Year 2 Annual Compliance Report for 191 Springberg Lane, Perry Bridge (EPBC 2016/7755)

Date: 26th August 2025

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Ref: 14592

1 Introduction

Ecology and Heritage Partners Pty Ltd was commissioned by Riverlee Caruso Epping Pty Ltd to prepare an annual compliance report of the Growling Grass Frog *Litoria rainformis major* offsite offset site located at 191 Springberg Lane, Perry Bridge, Victoria in accordance with the Offsite Offset Management Plan (Ecology Australia 2020).

The offset site was established on 29 June 2023 as part of the EPBC approval (2016/7755) for the development at 215, 315W and 325C Cooper Street, New Epping. This current report is for Year 2.

1.1 Requirement for Compliance Report

The requirement for this compliance report is outlined in Section 9.1 of the Offset Management Plan (Ecology Australia 2020) and consists of a review of the annual landowner report and the annual Growling Grass Frog monitoring report.

1.2 Compliance Reporting Period

This compliance covers the second year of the establishment of the offset site from June 2024 to June 2025.

2 Compliance Findings

2.1 Non-compliance Findings

2.1.1 Growling Grass Frog Habitat Monitoring

An assessment of floristics (i.e. plant species and their cover along two transects per wetland) was not clearly described within the Growling Grass Frog habitat monitoring undertaken. Section 4.2 of the annual report (EcoCentric 2025) discusses the habitat features present, but does not include the results of the transects. Floristic assessments using transects must be undertaken in conjunction with Growling Grass Frog habitat monitoring for future surveys. An assessment of the floristics around each wetland will be undertaking during November/December 2025 Growling Grass Frog surveys.

Please refer to section 5.11 and Table 6, item 11 of the Offset Management Plan (Ecology Australia 2019).

2.2 Further Recommendations

2.2.1 Chytrid Control

Section 5.10 of the Offset Management Plan states that following must occur:

- Clean vehicles coming on site and/or ensure vehicles have been washed down immediately prior to coming on site;
- Clean and disinfect equipment to minimise the rest of introducing or spreading chytrid fungus;
- Clean and disinfect footwear when working around growling grass frog habitat; and,
- Monitor the cover of shrubs or trees >2m tall within 10m of wetlands and control them as required, to ensure wetlands are not shaded.

While the landowner confirmed that wash down is complete by those entering site (i.e. ecologists), no evidence can be provided of this.

A logbook be kept for future site visits to document anyone who enters the offset sites and confirm that wash down procedure has been followed.

The OMP requires the monitoring and control of shrubs or trees >2m tall within 10m of wetlands to ensure wetlands are not shaded and thresholds for tree cover within the Offset Management Plan are not exceeded. Future chytrid control efforts must include the monitoring of shrubs >2m tall within 10m of the wetland.

Section 4.2.2.2 of the Annual Monitoring Report (Ecocentric 2025) includes a statement that there was no evidence of new swards of establishing trees within the site, but does not explicitly address when monitoring was undertaken, or a break down for the applicable offset areas.

2.2.2 Growling Grass Frog Population Monitoring

Section 5.11 of the OMP states that two surveys should ideally be undertaken twice annually, in November/December and January-March.

In total, three Growling Grass Frog Surveys were undertaken at the study area. Two of these surveys occurred within the calling period (21 November 2024 and 19 December 2024) and one was conducted during the active season. These surveys are in accordance with the management actions of the OMP.

A specific trigger exists for further management actions for the following:

- a decline of ≥10% in the total number of individuals recorded during summer surveys over 3 consecutive years
- An overall decline of ≥25% in annual average number of individuals recorded during summer surveys over a 3 year period
- A decline of >50% in a single year

One GGF was recorded in wetland and none were recorded in wetland 3 in the 2023/2024 survey events, and none were recorded in either wetland in the 2024/2025 survey events. Given there has been a drop in recorded individuals since the 2022 surveys, this may trigger further management actions, noting that the

habitat improvement works undertaken previously may be contributing to the limited presence of the species to date, but that numbers are anticipated to increase in the coming years.

