Traralgon North
Targeted Dwarf Galaxias, Flinders Pygmy Perch and Growling Grass Frog Survey

Draft report Prepared for Millar Merrigan

March 2024

AQUATIC ECOSYSTEM & ENVIRONMENTAL MANAGEMENT CONSULTING

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Citation: Aquatica Environmental (2024). Traralgon North, Targeted Dwarf Galaxias, Flinders Pygmy Perch and Growling Grass Frog Survey. Draft report prepared for Millar Merrigan, 14th March 2024.

Version	Author	Reviewer/s	Issued To	Date Issued
Draft V1	[redacted]	[redacted] (Aquatica) & [redacted] (ID Ecological Management)	Millar Merrigan C/o ID Ecological Management	6th March 202
Final	[redacted]	[redacted] (Millar Merrigan)	Millar Merrigan C/o ID Ecological Management	14th March 2024

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1. INTRODUCTION

1.1 Introduction

Aquatica Environmental and ID Ecological Management were engaged by Millar Merrigan (MM) to undertake a targeted aquatic fauna species survey for a proposed land development located on Traralgon – Maffra Road, to the immediate north of Traralgon, Victoria (the site; Figure 1).

The target species for this assessment included:

- Growling grass frog (*Litoria raniformis*) – EPBC Act 'Vulnerable' and FFG Act 'Endangered'.
- Dwarf galaxias (*Galaxiella pusilla*) – Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) 'Endangered' and Flora and Fauna Guarantee Act 1988 (FFG Act) 'Endangered'; and
- Flinders pygmy perch (*Nannoperca* sp.1) – FFG Act 'Vulnerable'.

1.2 Project Background

The site encompasses a number of properties including 2-55 Glendale Road, 50 Glendale Road, 60 Marshalls Road, 110 Marshalls Road and Parcel C\PS821062. MM has successfully had the land rezoned from farming zone to residential and a Development Plan Overlay (DPO) has been applied. MM is now in the process of preparing a Development Plan for approval, which is based upon an already developed concept layout or plan (Figure 2).

The concept plan was prepared for the rezoning application and extensive third party reporting was prepared based on this plan. Some of the reporting included a Flora Survey and Fauna Assessment (Ironbark 2021a/b). Specific to aquatic ecology, Ironbark 2021b recommended:

> "*Undertake a targeted GGF survey of water bodies on the subject site*".

Further the DPO has been prepared requiring the following regarding "*flora and fauna*":

> *"A flora and fauna survey, prepared by a suitably qualified consultant and with the approval of the Department Environment, Energy and Climate Action and other relevant agencies and authorities, which includes but is not limited to species surveys for:*
>
> *– Growling Grass Frog and avifauna;*
>
> *– Eastern Grey Egret;*
>
> *– Blue - Billed Duck;*
>
> *– Dwarf Galaxias;*
>
> *– Australian Grayling;*
>
> *– White - Bellied Sea Eagle;*
>
> *– Southern Brown Bandicoot;*
>
> *– Glossy Grass Skink;*
>
> *– Strzelecki Gums;*
>
> *– Matted Flax Lily;*
>
> *– Grey Billy Buttons; and*
>
> *– Forest Red Gum Grassy Woodland Community*
>
> *and measures required to protect the identified species.*
>
> *An assessment of any native vegetation to be removed having regard to the background document Protecting Victoria's Environment - Biodiversity 2037, including how it is proposed to protect and manage any appropriate native vegetation.*
>
> *Identification of any existing native vegetation and how is responds to the Guidelines for the Removal, Destruction or Lopping of Native Vegetation, 2017.*

Regard must be had to the background document West Gippsland Native Vegetation Plan 2003.

Any management plan should take into account that the Strzelecki Bioregion is one of Victoria's most fragmented Bioregions and address this as a consideration".

Based on Aquatica Environmental's and ID Ecological Managements extensive experience in the region Australian grayling (*Prototroctes maraena*) were eliminated as a target species for the survey as there is no suitable habitat on the site.

Accordingly, the remaining aquatic ecology specific requirement was the survey of dwarf galaxias and growling grass frog. Flinders pygmy perch was also included in the scope given their likelihood of potential occurrence and ability to be surveyed at the same time as the other target species.

1.3 Purpose

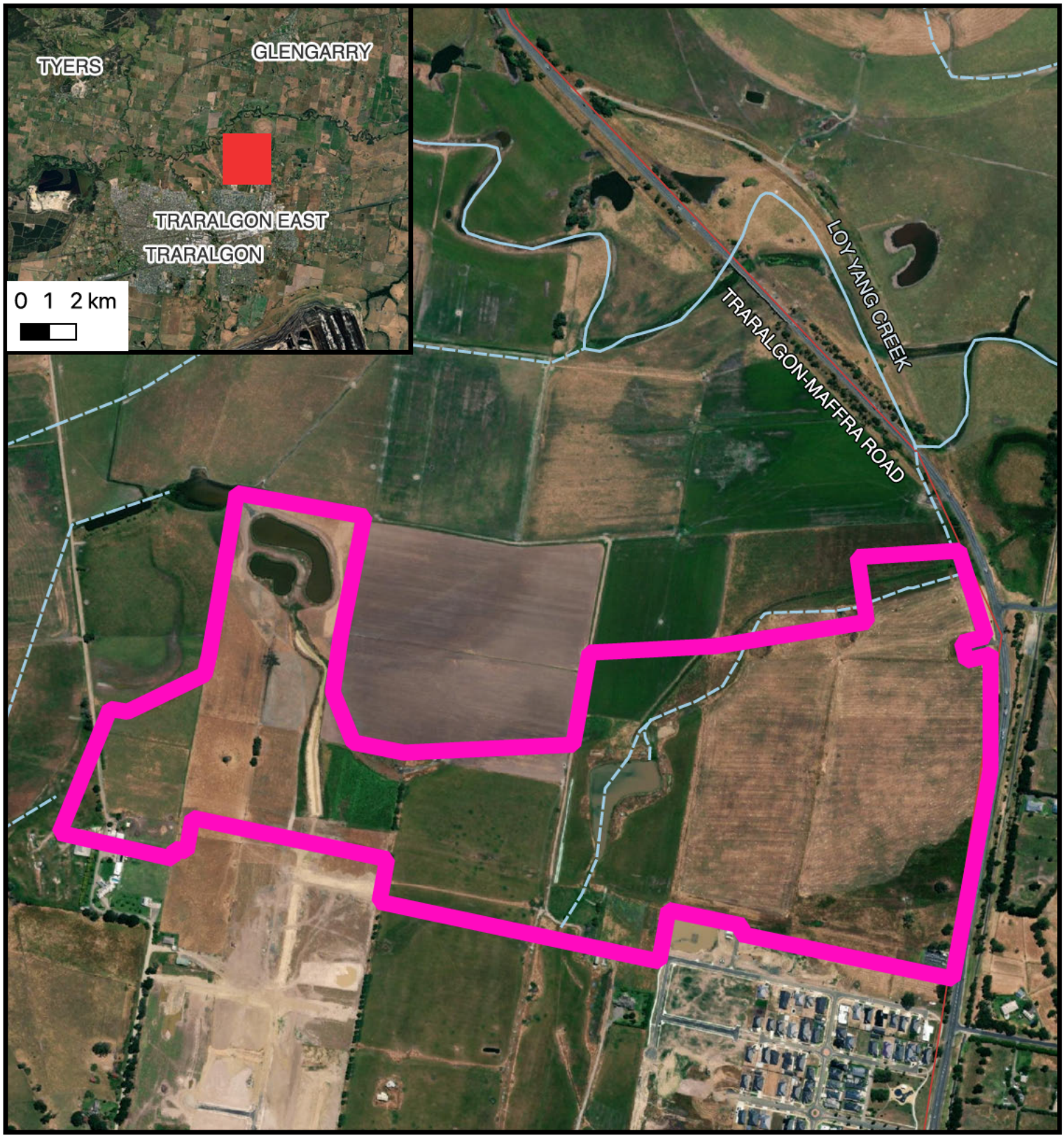
The purpose of this assessment was to undertake a survey for the target species to determine their presence/absence in the site, and if found to be present (or likely present) provide advice on the potential project impacts, mitigation measures and approvals.

1.4 Assumptions and Limitations

Aquatica Environmental believes that the survey effort conducted was sufficient to determine the likelihood that the target species were present/absent in the site during the survey period. However, it must be noted that the survey was only undertaken in the short reaches or areas of waterways within public areas predominantly along the roadsides.

The majority of the waterways and water bodies identified and surveyed extended into private land and it is likely more extensive aquatic habitats lied outside where the survey was able to be undertaken that could constitute potential residential habitat for the target species.

The absence of detection of a species during the assessment does not mean absence of the species in the site. Where possible we have assessed the 'likelihood of occurrence' assessment for the species was undertaken.



