (A) Act or listed under the EPBC Act that have been recorded, or have the potential to occur, within a 5km buffer of the study site was compiled. The list of the 33 avian species can be found in Appendix B.

There are some differences in the species listed in Appendix B and those identified by Indigenous Design in their ecological report (2022). These differences arise from different versions of the PMST search (eg a slightly different search extent based on user-defined polygons on different dates) and our inclusion of eBird (2022) records from within 5km of the study area. An additional five species were included that are currently only available on eBird.

4.2. AVIFAUNA ASSESSMENT

From the avifauna assessment, a total of 17 species were recorded during the site visit on 7 December 2022. Fourteen of these species were native and three introduced. Nearly half of the native species were those associated with wetland habitats, such as Australasian Grebe *Tachybaptus novaehollandiae,* Australasian Swamphen *Porphyrio melanotus,* Chestnut Teal *Anas castanea* and Black Swan and Black Swan *Cygnus atratus*. Other species included "grassland" birds like Australian Pipit *Anthus australis* and Eurasian Skylark **Alauda arvensis* along with rosellas or generalists like swallows, magpies and ravens.

A full list of species observed and the areas where they were recorded can be found in Appendix C.

4.3. HABITAT ASSESSMENT

Targeted avifauna assessments were undertaken within a limited area of the overall property, namely around the wetlands and associated drainage lines, where threatened fauna were most likely to occur.

At the time of the assessment the water level in the two wetlands was high but slightly receding, creating a muddy edge especially along shallow parts of the larger wetland. Some of the exposed shoreline was covered with rushes and grasses providing habitat for some wetland avifauna.

Below is a description of the habitats within the study area with photos provided in Appendix D. The classification of the type of habitat are consistent with that previously determined by Indigenous Design (2022). It should be noted that the habitat types described below are based on a broad categorization. These broad categories may also appear as smaller examples in areas across the study site that are not mapped and may also include other minor habitat types.

WETLANDS

The two wetlands (Images 10 & 11) encompass the majority of the study site and is the largest habitat type covering approximately 5ha (as shown in Figure 1). Along with the open water, the banks of the wetlands are included in this habitat type and these vary from the constructed walls in the northern section of the largest wetland to muddy edges along the southern shorelines (Image 12) and vegetated banks around much of the remainder.

The smaller wetland had an island in the middle, which provides roosting habitat amongst the trees, both living and dead, for aquatic species like cormorants, darters and ducks. From the amount of faecal matter present on some of the branches, indicates they were used regularly. Breeding may also occur within the branches of these trees due to the presence of sticks in the forks and on branches that are above any flood height to indicate flood debris. The south-eastern end of this wetland had shallow water that was vegetated with grass and aquatic species (image 13), where the drainage line flows into this wetland.

The open water and shoreline of the wetlands can support many avifauna species including duck, cormorants, Eurasian Coot, Australian Pelican, White-bellied Sea-eagle, plovers and dotterels and other wetland species. Some of these species like the dotterels and snipe are partly or wholly dependent on the water levels exposing the shoreline to provide suitable habitat.

DRAINAGE LINES

There are two areas of drainage line habitat that have been identified within the study site (as shown in Figure 1). Boyd's Creek enters the study area at the south-west corner, near the Princes Highway and exits mid-way along the northern boundary of the property. The largest area of drainage line habitat is within the eastern part of the study area (Image 14), before it reaches the smaller wetland. This area has a range of aquatic and semi-aquatic vegetation including grass and juncus tussocks, all providing potentially suitable habitat for wetland avifauna.

The drainage lines exiting both wetlands (Image 15) are primarily grassy and heavily grazed by cattle for the most part, providing little habitat for most avifauna species.

Avifauna likely to, or potentially, use the drainage line habitat include a range of wetland species such as Latham's Snipe, ducks, herons, egrets, and rails. Some of these birds like Latham's Snipe may utilise these areas in mid-late summer when these areas have less standing water than during the site assessment in December.

SCATTERED TREES

The habitat type identified as 'scattered trees' are occurring in two areas; a large dead tree in the eastern part of the study area (Image 16) and three large eucalypts beside the Boyd's Creek wetland in the western part of the study area (Image 17).

The hollows in these trees provide breeding habitat for local parrots such as Eastern Rosella but also for the introduced Common Myna, both observed leaving hollows during the site assessment (Images 18 & 19).

4.4. LIKELIHOOD OF OCCURRENCE

Part of the desktop review was to compile a list of avifauna species that are either listed under the Commonwealth EPBC Act or under the Victorian FFG (A) Act, that occur within a 5km radius of the study area. This list of avifauna was further analysed to create a "likelihood-of-occurrence" for each species with the results provided in Appendix B.

Of the 33 species occurring in Appendix B, nine species were considered to have a moderate "likelihood-of-occurrence". Of the remaining 24 species, one was considered to have a low likelihood and 23 negligible likelihood of occurring within the study area. The nine species that are considered to have a Moderate "likelihood-of-occurrence" within the study site are found in Table 2 below. These nine species are considered in more detail below in Section 4.5 Species Profiles.

Table 2: Avifauna species with a Moderate or High "Likelihood of Occurrence" in the study site.

Common Name	Scientific Name	Conservation Status		Treaty	Likelihood of Occurrence
		EPBC	FFG (A)		
Eastern Great Egret	*Ardea alba modesta*		vulnerable		Moderate
Hardhead	*Aythya australis*		vulnerable		Moderate
Musk Duck	*Biziura lobata*		vulnerable		Moderate
Gang-gang Cockatoo	*Callocephalon fimbriatum*	Endangered			Moderate
Latham's Snipe	*Gallinago hardwickii*	Migratory Marine		ROKAMBA JAMBA Bonn A2H	Moderate
White-bellied Sea-Eagle	*Haliaeetus leucogaster*	Marine	vulnerable		Moderate
White-throated Needletail	*Hirundapus caudacutus*	Vulnerable Migratory Marine	vulnerable	CAMBA JAMBA ROKAMBA	Moderate
Blue-billed Duck	*Oxyura australis*		vulnerable		Moderate
Australasian Shoveler	*Spatula rhynchotis*		vulnerable		Moderate

4.5. SPECIES PROFILES

EASTERN GREAT EGRET *Ardea alba modesta*

Status

Eastern Great Egret is listed as vulnerable under the FFG (A) Act.

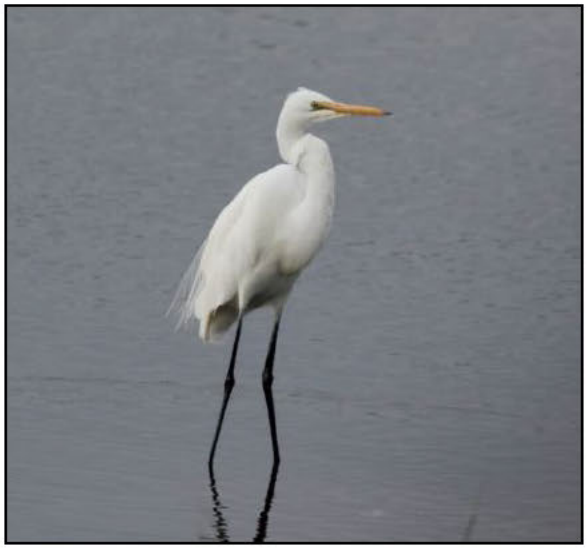

Image 1: Eastern Great Egret
(illustrative purposes only)

Habitat and Ecology

The Eastern Great Egret occurs in a wide range of wetland habitat, both freshwater and saline. Prefers shallow water, particularly when flowing but may inhabit any watered area, including damp grassland. It has a wide habitat range including swamps and marshes; margins of rivers and lakes; damp or flooded grasslands, pastures or agricultural lands; reservoirs; sewage treatment ponds; drainage channels; salt and estuarine environments. These birds nest in colonies, primarily located in wooded and shrubby swamps (DCCEEW 2022c), with most of the breeding in NSW and Victoria being recorded in the Murray-Darling Basin (Marchant and Higgins 1990).

Distribution

Eastern Great Egrets are widespread in Australia, occurring in all states/territories of mainland Australia and in Tasmania (Marchant and Higgins 1990). They are also found in small numbers in New Zealand.

HARDHEAD *Aythya australis*

Status

Hardhead is listed as vulnerable under the FFG (A) Act.

Habitat and Ecology

Hardheads favour freshwater swamps and wetlands and occasionally occur in sheltered estuaries. They rarely venture onto land, preferring to roost on low stumps near the water. Hardheads prefer deep, fresh open water and breed in wetlands and waterways with dense fringing vegetation (Birdlife Australia 2019).