2.2.3 Growling Grass Frog Habitat Monitoring

Section 5.11 of the OMP states that the following must occur biannually:

- An assessment of the cover of floating and submergent vegetation;
- An assessment of the cover of emergent vegetation surrounding the wetland;
- An Assessment of inter tussock areas in terrestrial habitat around wetlands;
- An assessment of remaining terrestrial habitat dominated by mown grassy areas;
- An assessment of the cover of rocs and logs for calling, perching, basking and overwintering habitat;
- Assessment of water quality and availability;
- An assessment of the area and cover of riparian fringing, emergent and floating/submergent vegetation;
- An assessment of water quality (i.e. temperature, electrical conductivity, salinity pH, turbidity, dissolved oxygen); and,
- An assessment of average depth of each wetland and how full (%) each wetland is.

While qualitative data on Growling Grass Frog habitat was collected, quantitative data is required so that measurable comparisons can be made about the offset sites over time.

Future Growling Grass Frog habitat monitoring must include the collection of quantitative data on Growling Grass Frog habitat within the offset sites for during subsequent surveys.

2.3 Incidents

No incidents have been reported during management of the offset sites in Year 2.

Landowner(s):_John Robert Cromb **Site Reference:** TFN-C2029_2 (Off-INT9140-191 Springberg Lane-Perry Bridge)

Management Actions –Fencing, Photopoints, Erosion, Signage, Grazing, Burning Year: 2024-2025

Year	**Site and Zone(s)** (e.g. 001/A)	**Management action to be completed**	**Standard to be achieved** (from OMP)	**Description of action from OMP** (Management actions and Targets are found listed in the Offset Management Plan appended to your Deed of Covenant)	**Timing** (From the OMP) (What time of year?)	**Actions completed this year (yes/no)** (if no state % completed)	**Description of Action** (What method of control did you use? E.g. Hand weeding/spot spray using glyphosate)	**Comments and Observations** (Have you noticed any changes in the vegetation, fauna or other features of the site e.g. have you found new species, have the weed/pest increased/ decreased/ remained the same?)
1	All	**Fence offset sites to exclude stock and prevent access.**	Livestock and Unauthorised vehicles excluded from he offset area (DSE 2009b)	Offset sites fenced in accordance with management standards (DSE 2009b). Gates kept closed at all times. Fences regularly inspected and repaired as necessary. Exclude stock, unauthorised access and vehicles from the offset area. Construct and maintain fencing to the cattle and sheep standard outlined in DSE (2009b). If new fences are required to control new and emerging threats, fencing design will incorporate the standards outlined above for stock.	With a month of this OMP coming into force.	Yes	Inspections regularly. All stock excluded. Gate kept closed at all times. Electric fence around wetland boundary.	Fence in good condition.
		Increase freshwater wetland area at offset sites	The area of freshwater wetlands will be increased at both offset sites. At the southern offset site, at least three small wetlands will be constructed at the northern end of the offset site to	-At southern offset site, construct at least 3 small wetlands as outlined in Figure 7 to capture surface runoff. - At the northern offset site: -Construct a small, deep perched wetland adjacent to the existing soak to be fed by overflow from the existing soak.	Within 1 year of commencement of OMP	Yes		Completed 3 years ago.

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			capture overland flows following rainfall. At the Northern offset, a small, deep, perched wetland will be constructed adjacent to the existing soak, which will be fed by overflow from the soak. In addition, the pipe will be removed from the causeway in the south eastern corner of the offset site, and the causeway upgraded. This will allow overflows from the spring ad overland flows down the small drainage line to backfill and pool upstream of the causeway. Construction of additional wetlands done in a sensitive way to minimise environmental impact.	-Remove the pipe that allows flow under the causeway, raise the causeway and create a slightly lower, strengthened area to allow for overflows. This will allow the area upstream of the causeway to backfill due to overflow from the existing soak and overland flows, creating a large area of wetland habitat. - Wetlands to be constructed to minimise damage to Growling Grass Frog habitat, such as construction using a long armed excavator from outside the offset and avoiding dense vegetation where Growling Grass Frogs may be sheltering. Where vegetation may be impacted, pre clearance searches and relocation may be required.				
1-10		**Maintain existing spring fed soak at northern offset site.**	Maintain the existing conditions in the existing soak at the northern offset site. Overflow can be used to maintain new constructed wetlands at the northern offset site	The existing soak at the northern offset site will be maintained in its current form, with dense fringing vegetation and areas of submergent and floating vegetation.	Ongoing	yes		