0 0.5 1 km

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Traralgon-Maffra Road Site and Study Area

Project: Traralgon-Maffra Road, Traralgon Rezoning

Project No.: 000464
Figure 1
Created 17/02/2024

Legend

- Study Area
- Rivers
- Creeks
- Other waterways
- Main roads

Spatial Reference
Name: GDA2020 MGA Zone 55
PCS: GDA2020 MGA Zone 55
GCS: GDA2020
Datum: GDA2020
Projection: Transverse Mercator

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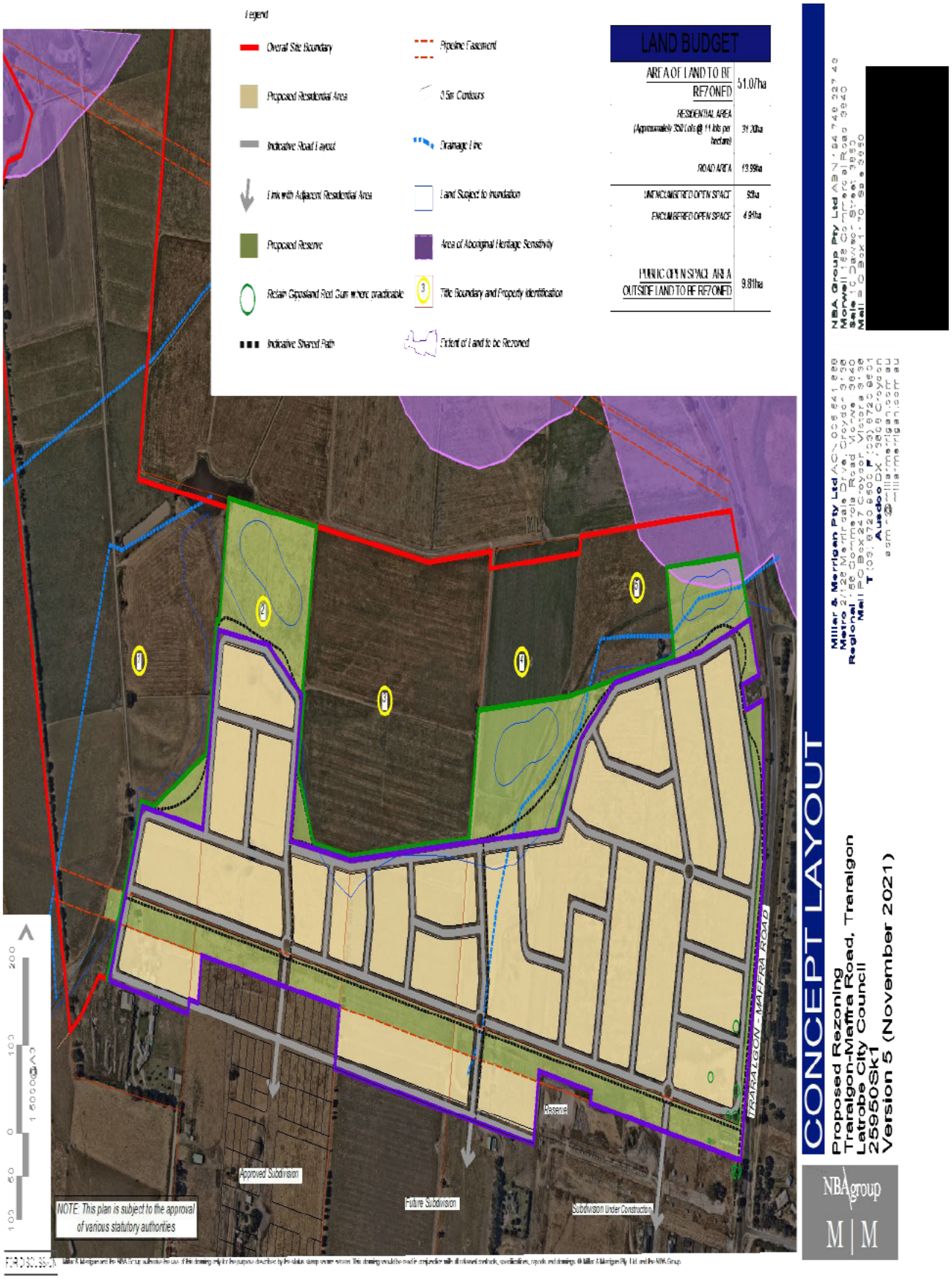


Figure 2 Concept plan

2. METHODOLOGY

2.1 Desktop review

A brief desktop review of relevant databases, literature available information was undertaken to determine any recorded information relating to the target species on and within a reasonable range of potential impact of the site. Data and information was sourced from the following:

- Department of Energy, Environment and Climate Action's (DEECA) Victorian Biodiversity Atlas (VBA) for existing records using a 5 kilometre search radius on the site (DEECA 2024);
- DEECA's Nature Kit for existing records using a 5 kilometre search radius on the site (DEECA 2023b);
- The target species' State and / or National Recover Plans;
- An internet resources search for reports or other sources of information relevant to the target species; and
- Existing knowledge, reports and information held by Aquatica Environmental and ID Ecological Management from other projects we have undertaken in the area.

2.2 Targeted Survey

2.2.1 Survey Sites

ID Ecological Management undertook an initial assessment of the project's alignment prior to this survey and identified and mapped waterways and water bodies that transected or interacted with the alignment. A total of nine waterways/water bodies (re survey sites), were mapped (Figure 3). Aquatica Environmental field ecologists initially located each site, assessed the habitat suitability for the target species and deployed the appropriate survey method/s.

2.2.2 Dwarf Galaxias and Flinders Pygmy Perch

Aquatica Environmental undertook a targeted survey for dwarf galaxias and Flinders pygmy perch in the site, and at a 'control' site near Traralgon, where a dwarf galaxias and Flinders pygmy perch population is known to occur. The control site was included to confirm the survey methods were reasonably able to detect the species if present at the time.

The survey was undertaken on 31st January and 1st February 2024.

Two survey techniques were deemed suitable for the available habitat including:

- Hand-held dip-net: Dip-netting was undertaken in and around the range of available aquatic habitats at each site using a fine and soft mesh dip-net.
- Bait traps: Set in the afternoon, baited with phosphorescent baits (i.e. glow sticks) and left in situ before being retrieved the next morning.

Visual survey for larval and juvenile fish was also undertaken by placing water collected from the waterway into a large white tray where the small (<5 mm) fish can be observed (may not be suitable/required depending on seasonal timing of survey).

2.2.3 Growling Grass Frog

The growling grass frog survey was undertaken in broad accordance with the following accepted methodologies:

- Survey Guidelines for Australia's Threatened Frogs (DEWHA 2010);
- Guidelines for managing the endangered Growling Grass Frog in urbanising landscapes (Heard et al. 2010);
- Biodiversity Precinct Structure Planning Kit (DSE 2010); and
- Hygiene Protocol for the Control of Disease in Frogs (DECC NSW 2008).

The targeted survey included two nocturnal surveys and one diurnal survey undertaken in unison with the dwarf galaxias and Flinders pygmy perch survey.

The diurnal survey was undertaken on the 31st January 2024 in unison with the fish survey. Nocturnal surveys were undertaken on the nights of 5th and 6th December 2023 at safe access po9nts across the site (Figure 3). Although not mapped in Figure 3, the nocturnal surveys were also undertaken to the east of the site, where there are large vegetated wetlands along the north-south rail trail.

A growling grass frog control site was also referenced during the survey to provide context to the site results. The control site is a small constructed stormwater basin located at Trafalgar, approximately 30 km to the east of the eastern extant of the project alignment, and has a small population with 1-3 individuals being heard calling at times. This control site is about the nearest known site to support a population of the species in proximity to the site. The nearest known larger populations are significant distance away to the west near the eastern outskirts of Melbourne, and to the east near Sale.

Weather and conditions during all three surveys were within the range considered amenable for the detection of the species (Table 1; BOM 2024)

To further support the reliability of the survey, records of growling grass frog survey events from across Victoria for the 2023 survey season were extracted from a live database managed by the Ecological Consultants Association of Victoria (ECAV). These records are collected by member ecologists across the state and it provides an additional line of evidence as to the seasonal behaviour of growling grass frog across the state.