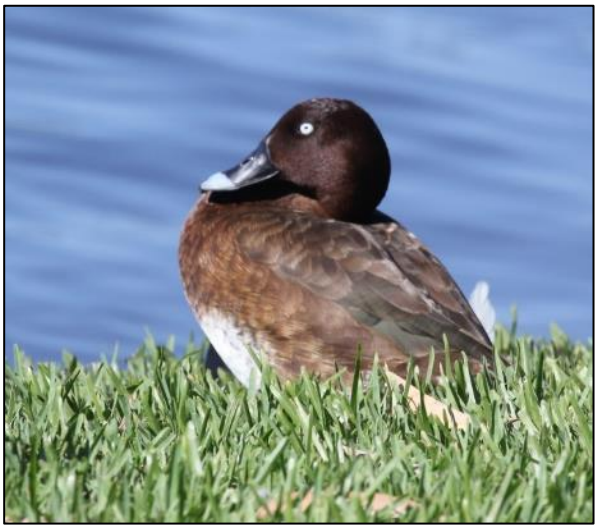

Image 2: Hardhead
(illustrative purposes only)

Distribution

The Hardhead is widely distributed throughout mainland Australia and Tasmania. The species breeds in mainland eastern, south-eastern and south-western Australia, dispersing to Tasmania and far inland, after good rains (Pizzey and Knight 2007). The species' stronghold is the deeper freshwater wetlands of the Murray Darling drainage area of NSW and Victoria (Marchant and Higgins 1990).

MUSK DUCK *Biziura lobata*

Status

The Musk Duck is listed as vulnerable under the FFG (A) Act.

Habitat and Ecology

The Musk Duck is a breeding resident endemic to the south-eastern and south-western parts of Australia. Its favoured habitat is terrestrial wetlands but unlike the two other duck species, it also favours estuarine habitats and sheltered inshore waters, where its preference is for deep water of large permanent swamps, lakes and estuaries where conditions are stable and there is abundant aquatic flora.

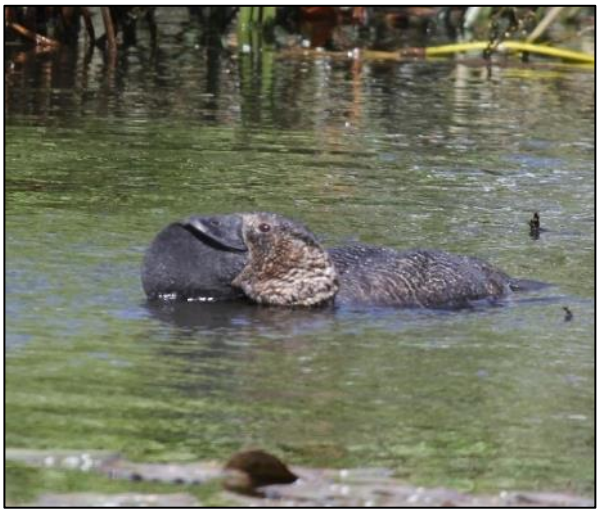

Image 3: Musk Duck
(illustrative purposes only)

Distribution

Musk Ducks are found only in Australia. They range from Shark Bay in the mid-west of Western Australia, through the south to Tasmania and east to southern Queensland, and can be found several hundred kilometres inland in some areas (Pizzey and Knight 2007).

GANG-GANG COCKATOO *Callocephalon fimbriatum*

Image 4: Gang-gang Cockatoo
(illustrative purposes only)

Status

The Gang-gang Cockatoo is listed as Endangered under the EPBC Act, effective from 2 March 2022.

Habitat and Ecology

Gang-gang Cockatoos primarily occur within the temperate eucalypt forests and woodlands of mainland south-east Australia (Menkhorst *et al* 2017). The species is known to migrate seasonally preferring the wet sclerophyll forests during the summer months and inhabits woodland assemblages at lower, drier altitudes during the winter months (Higgins 1999).

Gang-gang Cockatoos are known to feed from both native and introduced ornamental species. Whilst feeding on native vegetation, the species rely heavily on eucalypts and acacias. When feeding on introduced vegetation, these cockatoos primarily rely on the berries of species such as Hawthorn and Cotoneaster. They favour old growth forest and woodland assemblages for nesting, loafing and roosting (DAWE 2022).

Distribution

Gang-gang Cockatoos are endemic to south-eastern Australia. The species is considered to be rare at the extremities of its range, with isolated records known from as far north as Coffs Harbour and as far west as Mudgee (Higgins 1999). The Gang-gang Cockatoo is adapted to cooler conditions and has always been more common at high elevations and more southern latitudes (DAWE 2022).

In Victoria, the Gang-gang Cockatoo is widespread through north-east and southern regions, with numerous records in eastern Melbourne, Mornington Peninsula, and south-western Gippsland (Higgins 1999, Menkhorst *et al* 2017)

The fires of 2019 / 2020, in south-eastern Australia, devastated large areas of Gang-gang Cokatoo habitat, which further impacted this species whose numbers were already in serious decline (approx 69% in the years 1999-2019) (DAWE 2022).

LATHAM'S SNIPE *Gallinago hardwickii*

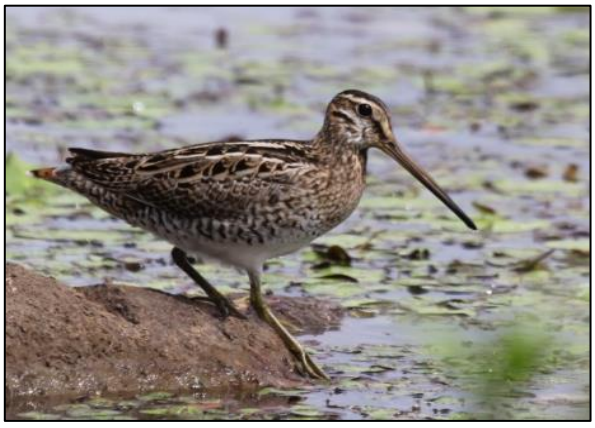

Image 5: Latham's Snipe
(illustrative purposes only)

Status

The Latham's Snipe is protected as a Marine and Migratory shorebird species under the EPBC Act (under international treaties JAMBA, ROKAMBA and Bonn).

Habitat and Ecology

Latham's Snipe inhabits a wide variety of permanent and ephemeral wetlands including flooded pastures, swamps, billabongs, lagoons, lakes, creek or river margins, river pools and floodplains. They usually

occur in open freshwater wetlands that have some form of shelter (usually low and dense vegetation) nearby (Higgins and Davies 1996, DCCEEW 2022d).

Vegetation surrounding the wetland can be varied and may include tussock grasslands with rushes, reeds and sedges, coastal and alpine heathlands, lignum or tea-tree scrub, button-grass plains, alpine herbfields or open forest (DCCEEW 2022d).

Distribution

Latham's Snipe is a non-breeding visitor to Australia and has a widespread range from Cape York Peninsula through to south-eastern South Australia. The species can be found in all regions of Victoria except the north-west (DCCEEW 2022d).

WHITE-BELLIED SEA-EAGLE *Haliaeetus leucogaster*

Status

The White-bellied Sea-Eagle is protected as a marine species under the EPBC Act and listed as vulnerable under the FFG (A) Act.

Habitat and Ecology

White-bellied Sea-Eagles occupy maritime habitats, terrestrial wetlands and coastal lands of tropical and temperate Australia. They hunt over large open tracts of water, particularly in maritime habitats, with a preference for open terrestrial wetlands also deep channels, coastal lagoons, saltmarsh. The presence of shoreline or emergent vegetation apparently unimportant, provided open water remains (Marchant and Higgins 1993).

Image 6: White-bellied Sea-eagle
(illustrative purposes only)

Distribution

The White-bellied Sea-Eagle is distributed along the coastline (including offshore islands) of mainland Australia and Tasmania. It also extends inland along some of the larger waterways, especially in eastern Australia. The inland limits of the species are most restricted in south-central and south-western Australia, where it is confined to a narrow band along the coast (DCCEEW 2022e).

WHITE-THROATED NEEDLETAIL *Hirundapus caudacutus*

Status

The White-throated Needletail is listed as a Vulnerable species under EPBC Act, and under the same act is protected as a Marine and Migratory shorebird species (under three international migratory bird agreements CAMBA, JAMBA, and ROKAMBA). It is also listed as vulnerable under the FFG (A) Act.

Image 7: White-throated Needletail
(illustrative purposes only)

Habitat and Ecology

The White-throated Needletail is a non-breeding migrant to Australia where it almost always forages aerially, at heights up to 'cloud level', above a wide variety of habitats ranging from heavily treed forests to open habitats, such as farmland, heathland or mudflats (DCCEEW 2022f).

Distribution

The White-throated Needletail is widespread in eastern and south-eastern Australia. In eastern Australia, it is recorded in all coastal regions of Queensland and NSW, extending inland to the western slopes of the Great Divide and occasionally onto the adjacent inland plains. Further south on the mainland, it is widespread in Victoria, though more so on and south of the Great Divide, and there are few records in western Victoria outside the Grampians and the South West.

Most White-throated Needletails spend the non-breeding season in Australasia, mainly in Australia, and occasionally in New Guinea and New Zealand, though it has been suggested that some may overwinter in parts of South-East Asia (DCCEEW 2022f).

BLUE-BILLED DUCK *Oxyura australis*

Status

The Blue-billed Duck is listed as vulnerable under the FFG (A) Act.