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1-10		**Management of natural recruitment**	<10 m from wetlands, cover of native trees and shrubs >2 m should be kept below 20% >10 m from wetlands, cover of native trees and shrubs >2 m should be kept below 50% Cover of trees >5 m tall should not exceed 10% across the offset sites.	Recruitment of trees and shrubs should be controlled where required. Cover should be controlled depending on distance from wetlands and size of trees and shrubs as follows: -Within 10 m of each wetland, cover of trees and shrubs over 2 m should be kept below 20%. If cover exceeds 20%, cover of shrubs and trees should be reduced to <10%. -More than 10 m from wetlands, cover of trees and shrubs over 2 m should be kept below 50%. If cover exceeds 50%, cover of shrubs and trees should be reduced to <20%. -Cover of trees over 5 m tall should not exceed 10% throughout each offset site. The removal or damage of native vegetation will require pre-approval by Trust for Nature to temporarily waive the relevant provisions of the Conservation Covenant.	Annually in spring	Yes		
1	Southern Offset site	**Manage salinity**	Saline inflows from Perry River reduced as a result of any infill works.	Investigate the potential to fill in low areas along the riverbank of the Perry River to reduce saline inflows during very high tide events (e.g. king tides with strong winds) -Modification to bank height will be done in a sensitive manner to reduce potential impacts to Growling Grass Frogs and their habitat (e.g. using a long armed excavator from the unvegetated wetland).	Within 1 year of commencement of OMP	No	Unable to be completed until drought dries swamp out	

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			Small, constructed wetlands function as additional freshwater refuges on site.	Construct at least three small freshwater wetlands to intercept surface flows before they enter the wetland.		Yes	Small Wetlands completed	
1	Northern offset site	**Manage salinity**	An additional perched wetland constructed. The causeway upgraded.	At the northern offset site -Construct a perched wetland adjacent to the existing soak, to be fed by overflow from the soak. -Remove the pipe under the causeway and raise the causeway, to inundate the existing drainage swale and reduce saline intrusion from the Perry River into this site. - Improve that causeway to reduce saltwater intrusion from the Perry River and increase area of freshwater habitat.	Within 1 year of commencement of OMP	Yes	Completed to above flood level	
1		**Overwintering Sites**	Add logs and large rocks/boulders to the offset sites within the first year of the OMP	Place more logs and rocks at each offset site to provide more overwintering sites for Growling Grass Frogs.	Within the first year of the OMP	Yes	Completed	
1-10		**Manage Wetland depth and vegetation cover**	-Emergent vegetation cover <50% in all wetlands. -Depth of wetlands has not declined by 25% due to sediment deposition.	- Monitor vegetation cover and depth of wetlands. - If emergent vegetation cover exceeds 50%, remove emergent vegetation so cover is reduced to approximately 10%.	Monitor annually, control as required	Yes	No action required	

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				- If depth of wetlands decreases by 25% due to deposition of sediments, remove sediments. - A maximum of 50% of wetlands will have their vegetation/sediment removed in a 12 month period				
1-10		**Chytrid Control**	-Wash down and disinfect vehicles, equipment and footwear before working in and around wetlands -No major Growling Grass Frog population declines outside of expectations based on annual conditions.	When working in the offset sites: -Clean vehicles coming on site and/or ensure vehicles have been washed down immediately prior to coming on site. Offset Management Plan: 191 Springberg Lane, Perry Bridge Final 39 - Clean and disinfect equipment to minimise the risk of introducing or spreading chytrid fungus. -Clean and disinfect footwear when working around Growling Grass Frog habitats. Monitor the cover of shrubs or trees > 2m tall within 10 m of wetlands and control them as required, to ensure that wetlands are not shaded.	Ongoing	Yes	Disinfectant used before entering site as required	