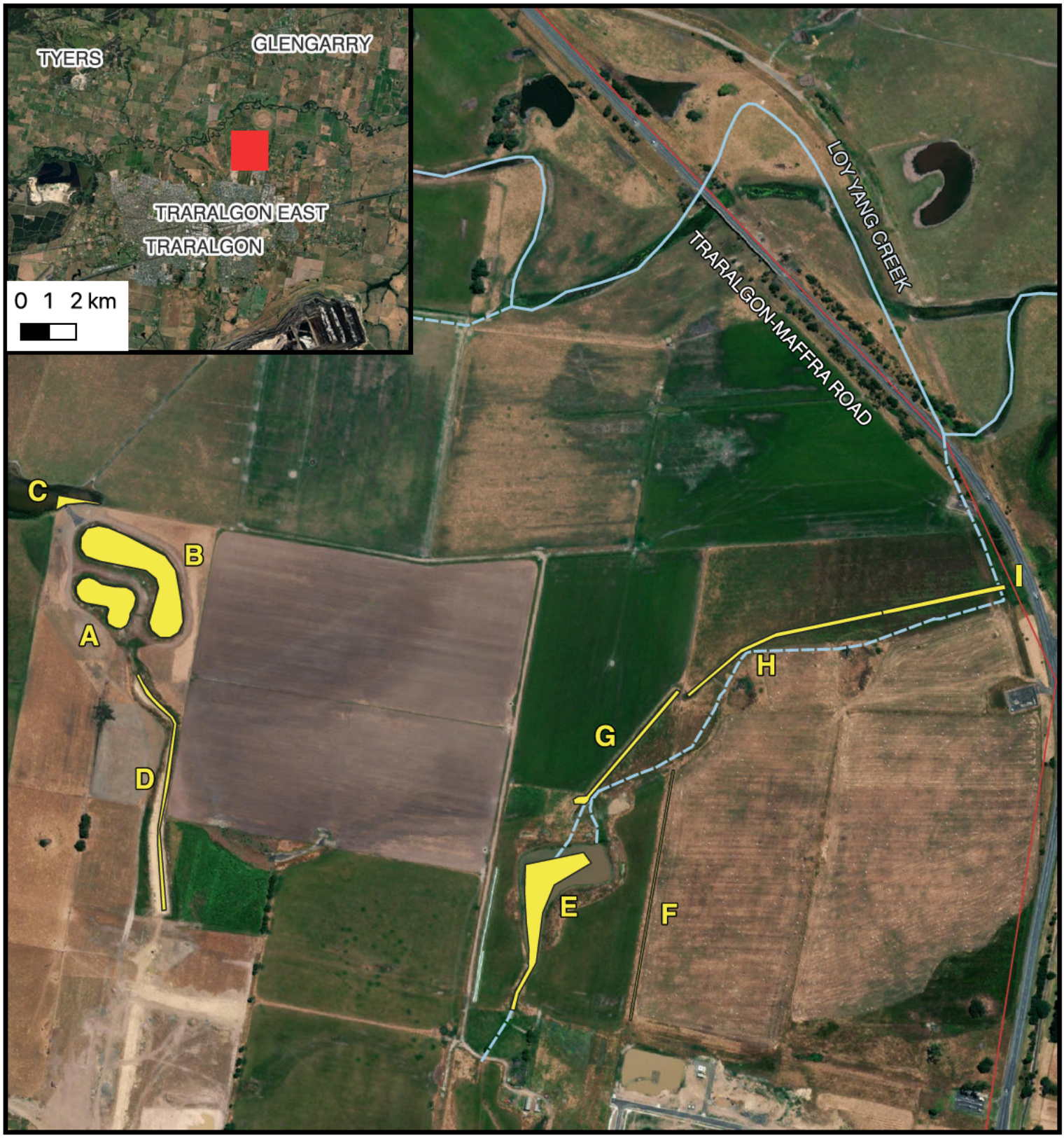
The surveys were undertaken by experienced ecologists (Table 1) and included the following at each location where a waterway was identified along the alignment (public access only):

- Diurnal surveys included call playback, searching on and under floating debris and organic matter, down cracks and under rocks surrounding the fringes of the dams, and dip-netting for tadpoles and metamorphs in the dams.
- Nocturnal surveys including active listening for 10-15 minutes for calls, call playback and spotlighting. For call play-back the ecologists undertook approximately 10 minutes of quiet listening, followed by approximately 5 minutes of call playback/mimicry followed by a further 10 minutes of quiet listening.

The frog species and the number of observed individuals, as well as the approximate numbers of calling males, were recorded during each survey (if able to be ascertained). The survey effort is considered adequate as Heard *et al.* (2010) demonstrates that a threshold of 95% detection probability, at least two surveys are required when surveys are conducted in October–December, whereas three are required in January–March. The conducting of three surveys across the December 2023 to January 2024 survey, therefore, indicate a 95% or greater detection probability and therefore relatively high confidence in the survey results.

Table 1 Growling grass frog survey dates, times and conditions

Parameter / Survey	Nocturnal 1	Nocturnal 2	Diurnal 2
Date	5 Dec 2023	6 Dec 2023	31 Jan / 1 Feb 2024
Surveyor	A Jenkin	T Brooker	C Clay and J Shaw
Start Time	21:00	20:45	8:00 / 8:00
Finish Time	23:30	22:50	17:00 / 10:00
Methods	Listening, call play-back, spotlight	Listening, call play-back, spotlight	Call play-back, dip-net, visual
Temperature	15.4	16.5	17.2-21.6
Humidity (%)	63	74	69-53
Wind Speed average (km/h)	10.8	5.5	17-19
Rain (mm)	0.0	0.0	0
Previous 24hr rain (mm)	0.0	0.0	0



0 0.5 1 km

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Traralgon-Maffra Road Survey Sites

Project: Traralgon-Maffra Road, Traralgon Rezoning

Project No.: 000464
Figure 2
Created 17/02/2024

Legend

- Survey sites
- Rivers
- Creeks
- Other waterways
- Main roads

Spatial Reference
Name: GDA2020 MGA Zone 55
PCS: GDA2020 MGA Zone 55
GCS: GDA2020
Datum: GDA2020
Projection: Transverse Mercator

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2.3 Permits and Approvals

The survey was undertaken in accordance with the following approvals and permits held by Aquatica Environmental:

- Department of Economic Development, Jobs, Transport and Resources Wildlife and Small Institutions Animal Ethics Committee approval (No. 30.21, exp 24/10/2024);
- Scientific Procedures Fieldwork Licence (No. SPFL20394, exp 30/6/2024);
- *Fisheries Act 1995* General Research permit (No. RP1312, exp 11/10/2023); and
- *Flora and Fauna Guarantee Act 1988* permit to "take protected fish" (No. 10010202, exp 24/7/2024).

In accordance with the permit requirements, DEECA and the Victorian Fisheries Authority (VFA) were notified prior to the survey and the resultant data will be uploaded to the relevant databases.

2.4 Likelihood of Occurrence Assessment

A likelihood of occurrence assessment was undertaken using the categories and criteria listed in Table 2 and the findings of the targeted survey.

Table 2 Likelihood of Occurrence Assessment criteria

Likelihood	Criteria
Known	Recorded in site during current or recent surveys within past 5 years
	Aquatic species recorded in connected waterbodies within 10 km of the site during current or recent surveys within past 5 years
Likely	Suitable habitat present in site
	Site within species' natural distribution range
	Recorded in site more than 5 years ago but less than 25
	Suitable good quality habitat present in connected waterbodies within 5 km of the site
	Recorded within the local area within the past 5 years
Possible	Aspects of habitat present and / or habitat modified
	Aspects of aquatic habitat in connected waterbodies within 10 km of the site
	Site within species' natural distribution range
	Numerous records within the local area between 5 to 25 years
	Recorded in site more than 25 years ago
Unlikely	Limited aspects of habitat present in site or in connected waterbodies within 5km of site and / or habitat highly modified
	Historical records within 10 km of site greater than 25 years
	Site on fringe or outside species natural distribution range
	No historical records in site
Very Unlikely	Habitat not present in site
	Habitat for aquatic species not present in connected waterbodies in proximity to site (within 10 km)
	Site is located outside of species natural range
	Considered locally extinct
	No records of the species within the local area in the last 25 years
Unable to determine	Insufficient data to make a determination

3. SPECIES DESCRIPTIONS

3.1 Australian Grayling

As noted in Section 1.2 Australian grayling were illuminated as a target species at the commencement of the project as it was identified there was no habitat suitable for the species on the site. Australian grayling are a river specialist fish, and do no to occur in dams or drainage lines, such as those on the site. The species' is nearest known occurrence is in the Latrobe River to the northwest of the site.

Photo 1 Australian grayling from the Tarwin River near Koonwarra

3.2 Dwarf Galaxias

3.2.1 Conservation Status

The dwarf galaxias is listed as 'vulnerable' under the EPBC Act, 'vulnerable' under the FFG Act, and 'endangered' on the International Union for Conservation of Nature (IUCN) Red List of Threatened Species (Hero et al 2004).

3.2.2 General Description

Dwarf galaxias are a small freshwater fish endemic to south-eastern Australia that occur only in Victoria, South Australia and Tasmania. Typical maximum lengths are 40 millimetres (mm) for males and 34 mm for females, with records up to 48 mm (Allen et. al. 2003) (Photo 2).

The dwarf galaxias most commonly occur in slow flowing or still, shallow, permanent and temporary, freshwater habitats such as swamps, drains and the backwaters of streams and creeks. Habitat often (but not always) contains dense aquatic macrophytes and emergent plants (Saddlier et. al. 2010).

Dwarf galaxias spend their entire life cycle in freshwater environments, and their diet consists primarily of small aquatic macroinvertebrates. Spawning occurs in late winter to spring (mostly April through to October) when females lay from 65 to 250 eggs on the underside of aquatic or submerged vegetation, or on hard surfaces (Saddlier et. al. 2010). They are a short-lived fish with only one year's age-class having been observed, and adults dying after spawning, indicating they are an annual species (Humphries 1986 in DEE 2019).