Habitat and Ecology

Almost entirely aquatic, the Blue-billed Duck is rarely seen ashore. The species inhabits deep freshwater wetlands, never in marine waters, unlike the Musk Duck. The Blue-billed Duck is secretive, preferring stable, deep, fresh well-vegetated wetlands (incl. freshwater lakes, swamps and dams) for much of the year, particularly for breeding preferring to utilise more open water over the winter months (Morcombe 2014).

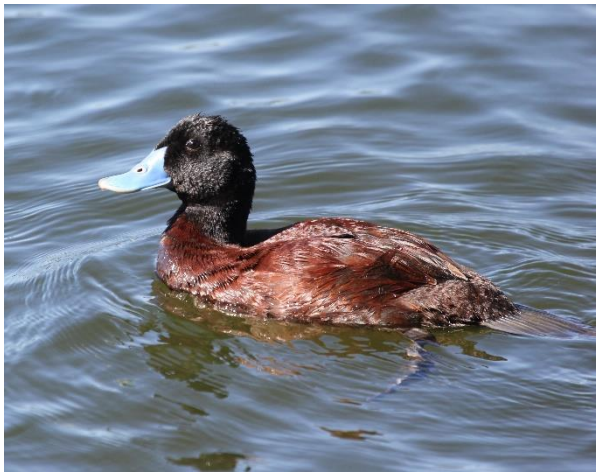

Image 8: Blue-billed Duck
(illustrative purposes only)

Distribution

There are two populations of the Blue-billed Duck, one in the south-east and the other in the south-west of Australia and appear to be isolated from each other (Marchant & Higgins 1990). In Victoria, the Blue-billed Duck is widely distributed with the majority of the records occurring as low numbers of birds (DuGuesclin 2003).

AUSTRALASIAN SHOVELER *Spatula rhynchotis*

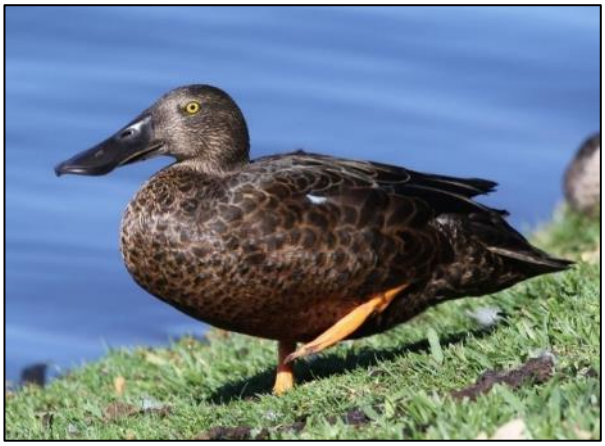

Image 9: Australasian Shoveler
(illustrative purposes only)

Status

The Australasian Shoveler is listed as vulnerable under the FFG (A) Act.

Habitat and Ecology

The Australasian Shoveler is a breeding endemic to Australia and New Zealand. While its favoured habitat is terrestrial wetlands, this species will occasionally use sheltered estuarine and inshore waters. It is a filter feeder which limits its foraging to aquatic habitats on open water or soft mud in fertile wetlands.

Distribution

The Australasian Shoveler occurs in south-western Australia, eastern Australia, Tasmania and New Zealand. In eastern Australia they extend in a line from Townsville in Queensland to Eyre Peninsula and South Australia (Pizzey and Knight 2007).

5. DISCUSSION

The study area is surrounded by a variety of habitats within a 5km buffer. Wetland habitats such as those found within the study area and along Wades Creek, along with wooded habitats including mixed plantings along the Princes Highway and plantations to the north and west and suburban areas, all provide a variety of habitats for both common and threatened avian species.

As a result of this variety of habitats, the VBA, EPBC and eBird database searches yielded a total of the 33 species that are listed as threatened either by the Commonwealth or in Victoria, or are protected by an international treaty. These 33 species have either been recorded within the 5km buffer of the study site or have the potential to occur based on mapped distributions or habitats. Using the "likelihood-of-occurrence" criteria in Table 1 and the on-site habitat assessment nine species; Eastern Great Egret, Hardhead, Musk Duck, Gang-gang Cockatoo, Latham's Snipe, White-bellied Sea-eagle, White-throated Needletail, Blue-billed Duck and Australasian Shoveler were all considered to have a moderate likelihood-of-occurrence within the study area. Of the remaining 24 species, one was considered to have a low likelihood and 23 species a negligible likelihood of occurring within the study area.

Of the 33 species identified as having a Moderate, or higher, likelihood of occurrence, three species;

- White-bellied Sea-eagle (1 record – 9 May 2021),
- Hardhead (1 Record – 18 November 2019), and
- Eastern Great Egret (7 records – 2018 - 2022)

have been observed on or around the larger wetland according to eBird records and Indigenous Design (2022). It is interesting to note that the larger Boyd's Creek wetland, adjacent to the Princes Highway, has its own 'birding hotspot' on eBird (Boyds Creek Rest Area, Princes Hwy, Traralgon, Latrobe, VIC, AU - eBird Hotspot). This 'hotspot' includes records of birds seen on the wetlands and in the adjacent open paddocks and plantings along the Princes Highway. A total of 52 species have been observed by various birders from the rest area since 2018. This shows the benefits of long-term monitoring of an area, as our site assessment in December 2022 yielded only a third of that number of species from the whole study area, and no threatened species.

Of the variety of habitats available within the study site, it is only the wetland habitats that are expected to reliably provide the resources available for threatened species to utilise due to their extent. Threatened non-wetland dependent species may utilise the other habitats but this is likely to be on an irregular basis due to the limited extent, possibly as they are passing through the area to other more suitable sites.

The two non-wetland species that is considered to have a moderate "likelihood-of-occurrence" are the Gang-gang Cockatoo and White-throated Needletail.

The Gang-gang Cockatoo was only added to the EPBC Act list in March 2022. Its closest record to the study area was from the Big 4 Traralgon Park Lane Holiday Park in December 2018 (eBird 2022) while the most recent record is from the Traralgon Golf Course in March 2021. Gang-gangs are known to be regular visitors to urban areas especially when Hawthorn *Crataegus monogyna* and Cotoneaster *Cotoneaster* spp. bushes and White Cedar trees *Melia azedarach* are in fruit.

As the White-throated Needletail is a migratory swift, generally being observed during December to March, it would only be using the 'air space' above the study area, up to 1.8km above ground, catching flying insects. These birds are often seen ahead of storm fronts, feeding on flying insects picked up by the air

currents. They seldom roost while in Australia, being primarily on the wing the whole time. As such, this species would have little to no dependence on the habitats within the study area. eBird records for this species include a record from 11 April 2022 from the nearby Lifestyles Caravan Park less than 1km away.

The other threatened wetland species can be divided into three groups; open water species (Musk Duck, Hardhead, Australasian Shoveler), shallow water species (Eastern Great Egret) and vegetated shoreline and open marshy species (Latham's Snipe).

The open water duck species are reliant of submerged aquatic vegetation and invertebrates for food resources. Given that both of these factors were not part of this assessment, it is not possible to determine if the required resources are available to enable the regular occurrence of these avifauna species within the two wetlands. It is expected that all of these species may be irregular visitors rather than residents. While that Hardhead has previously been recorded from the Boyd's Creek wetland in 2019 (eBird 2022), the other species; Musk Duck, Blue-billed Duck and Australasian Shoveler have all been previously recorded within 5km of the study site, at the Traralgon Railway Reserve Conservation Reserve. With a significant amount of water still across the wider landscape due to the heavy rainfall in spring 2022, the potential importance of the two permanent wetlands, in the study area, to these and other waterbird species may not be as apparent as in drier years.

The Eastern Great Egret is a species that prefer shallow waters, like areas close to a shoreline, creeks and pools. The Eastern Great Egret is a commonly observed waterbird across permanent and ephemeral wetlands across much of Victoria where suitable habitat exists and has previously been recorded from the study site. If water levels were to reduce further, more habitat may become available for this species to occupy.

Numerous records of White-bellied Sea-eagle over the past 10 years and even more so, the last five years, from within the five kilometre buffer and further afield in the Latrobe Valley (eBird 2022) indicate that wetlands across the area are visited by this species. While these wetlands do not provide significant habitat for the sea-eagle, they do none the less provide suitable habitat even if for only short periods of time.

The Latham's Snipe may potentially use the habitat identified as Drainage Lines and the muddy edges of the wetlands. This species is migratory from the northern hemisphere during spring-summer. The snipe is a wary, cryptic species that may go unnoticed unless disturbed. It feeds in muddy, often well-grassed areas where it blends into its environment, so a lack of records may not indicate its absence from the study area. Given that there was little muddy edge along the two wetlands and the drainage lines contained water during the December 2022 site assessment, it was not unexpected to find none of this species present. As the summer dries out and more edge becomes available, this species may visit the study area.

The common avifauna species observed during the assessment have the potential to breed where suitable habitat is available across the study site. Eastern Rosellas were observed leaving a nesting hollow in one of the three large eucalypts at the northern end of the larger Boyd's Creek wetland.