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1-10	All	**Growling Grass Frog population monitoring**	- Growling Grass Frog population surveyed twice annually. - Populations not declining beyond what is expected based on conditions.	The Growling Grass Frog population and habitat will be monitored twice annually. Growling Grass Frog population and habitat surveys as outlined above will be conducted twice per year for 10 years following onset of this OMP. Specific triggers for further management actions are as follows: - A decline of ≥10% in the number of individuals recorded during summer surveys over each of three successive years. - An overall decline of >25% in annual average number of individuals recorded during summer surveys over a three-year period. - A decline of >50% in a single year.	Monitoring will occur twice over each breeding/active season (preferably once in Nov/Dec and again in Jan/Feb)	Yes	Qualified ecologist Spring-Summer and Autumn surveys	
1-10	All	**Growling Grass Frog habitat monitoring**	- Habitat monitored twice annually, and supports features preferred by Growling Grass Frogs.	Each spring and autumn, Growling Grass Frog habitat quality will be assessed to identify any major changes to the habitat on site, with particular attention given to whether the habitat variables preferred by Growling Grass Frog at each wetland have changed. Habitat quality will be assessed biannually:	Annually in spring and autumn.	Yes	Qualified ecologist Spring-Summer and Autumn surveys Ecologist doing work	

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				• Vegetation cover and area • Floristics • Water quality • Pond depth • Sedimentation • Terrestrial habitat				

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Management Actions –Pest animals

Year	Site and Zone(s) (e.g. 001/A)	Management action to be completed	Standard to be achieved (from OMP)	Description of action from OMP (Management actions and Targets are found listed in the Offset Management Plan appended to your Deed of Covenant)	Timing (From the OMP) (What time of year?)	Actions completed this year (yes/no) (if no state % completed)	Description of Action (What method of control did you use? E.g. Hand weeding/spot spray using glyphosate)	Comments and Observations (Have you noticed any changes in the vegetation, fauna or other features of the site e.g. have you found new species, have the weed/pest increased/ decreased/ remained the same?)
1-10	All	**Pest animal Control - Rabbits**	Foxes, rabbits and hares not present within 500 m of offset site.	Rabbits will be monitored biannually in spring and autumn at the same time as habitat monitoring, and controlled where found. If rabbits are found on site, an integrated approach using fumigation, hand collapsing of burrows and baiting will be used to control rabbits (DSE 2012b). Carcasses will be removed to prevent native predators being poisoned.	Monitored biannually in Spring and Autumn. Monitoring ongoing and control as required	Yes	Foxes-Foxoff & Shooting Rabbits-Shooting if sighted Hares-Shooting if sighted Deer-Shooting	
1-10	All	**Pest animal Control - Foxes**		Foxes will be controlled if recorded at the property. If found, fox dens will be destroyed via fumigation followed by hand collapse.	Monitoring ongoing and control as required	Yes	Fox off	No dens on property Bait taken on a number of occasions. Foxes have been sighted on property
1-10	All	**Pest animal Control - Hares**		Hares will be monitored biannually in spring and autumn at the same time as habitat monitoring, and controlled where found.	Monitored biannually in Spring and Autumn. Monitoring ongoing and control as required	Yes	None required	Rarely seen
1-10	All	**Pest animal Control - Deer**	Deer are kept at low abundance.	Deer species including Hog Deer species should be controlled on site. Deer species except for Hog Deer can be controlled on private property without a permit. Controlling Hog Deer on private property requires an Authority to Control Wildlife Permit from DELWP.	Monitoring ongoing and control as required	Yes	Hog deer numbers culled in April by hunters with licences & permits	

