

17 December 2020

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Ample Investments Group Pty Ltd  
C/- Nick Clements  
Associate Town Planner  
Tract Consultants Pty Ltd  
Via email: [nclements@tract.net.au](mailto:nclements@tract.net.au)

Dear Nick,

**Re: Targeted Growling Grass Frog Survey, 103 Ash Road, Leopold**

Ecolink Consulting Pty Ltd was engaged by Ample Investments Group Pty Ltd undertake a Growling Grass Frog *Litoria raniformis* survey at a large dam located at 103 Ash Road, Leopold (the study area; Figure 1).

The survey follows a Biodiversity Assessment completed by Ecolink Consulting Pty Ltd in 2017 which identified the dam as potential habitat for this species (Ecolink Consulting Pty Ltd 2020).

**Growling Grass Frog Conservation Status and Biology**

The Growling Grass Frog is listed as Vulnerable on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), is Listed under the Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act), and is considered Endangered in Victoria (DSE 2013) (Plate 1).

The Growling Grass Frog is a relatively large and mobile species that inhabits a diverse range of wetlands such as swamps, marshes, slow flowing rivers/streams, lakes, drainage lines and artificial waterbodies (e.g. farm dams, reservoirs and former quarry pits). The species generally breeds in permanent or near-permanent waterbodies, but has also been recorded breeding regularly in ephemeral waterbodies, where they hold sufficient water during the breeding season (Heard et al. 2004; Ecology Australia 2006).

Several key habitat attributes significantly influence the presence and/or breeding success of the Growling Grass Frog, including:

- Connectivity to occupied sites;
- Hydroperiod (i.e. water permanence);
- Cover of aquatic vegetation;
- Water quality, particularly salinity;
- Terrestrial vegetation, including overshadowing by trees and shrubs; and
- Absence of predatory fish (Ecology Australia Pty Ltd 2006; Heard et al. 2004; Heard and Scroggie 2009; Heard et al. 2010; Heard et al. 2012).

With regard to the hydroperiod of waterbodies, larger and more permanent waterbodies are more likely to be occupied and sustain populations over a longer period. The Growling Grass Frog is a highly aquatic frog. As such, the drying out of waterbodies can increase the chance of local extinctions (Heard and Scroggie 2009); however, periodic drying of wetlands can also be potentially beneficial through reducing impacts from predatory fish and/or amphibian chytrid fungus *Batrachochytrium dendrobatidis*, which has caused the decline of amphibians worldwide, including the Growling Grass Frog (Clemann and Gillespie 2012).



**Plate 1:** Growling Grass Frog *Litoria raniformis* (Ecolink Consulting Pty Ltd)

The cover of aquatic vegetation has a strong positive relationship with habitat occupancy; aquatic vegetation is characterised as submerged, floating or emergent vegetation types. The microhabitat provided by the vegetation is important for the Growling Grass Frog (Heard and Scroggie 2009), with the species showing marked preferential use of submerged and floating vegetation during nocturnal activity (Heard et al. 2008), while emergent vegetation provides sheltered perching sites for basking during the day and for ambushing prey (Pyke 2002). These

plants also provide important microhabitat for aquatic larvae and are likely to serve as a refuge from predatory fish (Heard and Scroggie 2009; Webb and Joss 1997).

A number of studies have demonstrated that connectivity is a critical factor for the ongoing persistence of Growling Grass Frog populations in a given area (e.g. Heard and Scroggie 2009; Heard et al. 2010). The likelihood of a site being colonised by the species is strongly linked to connectivity, specifically the number of suitable wetlands in close proximity to the site (e.g. within approximately 1,000 m). This connectivity is essential as the species has been shown to operate under a 'metapopulation' paradigm, where sites vary in occupancy year to year, driven by local conditions and the processes of localised extinction and colonisation (Heard et al. 2013).

The Growling Grass Frog spends the non-breeding season (approximately May to September) sheltering in terrestrial environments (e.g. rocks, fallen timber, soil cracks or dense ground vegetation) some distance from water (Pyke 2002; Wassens et al. 2008; Wilson 2003). Terrestrial habitat surrounding waterbodies is important not only for providing shelter and over-wintering refuge, but also to provide a buffer from surrounding land uses (existing and future); a minimum buffer area of 200 metres is recommended around occupied wetlands (DEWHA 2009), however, subsequent modelling suggests buffers of 200 metres or less may materially increase the risk of local extinction in certain situations (Heard and McCarthy 2011). Buffer distances aim to account for distances moved by the frog during foraging at night and also movement to over-wintering sites.