While the survey limitations are acknowledged, threatened species have previously been recorded, or have the potential to occur, within the study area, it is believed that the study area does not provide important habitat for any of the EPBC Act species, based on the definition of 'important habitat' under the Act, but still provides valuable habitat for state-listed and common fauna in the area. Important habitat for migratory species as defined by the EPBC Act is habitat; *that supports an ecologically significant proportion of the population of a species, that is of critical importance in the life-cycle stages, used by migratory species at the limit of their range or in an area where the species is declining* (DoE 2013).

Further surveys would assist in the determination of the actual "likelihood-of-occurrence" for the identified threatened species and others whose likelihood has been determined as 'Low' or 'Negligible', however these surveys would need to be undertaken at a more appropriate time in the planning process.

6. RECOMMENDATIONS

It is difficult to assess the suite of avifauna and the determination that this site does not provide important habitat for threatened species that may use the Boyd's Creek wetlands and surrounding habitats from a single site visit. With this in mind, it is recommended that a series of follow-up avifauna surveys be undertaken, at least once per season, to provide a more complete picture of the species that occur in the study site and what habitats they utilise. These follow-up surveys should occur at an appropriate time in the overall planning process given that the site has not yet been rezoned and would help determine the presence of threatened species and numbers of individuals of each species. Numbers of individuals of species like Latham's Snipe help to determine if sites contain important habitat for the species, in this case 18 snipe is the criteria for this determination. Given the extent of the wetland habitat and the significantly higher numbers of threatened species that are wetland-reliant, it is recommended that these follow-up surveys concentrate on the wetland species. Avifauna species in the other habitats should be noted also.

As the study area is only part of a larger proposed housing development, there would potentially be significant loss of aquatic habitat in the local area leading to a reduction of biodiversity on the edge of Traralgon, if the wetlands were to be reshaped and reduced in size to 60m across. We would highly recommend that the existing wetlands, drainage lines and other habitat features be left as they are and incorporated into the overall design of the development plan, with a buffer (30m) between the wetlands / drainage lines and any housing. This would provide the wetland species with continued habitat, while making the wetlands a feature of the new development and allowing for passive recreation with a walking / bike trail around the two wetlands. Any trails should be well set back from the wetland edge to limit the disturbance from walkers, cyclists and pet dogs. Significant revegetation of suitable wetland plant species and those suitable for higher areas within the buffer area would further enhance habitat and visual amenity.

It is also recommended that measures be taken to remove rubbish, pollutants and silt before it enters the wetlands. This would assist to maintain the quality of the wetlands and the visual amenity for the future residents.

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APPENDIX A: Avifauna recorded within a 5km buffer of the Study Area.

The following avifauna have been recorded on the Victorian Biodiversity Atlas (DELWP 2022b) within a 5km buffer of the study area. These records do not include records taken from other databases that do not already appear in the VBA.

LEGEND

* Introduced

EPBC Act – *Environment Protection and Biodiversity Conservation Act 1999*

- **CR** = Critically Endangered, **EN** = Endangered, **VU** = Vulnerable

FFG (A) Act – *Flora and Fauna Guarantee (Amendment) Act 2019*

- **cr** = critically endangered, **en** = endangered; **vu** = Vulnerable.

Origin	Common Name	Scientific Name	Conservation Status
	Australasian Darter	*Anhinga novaehollandiae*	
	Australasian Grebe	*Tachybaptus novaehollandiae*	
	Australasian Shoveler	*Spatula rhynchotis*	vu
	Australasian Swamphen	*Porphyrio melanotus*	
	Australian Hobby	*Falco longipennis*	
	Australian King-Parrot	*Alisterus scapularis*	
	Australian Magpie	*Gymnorhina tibicen*	
	Australian Owlet-nightjar	*Aegotheles cristatus*	
	Australian Pelican	*Pelecanus conspicillatus*	
	Australian Pipit	*Anthus australis*	
	Australian Raven	*Corvus coronoides*	
	Australian Shelduck	*Tadorna tadornoides*	
	Australian White Ibis	*Threskiornis molucca*	
	Australian Wood Duck	*Chenonetta jubata*	
	Azure Kingfisher	*Ceyx azureus*	
	Barn Owl	*Tyto alba*	
	Bassian Thrush	*Zoothera lunulata*	
	Beautiful Firetail	*Stagonopleura bella*	
	Black Swan	*Cygnus atratus*	
	Black-faced Cuckoo-shrike	*Coracina novaehollandiae*	
	Black-fronted Dotterel	*Elseyornis melanops*	
	Black-shouldered Kite	*Elanus axillaris*	
	Blue-billed Duck	*Oxyura australis*	vu
	Brown Falcon	*Falco berigora*	
	Brown Goshawk	*Accipiter fasciatus*	
	Brown Thornbill	*Acanthiza pusilla*	
	Brown-headed Honeyeater	*Melithreptus brevirostris*	
	Brush Bronzewing	*Phaps elegans*	
	Brush Cuckoo	*Cacomantis variolosus*	
	Buff-rumped Thornbill	*Acanthiza reguloides*	
	Chestnut Teal	*Anas castanea*	
*	Common Blackbird	*Turdus merula*	

Origin	Common Name	Scientific Name	Conservation Status
	Common Bronzewing	*Phaps chalcoptera*	
*	Common Myna	*Acridotheres tristis*	
*	Common Starling	*Sturnus vulgaris*	
	Crescent Honeyeater	*Phylidonyris pyrrhopterus*	
	Crested Pigeon	*Ocyphaps lophotes*	
	Crimson Rosella	*Platycercus elegans*	
*	Domestic Goose	*Anser anser*	
*	Domestic Pigeon	*Columba livia*	
	Dusky Moorhen	*Gallinula tenebrosa*	
	Dusky Woodswallow	*Artamus cyanopterus*	
	Eastern Cattle Egret	*Bubulcus coromandus*	
	Eastern Great Egret	*Ardea alba modesta*	vu
	Eastern Rosella	*Platycercus eximius*	
	Eastern Shrike-tit	*Falcunculus frontatus*	
	Eastern Spinebill	*Acanthorhynchus tenuirostris*	
	Eastern Whipbird	*Psophodes olivaceus*	
	Eastern Yellow Robin	*Eopsaltria australis*	
	Eurasian Coot	*Fulica atra*	
*	Eurasian Skylark	*Alauda arvensis*	
*	European Goldfinch	*Carduelis carduelis*	
*	European Greenfinch	*Chloris chloris*	
	Fan-tailed Cuckoo	*Cacomantis flabelliformis*	
	Flame Robin	*Petroica phoenicea*	
	Galah	*Eolophus roseicapilla*	
	Gang-gang Cockatoo	*Callocephalon fimbriatum*	EN
	Golden Whistler	*Pachycephala pectoralis*	
	Great Cormorant	*Phalacrocorax carbo*	
	Grey Butcherbird	*Cracticus torquatus*	
	Grey Currawong	*Strepera versicolor*	
	Grey Fantail	*Rhipidura albiscapa*	
	Grey Goshawk	*Accipiter novaehollandiae*	en
	Grey Shrike-thrush	*Colluricincla harmonica*	
	Grey Teal	*Anas gracilis*	
	Hardhead	*Aythya australis*	vu
	Hoary-headed Grebe	*Poliocephalus poliocephalus*	
	Hooded Robin	*Melanodryas cucullata*	vu
	Horsfield's Bronze-Cuckoo	*Chrysococcyx basalis*	
*	House Sparrow	*Passer domesticus*	
	Jacky Winter	*Microeca fascinans*	
	Latham's Snipe	*Gallinago hardwickii*	
	Laughing Kookaburra	*Dacelo novaeguineae*	
	Leaden Flycatcher	*Myiagra rubecula*	
	Lewin's Honeyeater	*Meliphaga lewinii*	
	Little Black Cormorant	*Phalacrocorax sulcirostris*	

Origin	Common Name	Scientific Name	Conservation Status
	Little Corella	*Cacatua sanguinea*	
	Little Eagle	*Hieraaetus morphnoides*	vu
	Little Grassbird	*Poodytes gramineus*	
	Little Lorikeet	*Parvipsitta pusilla*	
	Little Pied Cormorant	*Microcarbo melanoleucos*	
	Little Raven	*Corvus mellori*	
	Little Wattlebird	*Anthochaera chrysoptera*	
	Magpie-lark	*Grallina cyanoleuca*	
*	Mallard	*Anas platyrhynchos*	
	Masked Lapwing	*Vanellus miles*	
	Mistletoebird	*Dicaeum hirundinaceum*	
	Musk Duck	*Biziura lobata*	vu
	Musk Lorikeet	*Glossopsitta concinna*	
	Nankeen Kestrel	*Falco cenchroides*	
	Nankeen Night-Heron	*Nycticorax caledonicus*	
	New Holland Honeyeater	*Phylidonyris novaehollandiae*	
	Noisy Miner	*Manorina melanocephala*	
	Olive Whistler	*Pachycephala olivacea*	
	Olive-backed Oriole	*Oriolus sagittatus*	
	Pacific Black Duck	*Anas superciliosa*	
	Pallid Cuckoo	*Cacomantis pallidus*	
	Peregrine Falcon	*Falco peregrinus*	
	Pied Cormorant	*Phalacrocorax varius*	
	Pied Currawong	*Strepera graculina*	
	Pilotbird	*Pycnoptilus floccosus*	VU
	Pink-eared Duck	*Malacorhynchus membranaceus*	
	Rainbow Lorikeet	*Trichoglossus molucannus*	
	Red Wattlebird	*Anthochaera carunculata*	
	Red-browed Finch	*Neochmia temporalis*	
	Red-browed Treecreeper	*Climacteris erythrops*	
	Red-kneed Dotterel	*Erythrogonys cinctus*	
	Reed-Warbler	*Acrocephalus australis*	
	Regent Honeyeater	*Anthochaera phrygia*	CR / cr
	Rose Robin	*Petroica rosea*	
	Royal Spoonbill	*Platalea regia*	
	Rufous Fantail	*Rhipidura rufifrons*	
	Rufous Songlark	*Cincloramphus mathewsi*	
	Rufous Whistler	*Pachycephala rufiventris*	
	Sacred Kingfisher	*Todiramphus sanctus*	
	Satin Bowerbird	*Ptilonorhynchus violaceus*	
	Satin Flycatcher	*Myiagra cyanoleuca*	
	Scarlet Robin	*Petroica boodang*	
	Shining Bronze-Cuckoo	*Chrysococcyx lucidus*	
	Silver Gull	*Chroicocephalus novaehollandiae*	