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1-10	All	**Pest animal Control – Predatory Fish**		Fish will continue to be excluded from these wetlands – improving the causeway at the northern site and building up low areas along the riverbank at the southern offset site will reduce the likelihood of fish colonising wetlands. However, if wetlands are found to be colonised by predatory fish, they will be allowed to dry out naturally by diverting spring waters. However, only 50% of wetlands at an offset site will be allowed to dry out in a single year.	Monitoring ongoing and control as required	Yes	Northern site levee secure	
						No	Southern site when dry	
1-10	All	**New and emerging pest animal species**	**N/A**	Monitoring will also be used to identify new and emerging pest species. New pest species identified on site will be controlled.	Monitoring ongoing and control as required	Yes		No new pest species

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Management Actions –Introduced plant species

*New and emerging weeds should also be documented here

The targets of either to control or eliminate should be reached by the end of the 10 year offset period

Year	Site and Zone(s) (e.g. 001/A)	Species	Baseline Cover abundance	Standard to be achieved (from OMP)	Description of action from OMP (Management actions and Targets are found listed in the Offset Management Plan appended to your Deed of Covenant)	Timing (From the OMP) (What time of year?)	Actions completed this year (yes/no) (if no state % completed)	Description of Action (What method of control did you use? E.g. Hand weeding/spot spray using glyphosate)	Comments and Observations (Have you noticed any changes in the vegetation, fauna or other features of the site e.g. have you found new species, have the weed/pest increased/ decreased/ remained the same?)
High Threat Weeds (Woody Weeds)									
		Blackberry *Rubus fruticosus spp. agg.*		Infestations of woody weeds to be controlled within 1 month of this OMP coming into force. All woody weeds encountered on site eradicated.	Monitor the site for weeds annually in spring. Eradicate woody weeds encountered on site prior to them setting seed. Where possible, physical removal should be the favoured method of control. Herbicides use should be avoided where possible. When used, herbicides should be applied: - Using wick wiping rather than spraying as much as possible. -Using non-residual herbicides with reduced toxicity to aquatic animals (e.g. RoundUp Biactive) -More than 2 m from water bodies. Areas where woody weeds were controlled should be regularly inspected for regrowth, and any regrowth controlled before setting seed.	Within 1 month of this OMP coming into force. Annually in spring thereafter	Yes	Ongoing spray as required using roundup biactive	

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Herbaceous weeds									
		Herbaceous weeds		-Cover of herbaceous weeds not to exceed current levels. -Cover of target weeds <1% by the end of the 10 year management plan. -No new threatening weeds on site.	Monitor weed cover across the offset site. Current levels to be determined during first year of monitoring. Use physical removal where possible and where herbicides are used, use less toxic herbicides and use wet wicking as much as possible to reduce off target impacts (i.e. to native vegetation and wetlands)	Annually in Spring	Yes	Roundup biactive	
		Tall Wheat-grass *Lophopyrum ponticum* (High Threat)		Cover of high threat weeds does not increase, and preferably cover declines.	Remove manually or spot spray with an appropriate herbicide. Use physical removal where possible and where herbicides are used, use less toxic herbicides and use wet wicking as much as possible to reduce off target impacts (i.e. to native vegetation and wetlands).	Remove manually at any time, spot spray in spring.	Yes	Wick wiping with roundup bioactive	

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		New and emerging high threat weeds		No new threatening weeds on site.	Monitor and eliminate new and emerging weeds	Annually in Spring	Yes	None required	No new threatening weeds found

Additional Comments: _____

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PHOTO POINT MONITORING SHEET

Photo Point Number	Location of Photo Point	Site and Zones	Direction	Date	Notes/Observations	Photo
PP1	*NE corner*	*001/A*	*60°N*	*13/1/2018*	*Survey peg disappeared! Replaced with new peg. 1 Banksia has died and fallen over, regeneration of approx. 50 wattles (still tiny, not visible in photo)*	 *To insert your photo, right click the photo above and select 'Change Picture' and navigate to your photo point photograph in your files then select 'Ok'.*

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PP1	**North Pond North End**		**North**			

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PP2	**North Pond South End**		**South**			

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PP3	**South Pond South End**		**South**			

*** Please email this form along with your photopoints to Trust for Nature at offsetsreporting@tfn.org.au**

PP4	**South Pond Middle**		**South**			

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	South Pond North End		**<u>North</u>**			

*** Please email this form along with your photopoints to Trust for Nature at offsetsreporting@tfn.org.au**

Please insert here or attach separately any supporting documentation (i.e. receipts for works completed, photos of works etc.)