Photo 2 Dwarf galaxias, adult and gravid female (left) and male (right) from Wades Creek, Victoria (Photo: A. Jenkin)

3.2.3 Habitat Requirements

Dwarf galaxias are a non-migratory species adapted primarily to wetland environments (Saddlier et. al. 2010). Within wetland-type environments, dwarf galaxias have a wide range of habitat requirements but typically occur in slow flowing, still, shallow, permanent and temporary, freshwater to slightly brackish waterways. These include wetlands, swamps, the backwaters of streams and creeks, drains and ditches, usually with dense aquatic, emergent or flooded vegetation (Allen et. al. 2003 and Saddlier et. al. 2010). Additionally, dwarf galaxias are tolerant of a wide range of variations in temperature, salinity and pH, and are only found at lower elevations.

The species can occur in wetlands that are ephemeral and partially or completely dry up during summer, where the wetlands rely on seasonal flooding and linkages to more permanent waterbodies, including connectivity to rivers and creeks. Dwarf galaxias are also known to seek refuge in freshwater crayfish/yabby burrows and are capable of aestivating (dormancy) in damp mud during drier periods (Wager & Jackson 1993; McDowall 1996 and Inland Fisheries Service 2000 in DEE 2019).

The National Recovery Plan for Dwarf Galaxias (Saddlier et. al. 2010) notes that dwarf galaxias have different habitat requirements (i.e. niches) depending on life stage and season including:

- Transient habitat: Ephemeral habitat that retains water for less than one month following inundation and is mostly used for dispersal.
- Spawning habitat: Ephemeral habitat with abundant aquatic or submerged vegetation that retain water for 1-3 months following inundation and during the May to October breeding season.
- Short-term refuge habitat: Ephemeral water bodies that retain water for more than three months but do not have the attributes to support a permanent population.
- Long-term refuge habitat: Permanent water bodies that provide permanent refuge for dwarf galaxias populations and where source stock can disperse and repopulate transient, spawning and short-term refuge habitats (i.e. those listed above).

3.2.4 Distribution

Although they are still widely distributed across south-eastern Australia (Figure 2), populations are fragmented and patchy across the landscape (Saddlier et. al. 2010). A decline in their abundance has been attributed to habitat loss due to wetland drainage, alterations to flow regimes, climate change, habitat damage (i.e. grazing and agriculture) and competition and predation by introduced fish species such as the eastern gambusia or mosquitofish (*Gambusia holbrooki*) and redfin perch (*Perca fluviatilis*) (DEE 2019).

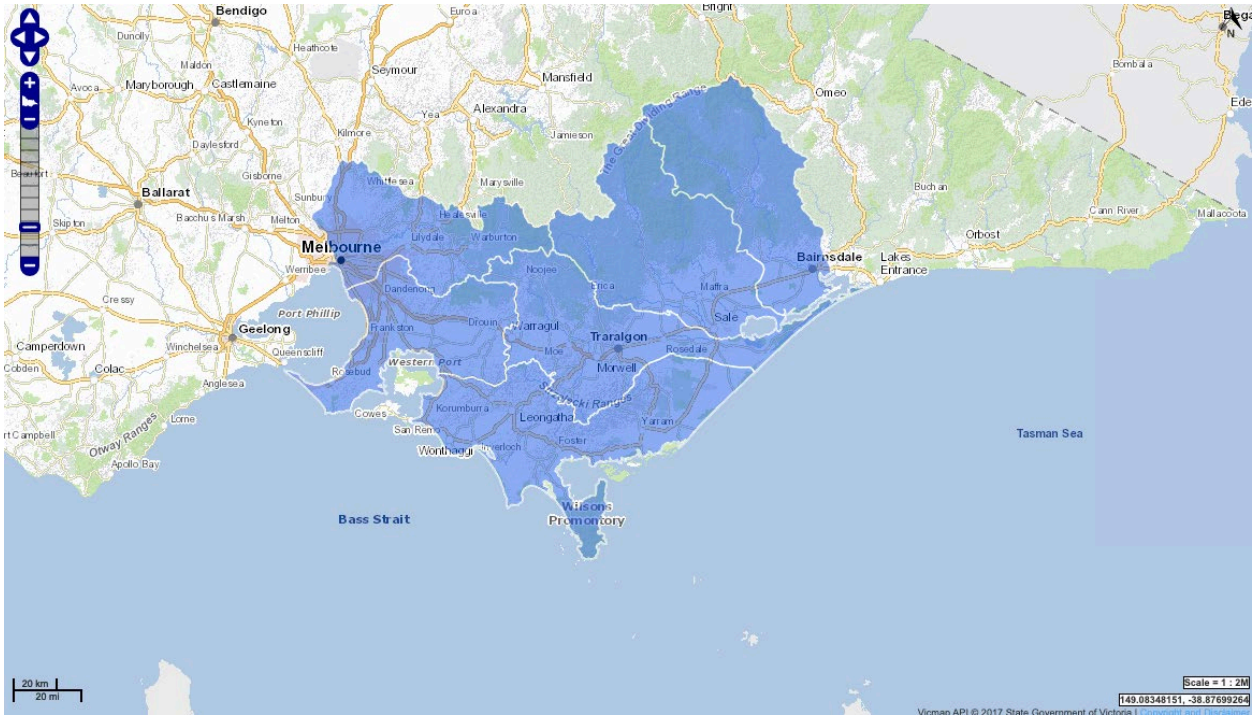


Figure 4 Dwarf galaxias distribution (Source: DEECA 2024)

3.2.5 Key Threats

Major threats to the dwarf galaxias in the region include (DEE 2019):

- Degradation and loss of habitat throughout its range, caused by wetland drainage, wetland inundation, fouling by livestock, ploughing, concreting of waterways, chemical pollution and European carp (*Cyprinus carpio*) associated degradation.
- Alteration to flow regime and reduced connectivity throughout its range, caused by dam and levee construction, surface and groundwater abstraction, drawdown associated with forestry/revegetation.
- Drying caused by climate change, reducing suitable habitat and connectivity throughout its range.
- Competition and predation by legally and illegally introduced aquatic species such as the Mosquitofish, brown trout (*Salmo trutta*), rainbow trout (*Onycorhynchus mykiss*) and redfin perch.
- Illegal collection leading to localised depletions, possibly intensifying with increased community awareness.

3.3 Flinders Pygmy Perch

3.3.1 Conservation Status

Flinders pygmy perch is listed as 'vulnerable' under the FFG Act.

3.3.2 General Description

The Flinders pygmy perch is a small, laterally compressed fish which grows to a maximum size of 85 mm (Photo 3 and Photo 4).

The species was previously included under Southern pygmy perch (*N. australis*), however, it was recently identified as a very divergent genetic lineage representing a previously unrecognised taxon. This taxon was previously described (from Flinders Island) as a subspecies of *N. australis*, (Scott 1971) and work is currently underway to revise the taxonomic description and formally elevate it to full species status.

Similarly to its parent species, Flinders pygmy perch inhabit a wide range of well-vegetated aquatic environments. These include low-gradient waterways and floodplains characterised by still or gently flowing streams, lakes, billabongs, drains, dams, swamps and ephemeral creeks and wetlands and dense aquatic macrophyte cover or wood at shallow depths, which may have little or no flow in summer (DELWP 2020).

Spawn occurs during spring to summer (September to January) at water temperatures of above 16°C (Kuiter et al. 1996 in DELWP 2020). Very little is known of the breeding biology of this species, although it is assumed that breeding behaviour is similar to Southern pygmy perch, which lays demersal, non-adhesive eggs over aquatic vegetation and the substrate.

Photo 3 Flinders pygmy perch from near Moe, Victoria (A Jenkin)

Photo 4 Flinders pygmy perch from Iguana Creek, Victoria (A Jenkin)

3.3.3 Habitat Requirements

Flinders pygmy perch typically occurs in slow-flowing or still waters that possess large amounts of aquatic vegetation (particularly emergent vegetation) such as lakes, ponds and slow-flowing rivers, creeks and drainage lines (Kuiter et al. 1996, Woodward and Malone 2002 in DELWP 2020). It is also found in the vegetated margins of moderate flow in larger streams, and can persist in isolated pools as streams dry (Raadik unpublished data).

3.3.4 Distribution

Flinders pygmy perch is distributed in Victoria in coastal Gippsland catchments from near the NSW/Victorian border in the east (Genoa/Wallagaraugh rivers), westward to the La Trobe River catchment, and extending into the South Gippsland catchment as far west as Merrimans Creek (Figure 5). A small population, possibly translocated, is also present further west in Pebble Creek, a tributary of the Franklin River system in Corner Inlet. It is also found on the east side of Flinders Island and the very north east of Tasmania (Anson River).