Origin	Common Name	Scientific Name	Conservation Status
	Silvereye	*Zosterops lateralis*	
	Southern Boobook	*Ninox boobook*	
	Southern Emu-wren	*Stipiturus malachurus*	
*	Spotted Dove	*Spilopelia chinensis*	
	Spotted Pardalote	*Pardalotus punctatus*	
	Spotted Quail-thrush	*Cinclosoma punctatum*	
	Straw-necked Ibis	*Threskiornis spinicollis*	
	Striated Fieldwren	*Calamanthus fuliginosus*	
	Striated Pardalote	*Pardalotus striatus*	
	Striated Thornbill	*Acanthiza lineata*	
	Stubble Quail	*Coturnix pectoralis*	
	Sulphur-crested Cockatoo	*Cacatua galerita*	
	Superb Fairy-wren	*Malurus cyaneus*	
	Superb Lyrebird	*Menura novaehollandiae*	
	Swamp Harrier	*Circus approximans*	
	Tawny Frogmouth	*Podargus strigoides*	
	Tree Martin	*Petrochelidon nigricans*	
	Varied Sittella	*Daphoenositta chrysoptera*	
	Wedge-tailed Eagle	*Aquila audax*	
	Welcome Swallow	*Hirundo neoxena*	
	Whistling Kite	*Haliastur sphenurus*	
	White-backed Swallow	*Cheramoeca leucosterna*	
	White-bellied Cuckoo-shrike	*Coracina papuensis*	
	White-bellied Sea-Eagle	*Haliaeetus leucogaster*	en
	White-browed Scrubwren	*Sericornis frontalis*	
	White-eared Honeyeater	*Nesoptilotis leucotis*	
	White-faced Heron	*Egretta novaehollandiae*	
	White-naped Honeyeater	*Melithreptus lunatus*	
	White-plumed Honeyeater	*Ptilotula penicillata*	
	White-throated Needletail	*Hirundapus caudacutus*	VU / vu
	White-throated Nightjar	*Eurostopodus mystacalis*	
	White-throated Treecreeper	*Cormobates leucophaea*	
	White-winged Chough	*Corcorax melanorhamphos*	
	Willie Wagtail	*Rhipidura leucophrys*	
	Yellow Thornbill	*Acanthiza nana*	
	Yellow-billed Spoonbill	*Platalea flavipes*	
	Yellow-faced Honeyeater	*Caligavis chrysops*	
	Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*	
	Yellow-tailed Black-Cockatoo	*Calyptorhynchus funereus*	
	Yellow-tufted Honeyeater	*Lichenostomus melanops*	

APPENDIX B: Avifauna species likelihood-of-occurrence within the Study Area.

The table below identifies all threatened and other species listed under both the EPBC Act 1999 and FFG (A) Act 2019 that were identified as occurring within a 5km buffer of the Study Area. The Likelihood of Occurrence has been determined using the criteria set out in Table 1.

Scientific Name	Common Name	Conservation Status		Treaty	PMST	Count of Sightings	Last Record	Habitat Description	Likelihood of occurrence	Assessment Criteria
		EPBC	FFG (A)							
Accipiter novaehollandiae	Grey Goshawk		vulnerable			1	22/06/2004	Tall, damp or wet forests in eastern and south-eastern Australia and riverine forest in northern Australia (Debus 2019). Prefers mature forest with overhead canopy and open understorey that suits hunting, often in the vicinity of watercourses (Morcombe 2014).	NEGLIGIBLE	L1, L2, N5
Actitis hypoleucos	Common Sandpiper	Migratory Marine	vulnerable	CAMBA JAMBA ROKAMBA Bonn A2H	Species or species habitat likely to occur within area			Found in coastal or inland wetlands both saline and fresh water and is found mainly on my edges or rocky shores. It requires estuaries and deltas of streams as well as banks farther upstream around lakes, pools, billabongs, reservoirs, dams and claypans and occasionally piers and jetties (DCCEEW 2023a).	NEGLIGIBLE	L3, N1
Anthochaera phrygia	Regent Honeyeater	Critically Endangered	critically endangered		Foraging, feeding or related behaviour likely to occur	2	01/01/1970	Typically, in dry woodlands, often in association with box-ironbark forest (Garnett and Crowley 2000). This species has a scattered distribution, now mostly restricted to the western slopes of the Great Dividing Range (Higgins *et al.* 2001).	NEGLIGIBLE	N2, N5
Apus pacificus	Pacific (Fork-tailed) Swift	Migratory Marine		CAMBA JAMBA ROKAMBA	Species or species habitat likely to occur within area			Non-breeding summer migrant, arriving in Australia from early October and departing in mid-April (Pizzey and Knight 2007). Almost exclusively aerial but have been occasionally observed on land (Higgins 1999).	NEGLIGIBLE	L1, N1
Ardea alba modesta	(Eastern) Great Egret	Marine	vulnerable		Species or species habitat known to occur within area	42 [e]	23/03/2021 [e]	Prefers shallow water, particularly when flowing but may inhabit any watered area, including damp grassland. It has a wide habitat range including swamps and marshes; margins of rivers and lakes; damp or flooded grasslands, pastures or agricultural lands; reservoirs; sewage treatment ponds; drainage channels; salt and estuarine environments. Nest in colonies, primarily located in wooded and shrubby swamps (DCCEEW 2022c).	MODERATE	H2, M1
Aythya australis	Hardhead		vulnerable			80+ [e]	30/09/2022 [e]	They favour freshwater swamps and wetlands and occasionally occur in sheltered estuaries. They rarely venture onto land, preferring to roost on low stumps near the water. Hardheads prefer deep, fresh open water and breed in wetlands and waterways with dense fringing vegetation (Birdlife Australia 2019).	MODERATE	H1, M1
Biziura lobata	Musk Duck		vulnerable			8 [e]	02/11/2020 [e]	Almost entirely aquatic, inhabiting deep waters in large permanent swamps, lakes and estuaries, and usually nests among tall emergent vegetation (Marchant and Higgins 1990).	MODERATE	H2, M3
Botaurus poiciloptilus	Australasian Bittern	Endangered	critically endangered		Species or species habitat known to occur within area			Occurs mainly in freshwater wetlands and rarely in estuaries or tidal wetlands. It favours wetlands with tall dense vegetation, where it forages in still, shallow water up to 0.3m deep, often at the edges of pools or waterways, or from platforms or mats of vegetation over deep water. It favours permanent and seasonal freshwater habitats, particularly those with abundant sedges, rushes and reeds. The species nests next to relatively deep, densely vegetated freshwater swamps and pools, building within a clump of reeds in water or a swamp on a reed platform (DCCEEW 2023b).	NEGLIGIBLE	L3, N1
Bubulcus coromandus	Cattle Egret	Marine			Species or species habitat may occur within area			Predominantly occur within shallow open wetlands including meadows, moist pastures and swamps (Marchant & Higgins 1990). They frequently forage away from water in pasture areas, including paddocks with livestock and roost in trees, or amongst ground vegetation in or near wetlands (DCCEEW 2023c). The species breeds in colonies, often in association with other waterbird species, where they build shallow platform nests in trees and bushes within wetland areas.	NEGLIGIBLE	L2, N3