I hereby declare that the supplied information contained within this report is accurate and complies with all the reporting requirements under the Offset Management Plan

Signed: _____ **Name:** J Robert Cromb **Date:** 03/05/2025

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PERRY BRIDGE: GROWLING GRASS FROG ANNUAL MONITORING 2025

EPBC PERMIT 2016/7755

August 2025

ecocentric

PERRY BRIDGE:

GROWLING GRASS FROG ANNUAL MONITORING 2025

EPBC Permit 2016/7755

Date:

August 2025

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Document history:

REVISION	DATE	DETAILS	AUTHORISATION
01	22-Aug-2025	Final draft for review	Ecocentric

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ACKNOWLEDGEMENTS

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- Robert Cromb: Landowner
- Martin Potts: Greening Australia
- Professor Geoff Heard: UNU and UQ
- Gondwanan Ecosystems Management Pty Ltd

ACRONYMS / ABBREVIATIONS

TERM	DEFINITION
BCS	Bioregional Conservation Status
CaLP Act 1994 (Vic)	Victorian Catchment and Land Protection Act 1994
Cwlth	Commonwealth
DBH	Diameter at Breast Height
DCCEEW	Federal Department of Climate Change, Energy, the Environment and Water (formerly DAWE)
DEECA	Victorian Department of Energy, Environment and Climate Action (formerly DELWP)
EPBC Act 1999 (Cwlth)	Commonwealth Environment Protection and Biodiversity Conservation Act 1999
EVC	Ecological Vegetation Class
EDD	Extended Detention Depth
FFG Act 1988 (Vic)	Victorian Flora and Fauna Guarantee Act 1988
GIS	Geographical Information System (mapping system)
MNES	Matter of National Environmental Significance
NTW	Normal Top Water Level
P&E Act 1987 (Vic)	Victorian Planning and Environment Act 1987
PSP	Precinct Structure Plan

TERM	DEFINITION
SBV	Strategic Biodiversity Value
TPZ	Tree Protection Zone
VBA	DEECA's Victorian Biodiversity Atlas
VQA	Vegetation Quality Assessment

GLOSSARY

TERM	DEFINITION
Bioregion	Biogeographical areas that capture the patterns of ecological characteristics in the landscape or seascape, providing a natural framework for recognising and responding to biodiversity values.
Bioregional Conservation Status (BCS of an EVC)	A state-wide classification of the degree of depletion in the extent and/or quality of an Ecological Conservation Class (EVC) within a bioregion in comparison to the State's estimation of its pre-1750 extent and condition.
Canopy tree	See 'Native Canopy Tree'.
Diameter at Breast Height (DBH)	The diameter of the trunk of a tree measured over bark at 1.3m above ground level.
Drip line	The outermost boundary of a tree canopy (leaves and/or branches) where the water drips onto the ground.
Ecological Vegetation Class (EVC)	A type of native vegetation classification that is described through a combination of its floristic, life form and ecological characteristics, and through an inferred fidelity to particular environmental attributes. Each EVC includes a collection of floristic communities (i.e. lower level in the classification that is based solely on groups of the same species) that occur across a biogeographical range, and although differing in species, have similar habitat and ecological processes operating.
EVC benchmark	A standard vegetation quality reference point relevant to the vegetation type that is applied in habitat hectare assessments. Represents the average characteristics of a mature and apparently long-undisturbed state of the same vegetation type.
Habitat Hectare	A site-based measure of quality and quantity of native vegetation that is assessed in the context of the relevant native vegetation type.
Habitat score	The score assigned to a Habitat Zone that indicates the quality of the vegetation relative to the EVC benchmark – sum of the site condition score and landscape context score usually expressed as a percentage or as a decimal fraction of 1.
Habitat Zone	A discrete area of native vegetation consisting of a single vegetation type (EVC) with an assumed similar quality. This is the base spatial unit for conducting a habitat hectare assessment.
High threat weed	Introduced plant species (including non-indigenous 'natives') with the ability to out-compete and substantially reduce one or more indigenous life forms in the longer term, assuming on going current site characteristics and disturbance regime.