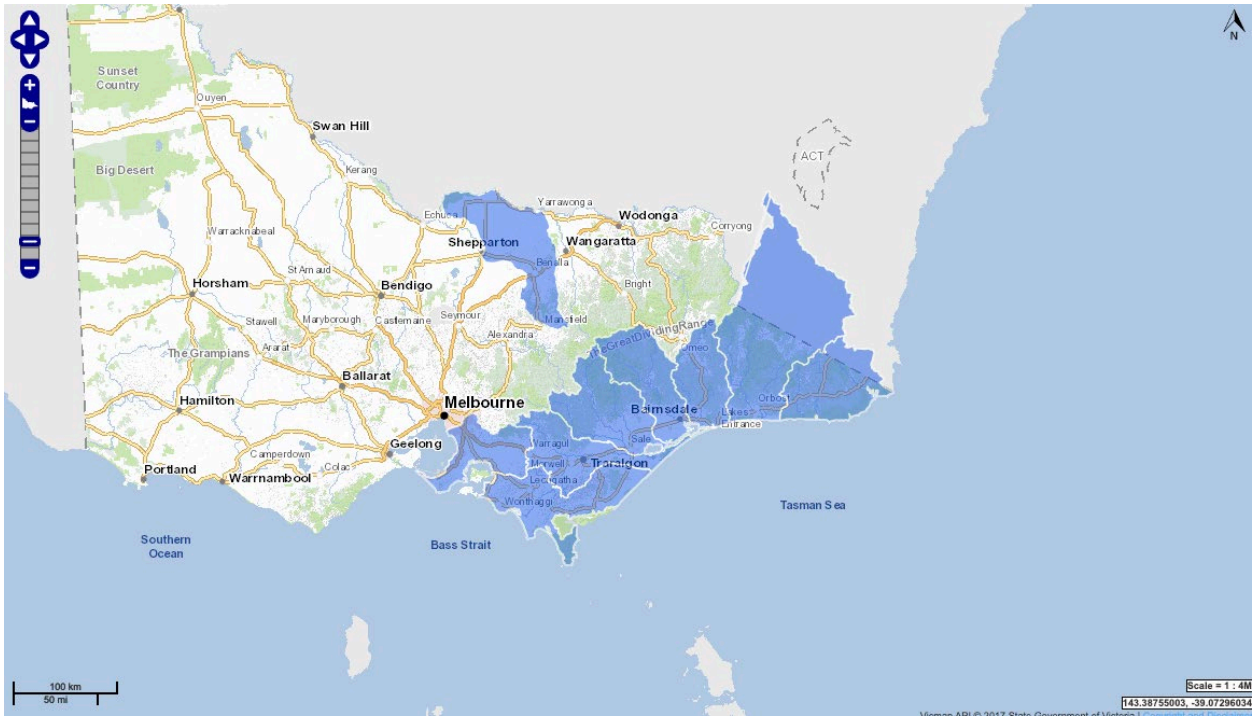


Figure 5 Flinders pygmy perch distribution in Victoria (DEECA 2024)

3.3.5 Key Threats

Key threats to Flinders pygmy perch include (DELWP 2020):

- Habitat damage or loss through water level/flow changes due:
  - agriculture,
  - urban or industrial development,
  - climate change impacts,
  - unrestricted stock access causing disturbance,
  - infilling, siltation,
  - increased turbidity, or
  - destruction/removal of instream habitat.
- Reduction and loss of surface water quantity and quality (through climate change impacts, and through extraction for stock and agriculture; and
- Competition with and/or predation by alien fish species such as Eastern Gambusia, Redfin, Brown Trout and Rainbow Trout.

3.4 Growling Grass Frog

3.4.1 Conservation Status

The growling grass frog is listed as 'vulnerable' under the EPBC Act, 'vulnerable' under the FFG Act and 'endangered' on the International Union for Conservation of Nature (IUCN) Red List of Threatened Species (Hero et al 2004).

3.4.2 Description

Growling grass frog can reach up to 104 mm in length, making them one of the largest frog species in Australia. They vary in colour and pattern but are mostly olive to bright emerald-green, with irregular gold, brown, black or bronze spotting. Their backs are warty and commonly have a pale green stripe down their back. On the underside their bellies are usually white and coarsely granular (Department of the Environment 2021).

Breeding generally occurs during November and March, usually triggered by local flooding and a rise in water levels, however exact timing varies seasonally and depending on location. During the breeding season, males may become yellow or dark grey/black under the throat and their groin can turn turquoise blue (DEC NSW 2005 in Department of the Environment 2021).

Photo 5 Growling grass frog (SWIFT 2022)

3.4.3 Habitat Requirements

Growling grass frog mostly occur in still or slow-flowing water bodies such as wetlands, lagoons, swamps, lakes, ponds and farm dams. These water bodies are typically dominated by aquatic and emergent vegetation including species such as Triglochin, Typha, Phragmites and Eleocharis. However, they have been recorded in a wide range of habitat types including agriculture and higher rainfall pastoral lands, irrigation channels, farm dams and open grassland. Generally larger and more permanent water bodies, with a higher portion of dense emergent and/or fringing vegetation, are more likely to support growling grass frog (Department of the Environment 2021).

Growling grass frog have three primary habitat requirements to support a population including:

- Basking habitat: Frogs are active during both day and night during the warmer months and require aquatic/emergent vegetation, grassy banks, rocks or logs where they have been observed to bask on both sunny and overcast days (DEE 2018)
- Breeding habitat: Breeding is dependent upon permanent freshwater waterbodies with submerged aquatic vegetation for breeding. Their preference is for the shallower/perimeter part of waterbodies (up to 1.5 metres in depth) where there is generally a complex aquatic and emergent vegetation structure (Threatened Species Unit 2001, Ehmann & White 1997 and Courtice and Grigg 1975 cited in DEE 2018).
- Refuge habitat: Used for overwintering/hibernation, the species is known to use a range of refuge habitats including cracks in soil, fallen timber, rocks, debris and dense vegetation on low, frequently inundated floodplains (Cogger 2000 and S. Wassen undated, pers. comm. cited in NSW DEC 2005a cited in Department of the Environment 2021).

Growling grass frog are also highly mobile and have been recorded to move up to 1 kilometre (km) in a 24-hour period (Department of the Environment 2021). However, this mobility tends to be more associated with ephemeral habitats (Wassen 2005 in Department of the Environment 2021).

3.4.4 Distribution

Growling grass frog was once widely distributed across Victoria, only being absent from the western desert regions and the eastern alpine regions (Littlejohn 1963, 1982; Hero et al. 1991 in Mahony 1999 in Department of the Environment 2021) (Figure 6). However, growling grass frog has disappeared from most of its former Victorian range and now only persists in isolated populations in the greater Melbourne area, in the south-west of Victoria, and a few sites in central Victoria and Gippsland (Department of the Environment 2021).

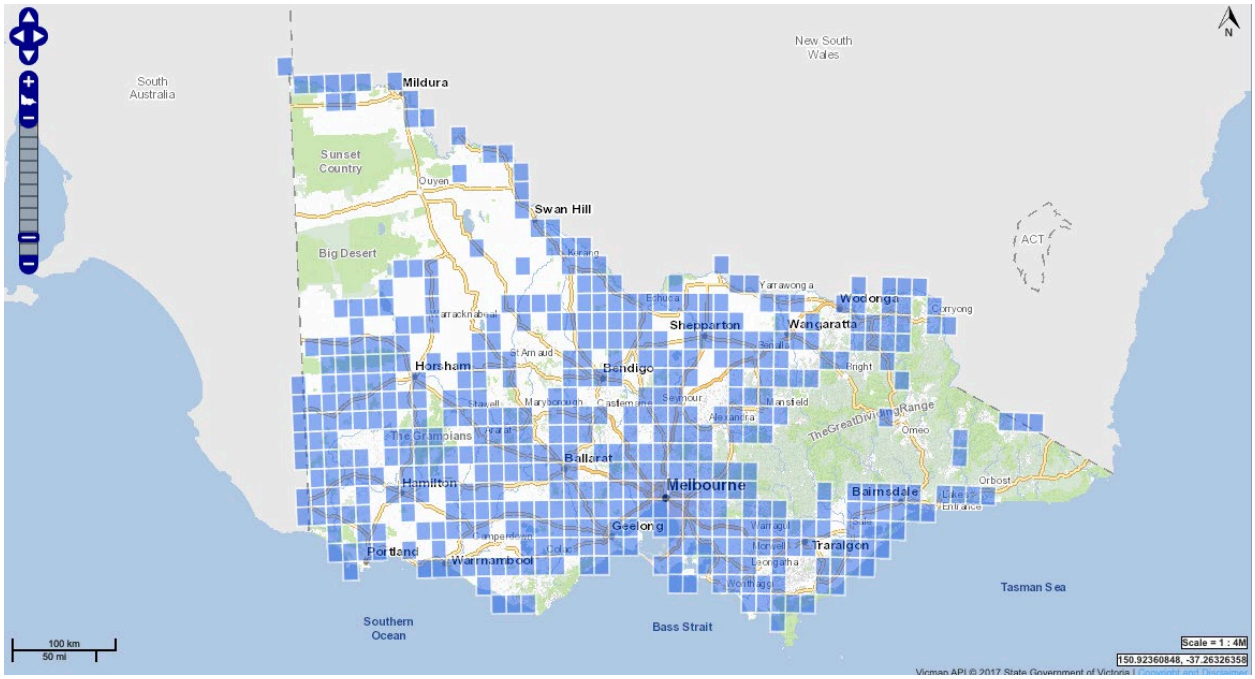


Figure 6 Growling grass frog historical distribution in Victoria (DEECA 2024)

3.4.5 Key Threats

Key threats to growling grass frog include (Department of the Environment 2021; Backhouse et al. 2008):

- Habitat loss and fragmentation
- Habitat degradation
- Altered flooding regimes
- Disease
- Predation by introduced fish
- Drought
- Chemical pollution of waterways
- Biocides
- Salinisation
- Roadkill
- Ultraviolet-B radiation

4. RESULTS

4.1 Desktop Review

Figure 7 show the results of a species records search, only for records of the target species in proximity to the site.