Scientific Name	Common Name	Conservation Status		Treaty	PMST	Count of Sightings	Last Record	Habitat Description	Likelihood of occurrence	Assessment Criteria
		EPBC	FFG (A)							
Calidris acuminata	Sharp-tailed Sandpiper	Migratory Marine		CAMBA JAMBA ROKAMBA Bonn A2H	Species or species habitat may occur within area			A small wader that spends the non-breeding season in Australia and many inland records are of birds on passage. Most of the population migrates to Australia, mostly to the south-east and are widespread in both inland and coastal locations and in both freshwater and saline. It is described as preferring muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation; They use flooded paddocks, sedge lands and other ephemeral wetlands, but leave when they dry (DCCEEW 2023d).	NEGLIGIBLE	L3, N1
Calidris ferruginea	Curlew Sandpiper	Critically Endangered Migratory Marine	endangered	CAMBA JAMBA ROKAMBA Bonn A2H	Species or species habitat may occur within area			Most common on tidal flats, also foraging in shallow water on muddy shores, in brackish and freshwater wetlands (Menkhorst *et al.* 2017).	NEGLIGIBLE	L3, N1
Calidris melanotos	Pectoral Sandpiper	Migratory Marine		JAMBA ROKAMBA Bonn A2H	Species or species habitat may occur within area			Uncommon but regular visitor, forming small groups in shallow water or at the grassy edges of freshwater wetlands, or occasionally in brackish wetlands with fringing saltmarsh (Menkhorst *et al.* 2017).	NEGLIGIBLE	M3, N1
Calyptorhynchus lathami lathami	Glossy Black Cockatoo (S-e)	Vulnerable	critically endangered		Species or species habitat may occur within area			Highly specialised and dependent on *Allocasuarina*. Prefer woodland dominated by *Allocasuarina*, or open sclerophyll forests or woodlands with middle layer of *Allocasuarina* below *Eucalyptus.* Often confined to remnant patches in hill and gullies, surrounded by cleared agricultural land (Higgins 1999).	NEGLIGIBLE	N1, N5
Callocephalon fimbriatum	Gang-gang Cockatoo	Endangered			Species or species habitat may occur within area	29 [e]	25/09/2022	Primarily occur within the temperate eucalypt forests and woodlands of mainland south-east Australia (Menkhorst *et al* 2017). The species is known to migrate seasonally preferring the wet sclerophyll forests during the summer months and inhabits woodland assemblages at lower, drier altitudes during the winter months (Higgins 1999).	MODERATE	H2, L1
Falco hypoleucos	Grey Falcon	Vulnerable	vulnerable		Species or species habitat may occur within area			Characteristic of shrubland, grassland and wooded watercourses of the arid zone, but visits northern coasts and occasionally appears in open areas in humid southern regions (Debus 2019). It is now considered to be an extremely rare vagrant to Victoria (Garnett, *et al* 2011).	NEGLIGIBLE	N1, N4
Gallinago hardwickii	Latham's Snipe	Migratory Marine		JAMBA ROKAMBA Bonn A2H	Species or species habitat may occur within area	21 [e]	11/02/2021 [e]	Inhabits a wide variety of permanent and ephemeral wetlands including flooded pastures, swamps, billabongs, lagoons, lakes, creek or river margins, river pools and floodplains. They usually occur in open wetlands that have some form of shelter (usually low and dense vegetation) nearby. Vegetation surrounding the wetland can be varied and may include tussock grasslands with rushes, reeds and sedges, coastal and alpine heathlands, lignum or tea-tree scrub, button-grass plains, alpine herbfields or open forest (DCCEEW 2022d).	MODERATE	H2, M3
Grantiella picta	Painted Honeyeater	Vulnerable	vulnerable		Species or species habitat may occur within area			This species has a preference for open forest, box-ironbark woodlands and other vegetation communities that support its primary food source – fruiting mistletoes. In Victoria, it is found in dry forests and woodlands across most of the state except east and central Gippsland (Menkhorst *et al.* 2017).	NEGLIGIBLE	L3, N1
Haliaeetus leucogaster	White-bellied Sea-Eagle	Marine	endangered		Species or species habitat may occur within area	16 [e]	11/07/2022 [e]	Usually seen high in a tree or soaring over waterways and adjacent land. The nests can be located in trees up to 30cm above the ground but may also be placed on the ground or on rocks. It prefers coastal habitats (especially those close to the sea-shore) and around terrestrial wetlands which are characterised by the presence of large areas of open water (larger rivers, swamps, lakes, the sea) (DCCEEW 2022e)	MODERATE	H2, L1
Hieraaetus morphnoides	Little Eagle		vulnerable			4	03/12/2004	Inhabits most wooded habitats, although it usually avoids dense forest (Debus 2019). It favours hilly country utilising the updrafts generated off the slopes. Most abundant where open country intermixes with wooded or forested hills as in farmland, irrigated lands (Morcombe, 2014)	LOW	M2, L1

Scientific Name	Common Name	Conservation Status		Treaty	PMST	Count of Sightings	Last Record	Habitat Description	Likelihood of occurrence	Assessment Criteria
		EPBC	FFG (A)							
Hirundapus caudacutus	White-throated Needletail	Vulnerable Migratory Marine	vulnerable	CAMBA JAMBA ROKAMBA	Species or species habitat known to occur within area	7 [e]	11/04/2022 [e]	Not often encountered on land, being airborne for much of the day and may roost aerially at night, although individuals have been reported to roost in trees (Higgins 1999).	MODERATE	H2, L1
Lathamus discolor	Swift Parrot	Critically Endangered Marine	endangered		Species or species habitat likely to occur within area			Migrates from its breeding grounds in Tasmania to over winter and forage mainly on box-ironbark vegetation along the Great Dividing Range (Higgins 1999). Also feeds on flowering Wattles and eucalypts planted along roadsides and in suburban parks and gardens (Pizzey and Knight 2007).	NEGLIGIBLE	N1, N3
Melanodryas cucullata	Hooded Robin		vulnerable			1	01/01/1973	Occupies drier and arid regions in open woodlands of eucalypts, casuarinas, (native) pine, mallee and mulga (Morcombe 2014). In parts of their distribution, they are also found in semi cleared farmland areas. In Victoria their distribution ranges across the entire state except for the Otways region. They are predominantly found in the drier forest of central Victoria, with records from Gippsland, the south-west and north-west of the state (Birdlife Australia 2014f)	NEGLIGIBLE	N2, N5
Monarcha melanopsis	Black-faced Monarch	Migratory Marine		Bonn A2H	Species or species habitat known to occur within area			Rainforest, monsoon forests, vine thickets, wet eucalypt forests and adjacent woodlands (Higgins *et al.* 2006). Largely restricted to East Gippsland and may occasionally migrate as far west as the Dandenong and Kinglake Ranges (Pizzey and Knight 2007).	NEGLIGIBLE	N1, N5
Motacilla (flava) tschutchensis	Yellow Wagtail	Migratory Marine		CAMBA JAMBA ROKAMBA	Species or species habitat may occur within area			Regular summer (Nov – April) migrant to mostly coastal Australia, especially Darwin to Broome. Found in short grass and bare ground; swamp margins, sewage ponds, saltmarshes, playing fields, airfield, ploughed land, town lawns (Pizzey and Knight 2007). Individuals occasionally reach southern Victoria (e.g. the Western Treatment Plant).	NEGLIGIBLE	N1, N3
Myiagra cyanoleuca	Satin Flycatcher	Migratory Marine		Bonn A2H	Breeding known to occur within area			Heavily vegetated gullies in forests, taller woodlands, usually above shrub-layer; during migration, coastal forests, woodlands, mangroves, trees in open country, gardens (Pizzey and Knight 2007)). Occupies a wider variety of wooded habitats outside of breeding, including suburban areas with scattered eucalypts (Higgins *et al.* 2006).	NEGLIGIBLE	N1, N5
Neophema chrysotoma	Blue-winged Parrot	Marine			Species or species habitat may occur within area			Occupies coastal, sub coastland and inland habitats, ranging into semi-arid zones. Throughout much of its range, it inhabits grasslands and grassy woodlands and forest. It is often near wetlands, both near the coast and in semi-arid zones (Higgins 1999).	NEGLIGIBLE	N1, N3
Numenius madagascariensis	Eastern Curlew	Critically Endangered Migratory Marine	vulnerable	CAMBA JAMBA ROKAMBA Bonn A1	Species or species habitat may occur within area			Most common on extensive tidal flats, also on beaches and saltmarshes (Menkhorst *et al.* 2017) along with estuaries, mangroves, occasionally in fresh or brackish lakes and bare grasslands near water (Pizzey and Knight 2007). Common summer migrant (Aug-May) to coasts of NE and SE Australia.	NEGLIGIBLE	N1, N5
Oxyura australis	Blue-billed Duck		vulnerable			53 [e]	25/09/2022 [e]	Deep, permanent, open water bodies supporting dense vegetation around the margins. Generally nests solitarily in emergent vegetation including bulrushes Typha spp. over water or on small islands (Marchant and Higgins 1990).	MODERATE	H2, M3
Pandion (haliaetus) cristatus	(Eastern) Osprey	Migratory Marine		Bonn A2S	Species or species habitat likely to occur within area			Along the coast, inland waters and tidal reaches of larger waterways (Menkhorst *et al.* 2017), nesting on prominent headlands, in tall trees or on other vertical structures (Pizzey and Knight 2007).	NEGLIGIBLE	N1, N3
Pycnoptilus floccosus	Pilotbird	Vulnerable			Species or species habitat may occur within area	1	01/04/1975	Prefers wet eucalypt and temperate rainforest, alpine and coastal woodland in dense undergrowth with abundant debris (Morcombe 2014).	NEGLIGIBLE	N2, N5
Rhipidura rufifrons	Rufous Fantail	Migratory Marine			Species or species habitat known to occur within area	3 [e]	07/01/1993 [e]	Moist or wet sclerophyll forests supporting shrubby understorey, and occasionally dry sclerophyll forests and woodlands. Also sometimes observed in parks, gardens and homesteads, but usually when migrating (Higgins *et al.* 2006).	NEGLIGIBLE	L2, N3