TERM	DEFINITION
Matters of National Environmental Significance (MNES)	There are nine MNES identified under the EPBC Act 1999 (Cwlth): World Heritage properties; National Heritage places; wetlands of international importance (listed under the Ramsar Convention); listed threatened species and ecological communities; migratory species protected under international agreements (protected under international agreements); Commonwealth marine areas, the Great Barrier Reef Marine Park; nuclear actions (including uranium mines); and water resources in relation to coal seam gas development and large coal mining development.
Native canopy tree	A native canopy tree is either: ○ a mature tree (able to flower) that is greater than three metres in height and is normally found in the upper layer of the relevant vegetation type (EVC); or ○ a standing dead tree (stag) if it has a trunk diameter of 40 centimetres or more at a height of 1.3 metres above the ground.
Native vegetation	Native vegetation is defined in the Victoria Planning Provisions as 'plants that are indigenous to Victoria, including trees, shrubs, herbs and grasses'.
Offset	Protection and management (including revegetation) of native vegetation at a site to generate a gain in the contribution that native vegetation makes to Victoria's biodiversity. An Offset is used to compensate for the loss to Victoria's biodiversity from the removal of native vegetation. Offsets are to be secured in perpetuity with an on-Title conservation covenant.
Offset target	The amount of Offset required, measured in Habitat Units, to ensure permitted clearing of native vegetation results in no net loss in the contribution made by native vegetation to Victoria's biodiversity.
Patch of native vegetation	A patch of native vegetation is either: ○ an area of vegetation where at least 25 per cent of the total perennial understorey plant cover is native; or ○ any area with three or more native canopy trees where the drip line of each tree touches the drip line of at least one other tree, forming a continuous canopy; or ○ any mapped wetland included in the current wetlands layer available in NVIM and other DEECA systems.
Perennial understorey	Plants that usually live for more than two years and are found in the lower layers of vegetation, like grasses and shrubs.
Plant cover	The proportion of the ground that is shaded by vegetation foliage when lit from directly above.
Recruitment	The production of new generations of plants, either by allowing natural ecological processes to occur (regeneration etc.), by facilitating such processes, or by actively revegetating (replanting, reseeding). See revegetation.
Revegetation	Establishment of native vegetation to a minimum standard in formerly cleared areas, outside of a remnant patch.
Scattered trees	A scattered tree is a native canopy tree (see 'Native Canopy Tree' above) that does not form part of a patch. Scattered trees have two sizes, small and large:

TERM	DEFINITION
	○ a small scattered tree is less than the large tree benchmark for the species in the relevant EVC; ○ a large tree is equal to or greater than the large tree benchmark for the species in the relevant EVC; ○ a standing dead tree that does not form part of a patch is treated as a large scattered tree if it has a trunk diameter of 40 centimetres or more at a height of 1.3 metres above the ground.
Tree Protection Zone (TPZ)	Calculated area (based on AS 4970-2009 (Protection of trees on development sites)) of soil volume required to encompass sufficient absorbing tree root systems to ensure the long-term survival of a tree. Trees may be considered as lost (and may require an Offset) if impacts of greater than 10% intrusion into the TPZ occur.
Vegetation Quality Assessment (VQA)	A site-based vegetation assessment method that measures the condition of native vegetation against a benchmark for the same vegetation type or Ecological Vegetation Class (EVC), where the benchmark represents the average mature condition of the EVC being assessed prior to European settlement. This is the method approved by the Department of Energy, Environment and Climate Action (DEECA) for assessing native vegetation for the purposes of regulation and investment. Qualified assessors undertake VQAs to determine the loss from clearing native vegetation and gains available at offset and investment sites.