The presence of predatory fish, such as Eastern Gambusia *Gambusia holbrooki*, has been implicated in the decline of Growling Grass Frogs, although, waterbodies with an extensive cover of aquatic vegetation may provide sufficient refuge and shelter for aquatic larvae to persist even in the presence of predatory fish (Heard and Scroggie 2009).

## Methods

The targeted Growling Grass Frog survey included two days of nocturnal surveys and a diurnal survey. The diurnal survey and one of the nocturnal surveys was undertaken on 25 November 2020. The second survey was a nocturnal survey only, and was completed on 16 December 2020.

Both surveys included active searching, call playback and tadpole surveys:

- Active surveys included the assessors actively searching on and under floating debris and organic matter, down cracks and under rocks surrounding the fringes of the wetland.
- The call playback survey methodology meant that the assessors undertook ten minutes of quiet listening, followed by approximately five minutes of call play back/mimicry followed by a further ten 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.

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.

Weather conditions were appropriate for frog detection with mild weather on each of the survey days (Table 1).

**Table 1.** Weather conditions during diurnal and nocturnal frog surveys at the study area.

Survey #	Diurnal	Nocturnal 1	Nocturnal 2
Date	25 Nov 2020	25 Nov 2020	16 Dec 2020
Start time	19:30	20:30	21:00
Finish time	20:30	21:45	21:50
Temperature (°C)	20.0	18.5	18.0
Humidity (%)	73	73	85
Wind speed average (km/h)	14	11	20
Wind direction	W	W	SW
Rain (mm)	0	0	0.1
Cloud cover (Octaves)	3/8	3/8	8/8
Preceding 24 hour rain (mm)	0	0	0

#### *Survey Hygiene*

To reduce the risk of infection and spread of amphibian disease, particularly chytrid fungus, the handling, collection and preservation was to follow standards used by the NSW National Parks and Wildlife Service (Department of Environment and Climate Change (NSW) 2008).

#### *Habitat Assessment*

The following habitat variables were measured and recorded during a Habitat conditions at the ponds were measured during the final diurnal survey:

- The location of potentially suitable habitat (Australian Map Grid co-ordinates);
- An analysis of the percentage cover of emergent, submerged, floating and fringing vegetation and terrestrial vegetation at both occupied (including sites where successful breeding is occurring) and unoccupied sites;
- Percentage cover and composition of terrestrial refuge sites (e.g. rocks, logs, debris) surrounding waterways and wetlands;
- Basic water chemistry analysis (dissolved oxygen, electrical conductivity, pH, turbidity, temperature, salinity);
- Information regarding water levels at sites;
- The type of surrounding habitat within 30 metres of each site;
- The location of potential dispersal routes and linked habitat; and,
- The presence and overall abundance of aquatic (Plague Minnow and other fish) and terrestrial predators (e.g. foxes, cats, birds).

Water chemistry was measured using a Horiba U-10 multi-parameter water quality analyser system on 25 November 2020, during the diurnal assessments.

General comments on the presence of pollutants, rubbish, refuse, or other threatening processes were made. A photograph of the waterbody was taken.

## Results

There are five historical records of Growling Grass Frogs, including a total of six individuals, within three kilometres of the study area based on a review of the Victorian Biodiversity Atlas (Figure 1) (Department of Environment Land Water and Planning 2020). None of these observations come from the study area. All are associated with Reedy Lake approximately 2.5 kilometres west of the study area, and range from 1991 to 2016 (Department of Environment Land Water and Planning 2020). We are aware of historic records from Lake Connewarre, approximately 1.5 kilometres south of the study area, although none were recorded within the three kilometre buffer of the study area (Department of Environment Land Water and Planning 2020).

The survey site is a large artificial dam located along a drainage line. The current landowner built the dam after purchasing the property in the early 1980s. Fill was taken from the creek to create the eastern dam wall. The owner states that it is up to 4 feet deep in the centre. A small island has been left in the northern portion of the dam, which is accessed via a bridge, also created by the landowner (pers comm. 25 November and 15 December 2020).

The dam is surrounded by planted Gums *Eucalyptus* spp. and some Black Sheoaks *Allocasuarina littoralis*, and other native vegetation. The fringing vegetation is a mix of indigenous vegetation, such as Narrow-leaved Cumbungi *Typha domingensis*, Rushes *Juncus* spp., and Slender Knotweed *Persicaria decipiens*, as well as exotic shrubs including Gorse *Ulex europaeus* and Flax-leaf Broom *Genista linifolia* (Plate 2). Further away, the study area includes mown, exotic grasses including Perennial Rye-grass *Lolium perenne* and Sweet Vernal-grass *Anthoxanthum odoratum*.