Scientific Name	Common Name	Conservation Status		Treaty	PMST	Count of Sightings	Last Record	Habitat Description	Likelihood of occurrence	Assessment Criteria
		EPBC	FFG (A)							
Rostratula australis	Australian Painted Snipe	Endangered Marine	critically endangered		Species or species habitat likely to occur within area			Shallow freshwater wetlands including permanent and ephemeral lakes, swamps, waterlogged grasslands, dams, drains and flooded crops (Marchant and Higgins 1993), feeding on seeds and invertebrates at the water's edge (Garnet *et al* 2010).	NEGLIGIBLE	N1, N3
Spatula rhynchotis	Australasian Shoveler		vulnerable			7 [e]	25/07/2022 [e]	Prefers large, deep water bodies such as lakes and permanent swamps supporting abundant aquatic flora, although often feeds away from cover in deep or shallow open water and may occasionally be found in irrigated fields and farm dams. Breeds on the ground in open paddocks or on embankments within a few hundred metres of water, often among grassy or herbaceous cover, although occasionally in more sparsely vegetated areas (Marchant & Higgins 1990).	MODERATE	H2, M1

([e]) Count of sightings includes records from eBird Australia, and may also be the latest record

APPENDIX C: Avifauna, and other fauna, recorded from the Study Area

Avifauna, and other fauna, observed at Boyd's Creek Wetlands, Traralgon, during the on-site assessment December 2022 and from eBird records of this site. Incidental fauna observations are also included.

LEGEND

* - Introduced species # - Domestic species

Origin	Common Name	Scientific Name	Habitat Zone	Observation Record
BIRDS				
	Australasian Darter	*Anhinga novaehollandiae*	Wetlands	
	Australasian Grebe	*Tachybaptus novaehollandiae*	Wetlands	Survey
	Australasian Swamphen	*Porphyrio melanotus*	Open Areas, Wetlands	Survey
	Australian Magpie	*Gymnorhina tibicen*	Open Areas, Scattered Trees	Survey
	Australian Pelican	*Pelecanus conspicillatus*	Wetlands	
	Australian Pipit	*Anthus australis*	Open Areas	Survey
	Australian Raven	*Corvus coronoides*	Open Areas, Scattered Trees	
	Australian Shelduck	*Tadorna tadornoides*	Open Areas, Wetlands	
	Australian White Ibis	*Threskiornis molucca*	Open Areas, Wetlands	
	Australian Wood Duck	*Chenonetta jubata*	Open Areas, Wetlands	
	Black Swan	*Cygnus atratus*	Wetlands	Survey
	Black-fronted Dotterel	*Elseyornis melanops*	Wetlands	
	Brown Thornbill	*Acanthiza pusilla*	Scattered Trees	
	Chestnut Teal	*Anas castanea*	Wetlands	Survey
	Common Myna	*Acridotheres tristis*	Open Areas, Scattered Trees	Survey
*	Common Starling	*Sturnus vulgaris*	Open Areas, Scattered Trees	Survey
	Eastern Great Egret	*Ardea alba modesta*	Wetlands	
	Eastern Rosella	*Platycercus eximius*	Open Areas, Scattered Trees	Survey
	Eurasian Coot	*Fulica atra*	Wetlands	
*	Eurasian Skylark	*Alauda arvensis*	Open Areas	Survey
*	European Goldfinch	*Carduelis carduelis*	Scattered Trees	
	Great Cormorant	*Phalacrocorax carbo*	Wetlands	
	Grey Fantail	*Rhipidura albiscapa*	Scattered Trees	
	Grey Teal	*Anas gracilis*	Wetlands	
#	Greylag Goose	*Anser anser*	Wetlands	
	Hardhead	*Aythya australis*	Wetlands	
	Hoary-headed Grebe	*Poliocephalus poliocephalus*	Wetlands	
	Little Black Cormorant	*Phalacrocorax sulcirostris*	Wetlands	
	Little Pied Cormorant	*Microcarbo melanoleucos*	Wetlands	Survey
	Little Raven	*Corvus mellori*	Open Areas, Scattered Trees	Survey
	Little Corella	*Cacatua sanguinea*	Open Areas, Scattered Trees	
	Magpie-lark	*Grallina cyanoleuca*	Scattered Trees	
	Masked Lapwing	*Vanellus miles*	Open Areas, Wetlands	Survey

Origin	Common Name	Scientific Name	Habitat Zone	Observation Record
	Musk Lorikeet	*Glossopsitta concinna*	Scattered Trees	
	Pacific Black Duck	*Anas superciliosa*	Open Areas, Wetlands	Survey
	Peregrine Falcon	*Falco peregrinus*	All	
	Rainbow Lorikeet	*Trichoglossus molucannus*	Scattered Trees	Survey
	Royal Spoonbill	*Platalea regia*	Wetlands	
	Straw-necked Ibis	*Threskiornis spinicollis*	Open Areas, Wetlands	
	Striated Pardalote	*Pardalotus striatus*	Scattered Trees	
	Superb Fairy-wren	*Malurus cyaneus*	Open Areas, Scattered Trees	
	Sulphur-crested Cockatoo	*Cacatua galerita*	Open Areas, Scattered Trees	
	Swamp Harrier	*Circus approximans*	Wetlands	
	Wedge-tailed Eagle	*Aquila audax*	All	
	Welcome Swallow	*Hirundo neoxena*	All	Survey
	Whistling Kite	*Haliastur sphenurus*	Open Areas, Scattered Trees	
	White-bellied Sea-Eagle	*Haliaeetus leucogaster*	Wetlands	
	White-eared Honeyeater	*Nesoptilotis leucotis*	Scattered Trees	
	White-faced Heron	*Egretta novaehollandiae*	Wetlands	Survey
	White-necked Heron	*Ardea pacifica*	Wetlands	
	Willie Wagtail	*Rhipidura leucophrys*	Open Areas, Scattered Trees	
	Yellow-billed Spoonbill	*Platalea flavipes*	Wetlands	
	Yellow-faced Honeyeater	*Caligavis chrysops*	Scattered Trees	
FROGS				
	Common Eastern Froglet	*Crinia insignifera*	Wetlands	Survey

APPENDIX D: Photo Log

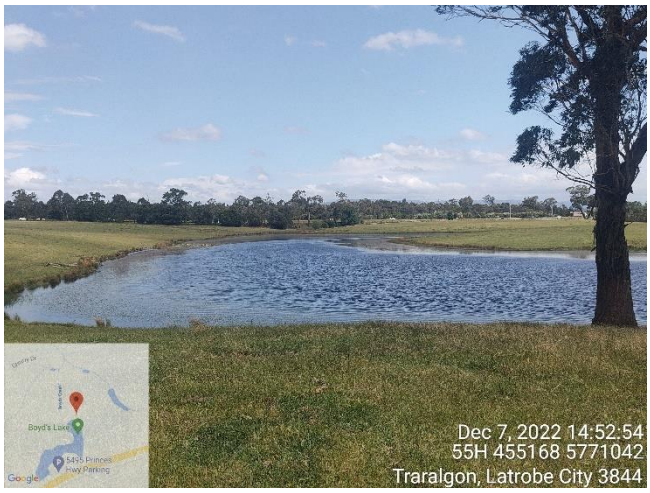

Image 10: The larger, Boyd's Creek wetland in the western part of the study area

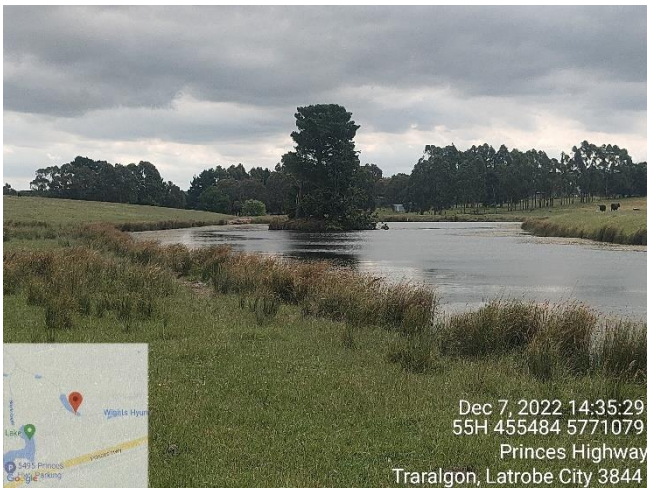

Image 11: The smaller wetland in the eastern part of the study area, showing island in the middle.