Dwarf galaxias is known to occur throughout the Latrobe River system. There are no records in the immediate vicinity of the site and the nearest records are all >10-20 years old (Figure 7). Recent records obtained by Aquatica Environmental for unrelated projects indicate that populations are still present to the west of Traralgon, approximately 9 km west of the site.

Similarly, Flinders pygmy perch are also known to occur throughout the Latrobe River system and are generally found more widespread and in greater abundance then dwarf galaxias (they are a much hardier species). Flinders pygmy perch are known to occur around the Traralgon and Morwell region, with most of the record markers in Figure 7 relatively reliably showing where the species is known to occur.

The existing records of growling grass frog shown in Figure 7 are somewhat deceptive as almost all are very old historical records. The nearest currently known populations albeit small population are over 30 kilometres to the west near Trafalgar and at least a similar distance to the east near Sale. Despite numerous targeted surveys for growling grass frog in the Traralgon region, resident population of the species has not been detected in recent years.

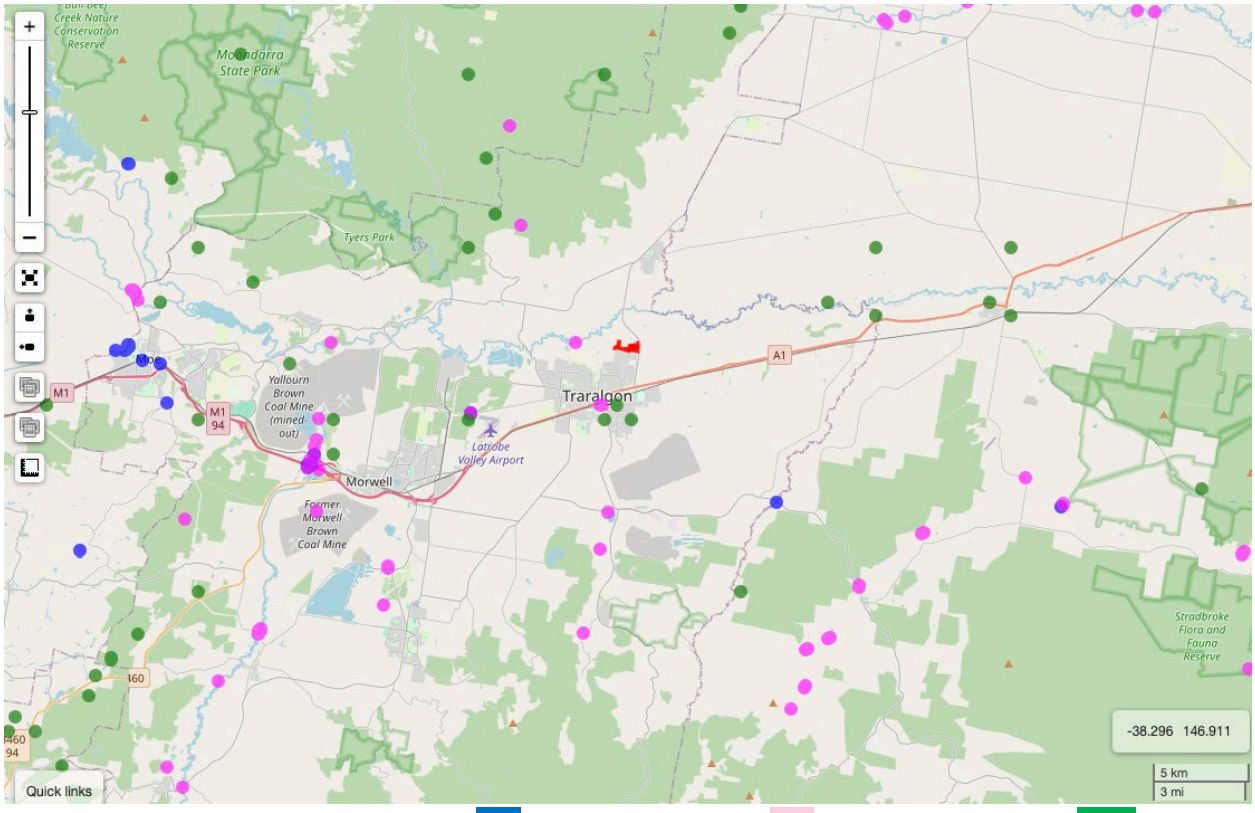


Figure 7 Existing records for dwarf galaxias (blue), Flinders pygmy perch (pink) and growling grass frog (green) in the vicinity of the site (red) (ALA 2024)

4.2 Targeted Survey

4.2.1 Habitat Assessment

A description of the habitat at each surveyed site is provided in Appendix A.

All of the waterways and water bodies on the site are constructed and or modified, and significantly impacted by the current and historical land uses including cattle grazing. With the exception of the two dams it has limited permanent aquatic habitat with most of the drains and channels likely being ephemeral.

Aquatic vegetation was limited to very common and hardy species with minimal diversity. Emergent and riparian vegetation was effectively composed of highly adaptable native and modified pasture species and weeds.

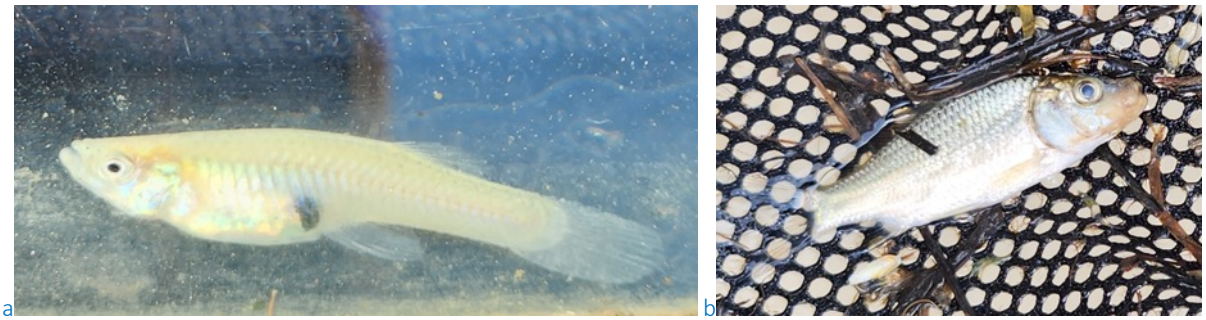
Overall, the habitat type, structure and condition at the majority of the waterways and water bodies surveyed within the site were marginal in terms of being able to support resident populations of the target species. This is particularly relevant to the two fish species, neither of which can tolerate complete drying of a waterway as was observed at many of the survey sites. The predominantly ephemeral habitat of the highly modified drainage lines throughout the site could potentially constitute opportunistic dispersal habitat for the three target species if there were nearby populations and if conditions were amenable at the appropriate time of year when dispersal was occurring. It's unlikely the habitat would support resident populations in its immediate vicinity.

4.2.2 Dwarf Galaxias and Flinders Pygmy Perch Survey

Neither of the target fish species were detected during the targeted survey, nor were any native species of fish. European carp (*Cyprinus carpio*) were observed at Site A and mosquitofish (*Gambusia holbrooki*; Photo 6a) recorded at almost all sites with water. Both species are listed as "*noxious aquatic species in Victoria*" under Section 75 of the Victorian *Fisheries Act 1995*. Introduced goldfish were also observed (Photo 6b).

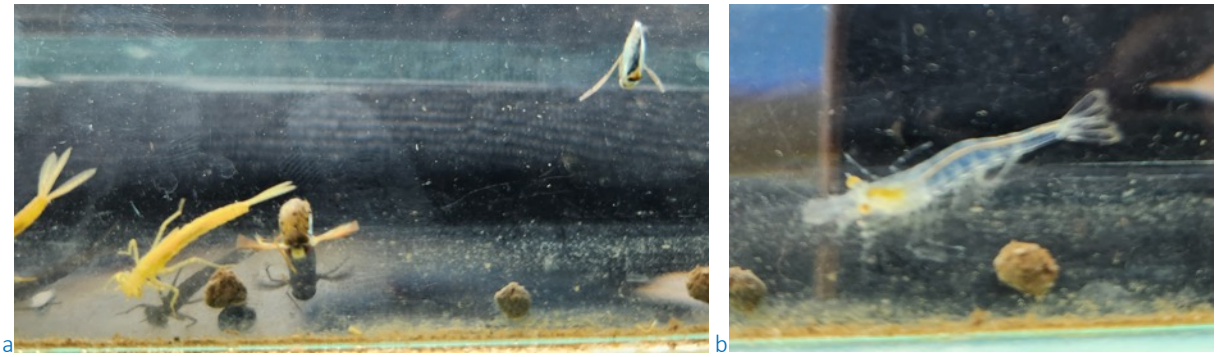
Both target species were readily detected at the control site, indicating that the survey methods were more than adequate for detecting the species should they be present.