Instream and emergent vegetation was present, including exotic Water Lilies and Watermilfoil *Myriophyllum* sp., Water Ribbons *Triglochin* sp. and Duckweed *Lemna* sp. The dam appeared to be at approximately 80% of its capacity, with some areas of exposed banks. The water trickles over the eastern dam wall and further down the drainage line, which was dry at the time of the assessment (Plate 3). This drainage line ultimately terminates at Lake Connewarre.

No predatory fish were recorded when dip netting, or observed during nocturnal surveys, however tadpoles of an unknown species (not Growling Grass Frog) were recorded during each of the surveys. A variety of birds were observed on the dam including Australian Wood Ducks *Chenonetta jubata*, Grey Teal *Anas gracilis*, Chestnut Teal *Anas castanea*, Hoary-headed Grebe *Poliiocephalus poliocephalus*, Eurasian Coot *Fulica atra*, Purple Swamphen *Porphyrio porphyrio*, Black Swan *Cygnus atratus*, Little Pied Cormorant *Microcarbo melanoleucos* and Black Cormorant *Phalacrocorax sulcirostris*. Little Pied Cormorant had an overnight colonial roosting stie in the Black Sheoak tree. These bird species may predate upon tadpoles and frogs.

No gross pollutants were recorded, and the water quality appeared high. None of the parameters measured during the water quality analysis would preclude Growling Grass Frogs from occurring at the wetland (Appendix 1).



**Plate 2.** The survey site was generally fringed with Cumbungi



**Plate 3.** Water flowing over the dam wall into the drainage line

No Growling Grass Frogs were detected during any of the three surveys (Table 2). No Growling Grass Frog tadpoles were recorded during the assessment.

Four other frog species were heard during the surveys. All of these species are common to the local area, and throughout the majority of Victoria.

**Table 2.** Results of frog surveys at the study area. C = Calling (not seen).

Species		Diurnal Survey	Nocturnal Survey #1	Nocturnal Survey #2
<i>Litoria raniformis</i>	<b>Growling Grass Frog</b>	-	-	-
<i>Litoria ewingii</i>	Southern Brown Tree Frog	-	2C	5C
<i>Litoria verreauxii</i>	Whistling Tree Frog	5C	5C	25+C
<i>Crinia signifera</i>	Eastern Common Froglet	15+C	50+C	15+C
<i>Limnodynastes dumerilii</i>	Pobblebonk Frog	5C	25+C	5C

## Discussion

The quality of habitats within the study area was moderate to high, with a diversity of submerged, emergent and fringing vegetation and suitable water quality. A substantial number of frogs were heard during the current assessment, and the landowner recalls a “cacophony” of frogs on some nights after rain.

Despite this, Growling Grass Frogs were not recorded during the current assessment. There are a few records of Growling Grass Frog within the vicinity of the study area, but none within the drainage line, near the study area. Surveys were undertaken on nights that are suitable for the detection of the frog, being mild to warm nights, in early summer when Growling Grass Frogs are at their most vocal and most easily observed. Predators of tadpoles and frogs that may occur within the study area include ducks, herons and gallinules (Marchant and Higgins 1990), although these are unlikely to be a significant to a Growling Grass Frog population if it were present. Growling Grass Frogs appear not to have colonised the dam within the study area, or there is some unknown factor preventing the establishment of a population within the dam.

It is concluded that Growling Grass Frogs do not occur within the study area, that further management of this species is not required and that a referral under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) is not required.

Growling Grass Frog Survey, Ash Road, Leopold, Victoria

I trust the above is clear, but please call me if you have any queries (Mobile phone no: 0422 623 144).

Kind regards,

A handwritten signature in blue ink, appearing to read "Simon Scott", enclosed in a white rectangular box.