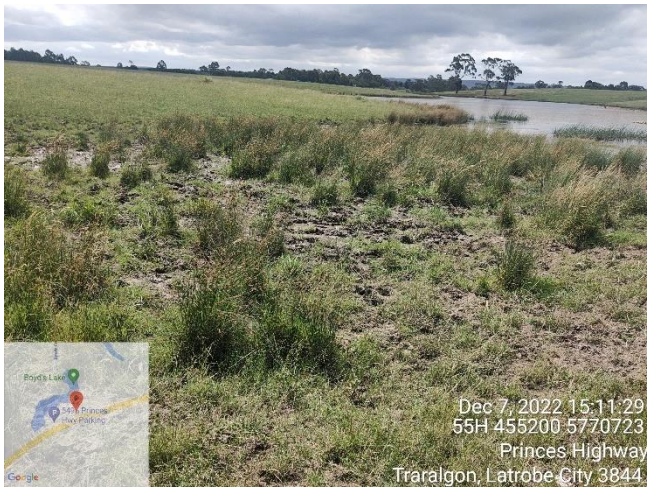

Image 12: Muddy edge on the southern shoreline of Boyd's Creek wetland

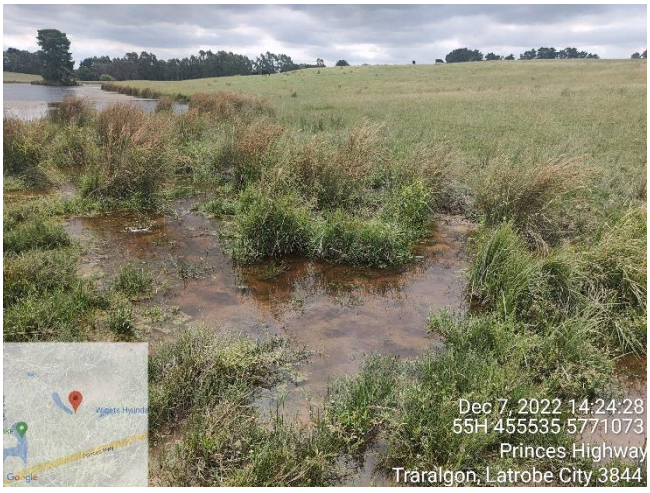

Image 13: South-eastern edge of the smaller wetland, inundated with water at the time of the site assessment.

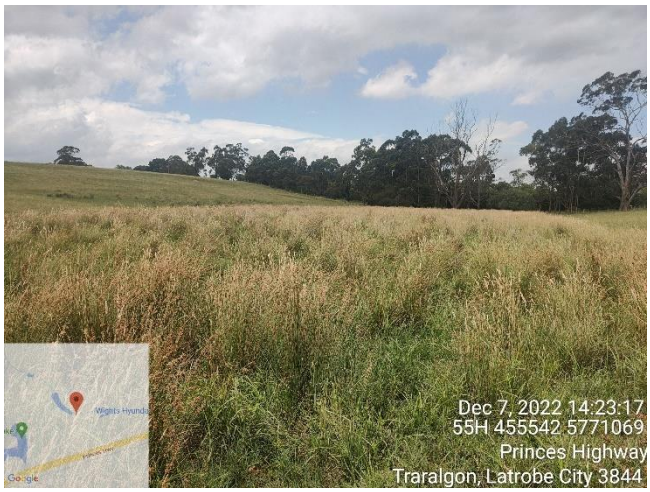

Image 14: The largest area of drainage line, in the eastern part of the study area..

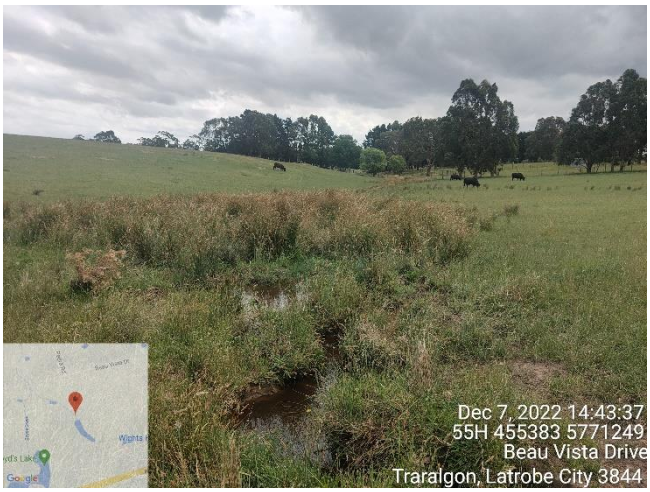

Image 15: Drainage line from smaller wetland, heading north towards Wades Creek.

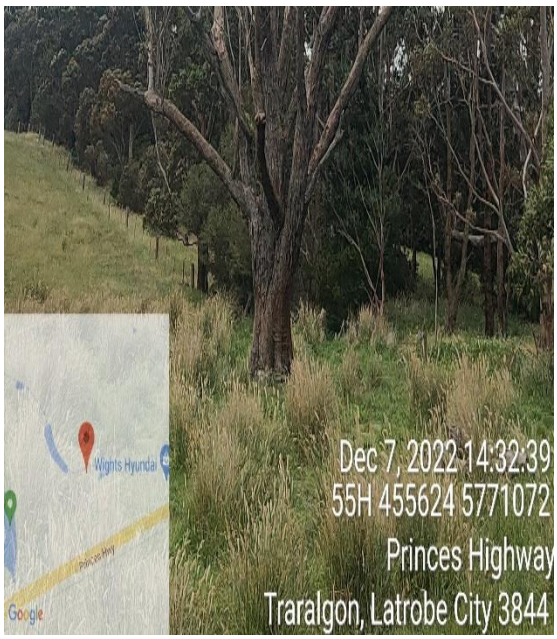

Image 16: Large dead tree, in the middle of the drainage line at the eastern part of the study area.

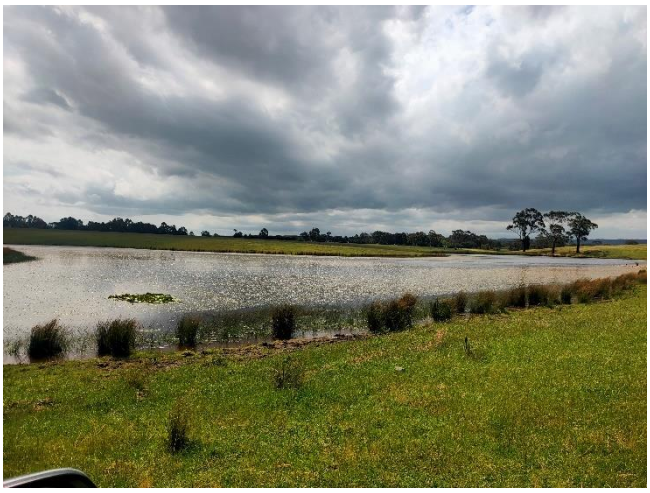

Image 17: Three large eucalypts (in the background) on the northern edge of the larger Boyd's Creek wetland.

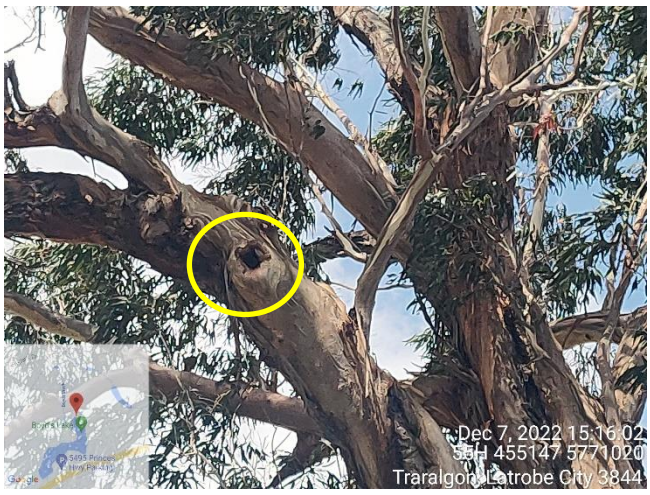

Image 18: Hollow in large eucalypt, where Eastern Rosellas were seen exiting

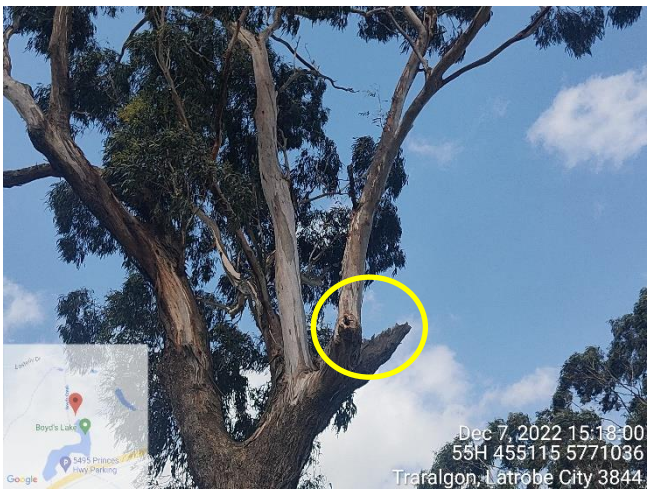

Image 19: Hollows and spouts in another large eucalypt, at the northern edge of the Boyd's Creek wetland..