Common aquatic invertebrates were observed at all sites with water (Photo 7).



a b

Photo 6 Mosquitofish (a) and goldfish (b)



a b

Photo 7 Common aquatic macroinvertebrates (a/b)

4.2.3 Growling Grass Frog Surveys

No Growling grass frog were detected during the diurnal or nocturnal surveys, under suitable conditions for the species detection (Table 3). Five species of common frog were recorded during the two nocturnal surveys on and in the vicinity of the site, most in moderately high abundance off the site, but less so on the site. Two unidentified tadpoles were also recorded during the diurnal survey at Site F.

Frog activity and calling peaked during the 5th and 6th December nocturnal surveys, with 10s of certain species being heard calling on the site, but 100s being recorded in more optimal amphibian habitat to the east of the site along the rail trail.

Survey of the nearest known population of growling grass frog, located at Trafalgar approximately 30 kilometres to the west of the site, was able to detect the species calling at 11:40pm on the 4th December 2023, the same day as the first nocturnal survey. However, the Ecological Consultant's Association of Victoria (ECAV) live growling grass frog

survey tracker indicates numerous records of the species calling across the state across the breeding season and same duration of the surveys undertaken for this project (Table 4).

Table 3 Targeted growling grass frog survey results

Species		Control 4th Dec 2023	Noct. 1 5th Dec 2023	Noct 2 6th Dec 2023	Diurnal 2 1st Jan 2024
Growling grass frog	***Litoria raniformis***	**2**	-	-	-
Spotted marsh frog	*Limnodynastes tasmaniensis*	5	1 (northern call race)	-	-
Striped marsh frog	*Limnodynastes peronii*	5	10s/100s	Heard	-
Peron's tree frog	*Litoria peroni*	-	-	Heard	
Whistling tree frog	*Litoria verreauxii*	-	10s/100s	Heard	-
Common eastern froglet	*Crinia signifera*	3	10s	Heard	-
Unidentified tadpoles		-	-	-	2 @ Site F

Table 4 ECAV growling grass frog records for the 2023/24 survey season

Date	Start Time	Location	GGF Recorded	# Sighted GGF	# Calling GGF
23/1/2024	8:30	Brady Swamp	Yes	2	50
23/1/2024	20:00	Merri Creek, Fawkner	Yes	1	1
4/1/2024	15:00	Galada Tamboore	Yes	-	70
26/12/2023	21:30	Caroline Springs	Yes	20	-
21/12/2023	9:30	Tullamarine	Yes	-	1
12/12/2023	20:30	Caroline Springs	Yes	-	1
11/12/2023	8:30	Pakenham	No	-	-
7/12/2023	**20:30**	**Dunkeld**	**Yes**	**10**	**70**
5/12/2023	**19:00**	**Caroline Springs**	**Yes**	**-**	**1**
4/12/2023	**8:00**	**Tullamarine**	**Yes**	**1**	**20**
4/12/2023	**9:30**	**Mortlake**	**No**	**-**	**-**
23/11/2023	10:00	Dunkeld	Yes	-	50
18/11/2023	11:00	West of Geelong	Yes	-	3
19/11/2023	12:15	Werribee Western Treatment Plant	Yes	-	20
9/11/2023	12:00	Trafalgar	Yes	-	1
27/9/2023	10:00	Brady Swamp	Yes	-	2

4.3 Likelihood of Occurrence Assessment

The likelihood of occurrence assessment for the target species at or within a reasonable distance of potential impact of the study area found the following:

Dwarf galaxias – Unlikely present

- There are no existing records within a reasonable distance of potential impact of the site, though the species is known to occur in the wider catchment.
- The species was not detected during the targeted survey and the habitat was considered marginal for supporting a resident population.

- Waterways and drainage lines in the site could represent potential disbursal/passage habitat if there was a nearby population (which is unlikely).
- Aquatica Environmental's experience with other targeted surveys in the wider area indicates that dwarf galaxias are not persisting in the highly modified waterway and landscape, and lower-lying agricultural areas.
- Overall, it is considered unlikely that dwarf galaxias occur within the site or the immediate connected catchment.

Flinders pygmy perch – Possibly present (occasional visitor)

- There are no existing records within a reasonable distance of potential impact of the site, though the species is known to occur in the wider catchment.
- The species was not detected during the targeted survey and the habitat was considered marginal for supporting a resident population.
- Waterways and drainage lines in the site could represent potential disbursal/passage habitat if there was a nearby population (which is possible).
- Aquatica Environmental's experience with other targeted surveys in the wider area indicates that Flinders pygmy perch are hardier and more persistent than dwarf galaxias in these modified habitat, they can take advantage of farm dams (if vegetated) and therefore could utilise the waterways and drainage lines that transact the site.
- Overall, it is possible the species could be present within the site as an occasional visitor when waterway conditions are suitable.

Growling grass frog – Unlikely present (occasional visitor)

- Habitat within and immediately adjacent to the site is considered unlikely to support a resident population of the species, representing only potential for dispersal habitat should there be a population within a reasonable distance of the site.
- There are records of the species in close proximity to the site.
- Weather and conditions were optimal for detection during the survey, the species was unable to be detected in the site, yet was recorded calling at the nearest control site and other locations around Victoria at the approximate time of the survey.
- Overall, it is considered unlikely that growling grass frog occur within the site or the immediate connected catchment.

5. POLICY AND LEGISLATION IMPLICATIONS

The overall findings of the desktop review, targeted survey and likelihood of occurrence indicate that only Flinders pygmy perch are possibly present, though only as potential occasional seasonal visitors. Accordingly, the project is unlikely to directly trigger any implications for the project specific to the target species, assuming appropriate timing of construction works and fauna handling and relocation measures are in place should they be incidentally encountered during construction.

Accordingly, Table 5 provides a high level assessment of the possible policy and legislation implications for the project more broadly.

Table 5 Policy and legislation implications

Legislation / Policy	Criteria	Potential Implications for Project
Commonwealth		
Environment Protection and Biodiversity Conservation Act 1999	The EPBC Act provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places, or matters of national environmental significance (MNES). There are nine matters of national environmental significance to which the EPBC Act applies, with three potentially applicable to the Study Area. • Wetlands of international importance (or 'Ramsar' wetlands); • Nationally threatened species and ecological communities; and • Migratory species. The EPBC Act establishes a process of assessment of proposed actions that are likely to have a significant impact on MNES. An action (i.e. project, development, undertaking, activity, or series of activities), unless otherwise exempt, requires approval from the Commonwealth Environment Minister if they are considered likely to have an impact on any MNES.	Both of the APBC Act listed species considered unlikely to occur. Accordingly, project is unlikely to trigger any implications under the EPBC Act relating specifically to the target species.
State		
Catchment and Land Protection Act 1994	The Catchment and Land Protection Act 1994 (CALP Act) is the principle legislation relating to the management of pest plants and animals in Victoria. Under this Act, landowners have a responsibility to avoid causing or contributing to land degradation, including taking all reasonable steps to conserve soil, protect water resources, eradicate regionally prohibited weeds, prevent the growth and spread of regionally controlled weeds and where possible, eradicate established pest animals, as declared under the Act. Under the CaLP Act it is prohibited to: • Carry out extractive activity unless an authority has been issued; • Move vehicles or machinery from land on to a road without first ensuring precautions are taken to ensure the equipment is free of noxious weeds; • Remove soil, sand, gravel or stone which comes from land on which noxious weeds grow. The Act outlines and guides the control of state and regionally prohibited weeds and prohibited pest animals.	Measures will need to be outlined in the project's CEMP that detail how the spread of disease, weeds and pests will be managed during construction.

Legislation / Policy	Criteria	Potential Implications for Project
Wildlife Act 1975	The Wildlife Act 1975 forms the procedural, administrative and operational basis for the protection and conservation of native wildlife within Victoria. The purposes of the Act are: 1. To establish procedures in order to promote: • The protection and conservation of wildlife; and • The prevention of taxa wildlife from becoming extinct; and • The sustainable us of and access to wildlife; and 2. To prohibit and regulate the conduct of persons engaged in activities concerning or related to wildlife. This Act often sits as the default reference for other associated policies regarding wildlife management or other Victorian legislation. For example, the operation of the FFG Act often needs to be considered in conjunction with the provisions and procedures of the Wildlife Act, as some wildlife will be both protected wildlife under the Wildlife Act and listed threatened species under the FFG Act. With the exception of 'pest animals' declared under the CaLP Act or wildlife declared to be 'unprotected wildlife', the Wildlife Act defines certain wildlife as 'protected wildlife'. It is an offence to hunt, take or destroy threatened or protected wildlife without authorisation.	In accordance with this Act, if any protected wildlife is located within vegetation proposed for clearing, a licence is required to take or destroy it, including salvage and translocation. This will also apply to any works on/to waterways that may result in an impact to wildlife (i.e. amphibians, reptiles, mammals, waterbirds, FFG Act protected aquatic fauna, etc.). The survey recorded two tadpoles as Site F and adult frogs calling across the onsite water bodies which should be considered within the project's CEMP in terms of potential salvage and relocation if they are encountered during works. The CEMP should ensure that ecologists are present during initial vegetation clearing and earthworks within the waterways and on call during works in order to salvage and relocate any wildlife that is encountered.
Flora and Fauna Guarantee Act 1988	The Victorian Flora and Fauna Guarantee Act 1988 (FFG Act) was established to provide a legal framework for enabling and promoting the conservation of all Victoria's native flora and fauna, and to enable management of potentially threatening processes. One of the main features of the Act is the listing process, whereby native species and communities of flora and fauna, and the processes that threaten native flora and fauna are listed in the schedules of the Act. This assists in identifying those species and communities that require management to survive, and identifies the processes that require management to minimise the threat to native flora and fauna species and communities within Victoria.	The FFG Act protected Flinders pygmy perch is possibly present as an occasional visitor. Similarly to the Wildlife Act, if there is potential that individuals may be encountered within the site during works a licence will be required for their appropriate salvage and relocation, which should be considered within the projects CEMP.