Simon Scott  
Principal Ecologist  
Ecolink Consulting Pty Ltd

## References

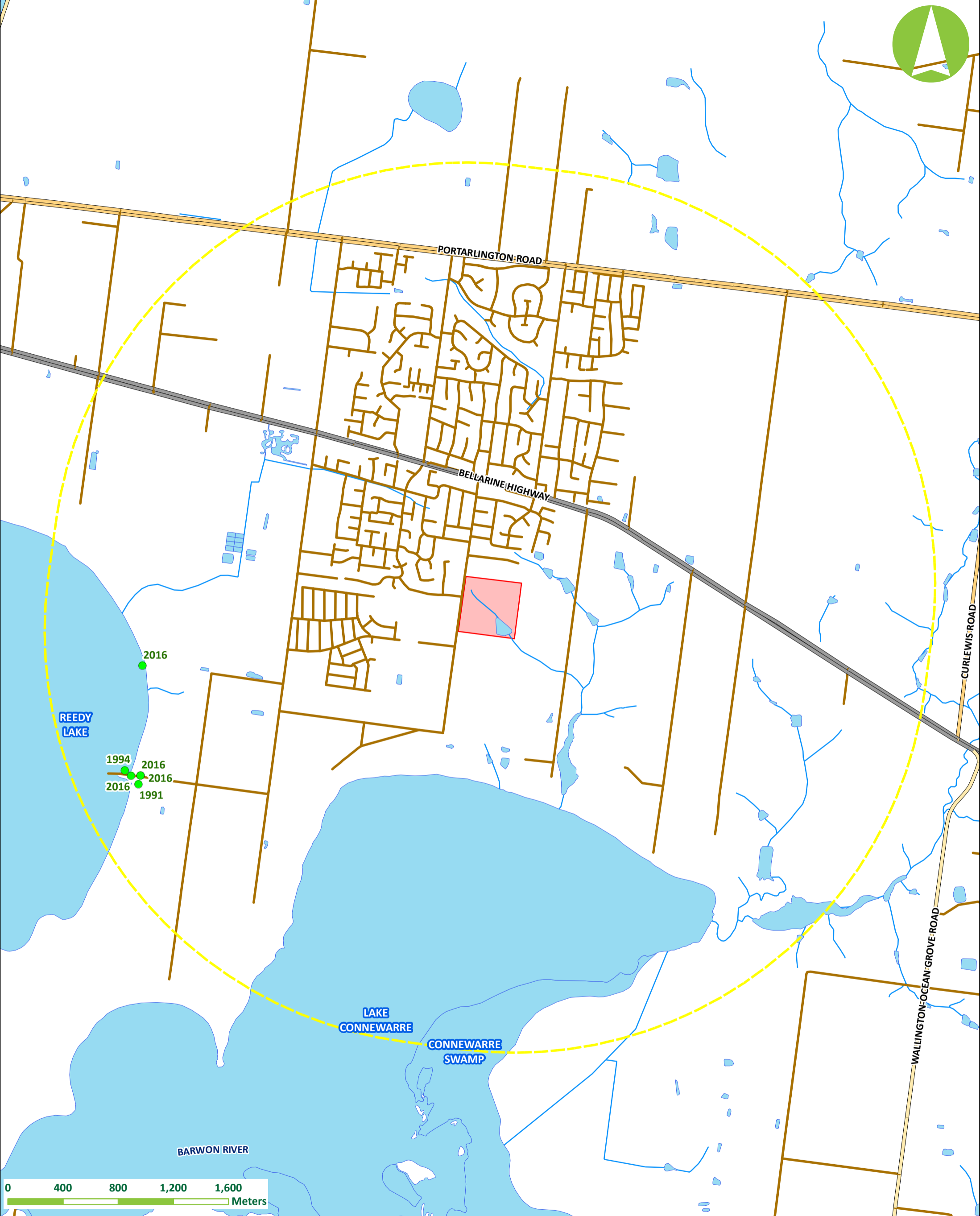
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**Figure 1:** Location of the study area  
 87-101 and 103-127 Ash Road,  
 Leopold

- Legend**
- Study Area
  - Survey Location

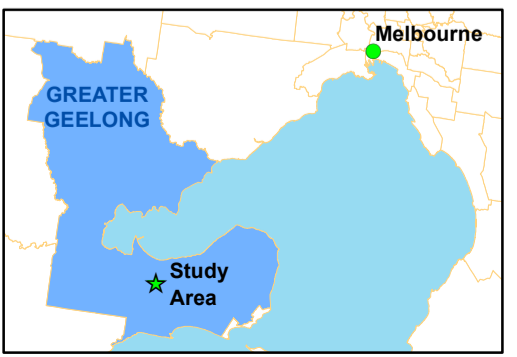




**Figure 2:** Historic records of Growling Grass Frog within 3kms of the study area.

87-101 and 103-127 Ash Road, Leopold

- Legend**
- Study Area
  - 3km Study Area Buffer
  - Growling Grass Frog records (date of record)



**Appendix 1.** Habitat variables measured to determine the suitability of dams at the study area.

Dam	Variable measured	Survey Site
<b>Description</b>	Approx. size	10,000m <sup>2</sup>
	Type of waterbody	Artificial dam
	Water level %	85
<b>Aquatic vegetation</b>	Floating vegetation %	15
	Submerged vegetation %	35
	Emergent vegetation %	15
	Fringing vegetation %	90
	Terrestrial vegetation %	100
<b>Terrestrial refuge sites (% `cover)</b>		5
<b>Water chemistry</b>	Dissolved oxygen (mg/L)	5.4
	Electrical conductivity (mS/cm)	1.8
	pH	7.6
	Turbidity (FTU)	10
	Temperature (°C)	17.0
	Salinity (ppt)	0.12
<b>Predators</b>	Aquatic	No
	Terrestrial	Yes (birds)