Legislation / Policy	Criteria	Potential Implications for Project
Water Act 1989	The Water Act 1989 (Water Act) provides the framework for allocating surface water and groundwater throughout Victoria. In Section 67 of the Act it states that works on waterways, such as the construction of dams, weirs and erosion control structures, are licensed in accordance with the Act. The Act allows conditions to be included in a works licence to protect the "environment, including the riverine and riparian environment". The purpose of the Water Act is to: • State the law relating to water in Victoria; • Maximise community involvement in the making and implementing for the use of conservation or management of water resources; and • Provide formal means for the protection and enhancement of the environmental qualities of waterways.	A Works on Waterways permit not required.
Fisheries Act 1995	One of the objectives of the Fisheries Act 1995 (Fisheries Act) is to protect and conserve fisheries resources, habitats and ecosystems including the maintenance of aquatic ecological processes and genetic diversity. One of the provisions of this Act is that a person must not, except as permitted by or under the Fisheries Act or any other Act, create an obstruction across or within a bay, inlet, river or creek or across or around an inter-tidal flat that: "(a) fish will or could be blocked and left stranded; or (b) immature fish will or could be destroyed; or (c) the free passage of fish will or could be obstructed." This act is relevant if there is a likelihood that a development will impact on fish habitat and aquatic ecological processes. Similar to the FFG Act, action statements must outline the process that will be implemented to ensure the long-term protection of fish habitat and/or specific species. In addition, Victoria has listed a number of species and genera as noxious under Section 75 of the Fisheries Act. By declaring a particular species noxious, the Victorian Government applies regulations to control the use and potential spread of such animals.	Similar to the Wildlife and FFG Acts consideration should be included in the project's CEMP to have an ecologist on call should any fish require salvage and relocation during works. This will be particularly relevant should any of the existing water bodies require decommissioning and dewatering, where a suitably experienced and licenced ecologist should be engaged to undertake salvage and relocation.

6. SUMMARY AND RECOMMENDATION

The desktop review identified that although the targeted species are known to occur in the wider Latrobe river catchment there were no records of the target species on the site itself nor any within a reasonable distance the potential implication for the development of the site

The targeted survey did not detect any of the target species on or immediately near the site. The survey did find there were aspects of suitable aquatic habitat for supporting Flinders pygmy perch but that the habitat would only be amenable dispersal and occasional visitation habitat (i.e. It cannot be completely excluded that individuals may occur as occasional visitors within the site).

Three species of fish were recorded on the site, all of which are introduced and two of which were listed as 'noxious aquatic species in Victoria'. Several species of common frogs were also recorded on the site. Other than three introduced fish and frogs, the only other aquatic fauna recorded were common aquatic invertebrates.

The results therefore suggest that there are no direct aquatic ecology related policy or legislation implications for the project pertaining specifically to the targeted species.

No further assessment or survey is deemed required relating to the target species.

Based on the findings of the desktop review and targeted survey the following is recommended:

- Should any of the water bodies or waterways on the site require decommissioning, and therefore dewatering, ensure that a suitably experienced and licenced aquatic ecologist is present to undertake salvage and relocation. This is a requirement under both the fisheries and wildlife act as no harm or injury should be caused two aquatic animals through works on the side
- Ensure that hydrological and stormwater investigations are undertaken and the site designed and developed so that there is no direct discharge of untreated surface waters or storm waters from the site into the nearby Latrobe River or associated tributaries.

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Appendix A Survey Site Details and Habitat Descriptions

Site	Type	Site Description	Fauna Observed / Recorded	Other Observations	
A	Wetland / Dam	Newly constructed dam with small areas of Bulrush (*Typha orientalis*) in the water and surrounded by introduced species including Rye Grass (*Lolium rigidum*), Brome Grass (*Bromus diandrus*) Spear Thistle (*Cirsium vulgare*), Wire weed (*Polygonum erectum*), and Ribwort (*Plantago lanceolata*)	Carp (Cyprinus carpio) observed. 6x Mosquitofish (*Gambusia holbrookii*). Macroinvertebrates including Freshwater shrimp (*Paratya* spp.), Water Boatmen (Family: *Corixidae*) and Damselfly Larvae (Sub Order: *Zygoptera*).	Cattle have caused soil pugging, both inside the dam and outside.	
B	Wetland / Dam	Newly constructed dam with small areas of Bulrush and Rush (*Juncus* spp) in the water and surrounded by a majority of introduced species including Strawberry Clover (*Trifolium fragiferum*), Tall Flatsedge (*Cyperus eragrostis*), Rye Grass, Milk Thistle (*Silybum marianum*), Brome Grass, Spear Thistle, Wire weed, and Ribwort. Small patches of Rush also in the riparian zone.	5x Mosquitofish. 2x Goldfish (Carassius auratus). Macroinvertebrates including Freshwater shrimp and Water Boatmen.	Cattle have caused soil pugging, both inside the dam and outside.	
C	Wetland / Dam	Large established dam with Bulrush and Rush in the water and surrounded by a majority of introduced species. Not accessed as was on neighbouring private property.	Australian Swamphen (*Porphyrio melanotus*)	-	

Site	Type	Site Description	Fauna Observed / Recorded	Other Observations	
D	Drainage Channel	The channel contained Bulrush and Rush and the riparian zone contained a majority of introduced species including Strawberry Clover, Tall Flatsedge, Rye Grass, Milk Thistle, Brome Grass, Spear Thistle, Wire weed and Ribwort.	Channel was dry so no sampling.	-	
E	Drainage Channel and Wetland (Dam?)	The channel contained Bulrush and Rush and the riparian zone contained a majority of introduced species including Strawberry Clover, Tall Flatsedge, Rye Grass, Milk Thistle, Brome Grass, Spear Thistle, Wire weed and Ribwort.	Limited netting opportunities due to the depth of the water (20-50mm). Many 10s/100s Mosquitofish in the small pools	Cattle have caused soil pugging, both inside the channel and outside.	
F	Drainage Channel	The channel contained Duckweed (*Lemna disperma*) and Rush. The riparian zone contained a majority of introduced species including Wild Oats (*Avena fatua*) Tall Flatsedge, Rye Grass, Barley (*Hordeum vulgare*), Milk Thistle, Brome Grass, Spear Thistle and Ribwort.	5x Mosquitofish. 2x unidentified tadpoles.	Cattle have caused soil pugging, both inside the channel and outside. There is slumping along sections of the channel.	

Site	Type	Site Description	Fauna Observed / Recorded	Other Observations	
G	Drainage Channel	The channel contained Slender Knotweed (*Persicaria decipiens*) and Rush. The riparian zone contained a majority of introduced species including Strawberry Clover, Tall Flatsedge, Rye Grass, Barley, Milk Thistle, Brome Grass, Spear Thistle, Wire weed and Ribwort.	Limited netting opportunities due to the depth of the water (20-100mm). Dip netting occurred near where it connects to channel at Site E 200+ Mosquitofish	Cattle have caused soil pugging, both inside the channel and outside.	
H	Drainage Channel	The channel contained Slender Knotweed, Rush and the introduced Summer Grass (*Digitaria ciliaris*) and Kikuyu (*Cenchrus clandestinus*). The riparian zone contained a majority of introduced species including Tall Flatsedge, Rye Grass, Barley, Milk Thistle, Brome Grass, Spear Thistle, Broadleaf Dock (*Rumex obtusifolius*) and Ribwort.	Limited netting opportunities due to vegetation entangling the net, only a 5m section could be netted. 30x Mosquitofish 2x Goldfish	Cattle have caused soil pugging, both inside the channel and outside.	

Site	Type	Site Description	Fauna Observed / Recorded	Other Observations	
I	Drainage Channel	The channel contained Slender Knotweed, Rush and the introduced Summer Grass. The riparian zone contained a majority of introduced species including Tall Flatsedge, Rye Grass, Barley, Milk Thistle, Brome Grass, Spear Thistle, Broadleaf Dock and Ribwort.	Dip netting in the few open areas where it wasn't choked with vegetation. 30+ Mosquitofish 2x Goldfish	Cattle have caused soil pugging, both inside the channel and outside.	

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