1. INTRODUCTION

Ecocentric Environmental Consulting (Ecocentric) was engaged to conduct ecological monitoring of Growling Grass Frog (*Litoria raniformis*) (GGF) populations at three wetland systems within the property at 191 Springberg Lane, Perry Bridge, 3862, Victoria. The wetlands are covenanted and managed for the generation of Offset Credits for the mitigation of GGF habitat losses associated with two residential developments in Melbourne, namely: the New Epping Estate, in Epping (with EPBC Permit 2016/7755); and the Aurora Estate, in Epping North (with EPBC Permit 2007/3524). This report provides details of surveys conducted in accordance with EPBC Permit 2016/7755 for the New Epping Estate.

GGF is listed as vulnerable (listing advice 16-July-2000) under the EPBC Act (EPBC SPraT Database online 2025[1]), and listed as vulnerable (listing advice March-2025) under the FFG Act (FFG Threatened List online 2025[2]).

On-going monitoring of GGF at the offset sites is a compliance requirement of the aforementioned EPBC Permits and conditions set out therein.

Table 1 below identifies the projects, the EPBC Permits and the on-site wetlands utitlised for the generation of Offset Credits in accordance with the Commonwealth's *Environment Protection and Biodiversity Conservation (EPBC) Act Environmental Offset Policy* (DSEWPC 2012[3]; hereafter the EPBC Environmental Offset Policy).

Table 1. EPBC Permits and project summary

PROJECT / PERMIT	PROPONENT	MNES LOSS	GGF OFFSET AREA
New Epping Estate EPBC Permit 2016/7755	Riverlee Caruso Epping Pty Ltd	Loss of 17.39 hectares of GGF habitat – 68.7% to be offset onsite, 31.7% (5.51 hectares) to be offset at Perry Bridge.	Two offset sites totalling 6.9 hectares for the protection of GGF.
Aurora Estate EPBC Permit 2007/3524	Development Victoria (current proponent) & Lendlease Communities (Australia) Ltd (proposed incoming proponent)	Significant impacts to GGF population at one artificial dam, originally to be offset onsite with new habitat and the establishment of a self-sustaining GGF population. In the absence of a self-sustaining population establishing in the new habitat, an offsite offset is now required.	10 hectares minimum for the protection of GGF.

[1] http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=1828
[2] https://www.environment.vic.gov.au/conserving-threatened-species/threatened-list
[3] https://www.dcceew.gov.au/environment/epbc/publications/epbc-act-environmental-offsets-policy

The landowner is required to submit a report detailing the results of GGF monitoring to the Federal Department of Climate Change, Energy, the Environment and Water (DCCEEW) in accordance with conditions set out in the respective GGF EPBC Offset Management Plans (OMPs). In general, the annual report must include:

- Details of management actions, including on ground works, undertaken within the reporting period;
- Results of targeted surveys for GGF and the GGF population;
- Site photographs;
- Details of compliance or non-compliance with the schedule of management actions; and
- Details of compliance or non-compliance with performance targets.

Targeted survey monitoring of GGF at this site has previously been conducted by Gondwanan Ecosystems Management Pty Ltd (GEM) during the summer breeding seasons of 2021-22, 2022-23 and 2023-24. These surveys are summarised in Table 2 below.

Table 2. GEM GGF targeted survey reporting

SEASON	SUMMARY
2021-22	Surveys of central wetland complex (Wetland 01) for EPBC Permit 2007/3524 for the Aurora Estate development. Surveys were conducted in late Autumn, outside of the GGF calling and breeding season, and thus outside of the ideal GGF survey season.
2022-23	Surveys of central wetland complex (Wetland 01) for EPBC Permit 2007/3524 for the Aurora Estate development. Adult and tadpole surveys were conducted at appropriate times (December and January, respectively), but water quality wasn't assessed until a later (February) date, after water levels had dropped.
2023-24 a	Surveys of central wetland complex (Wetland 01) for EPBC Permit 2007/3524 for the Aurora Estate development. Adult surveys were conducted at appropriate times (December), and while tadpole surveys were conducted inside the recommended survey season (March), GEM recommended that future tadpole surveys be conducted earlier (late December to January).
2023-24 b	Surveys of the northern (Wetland 02) and southern (Wetland 03) wetlands for EPBC Permit 2016/7755 for the New Epping development. Adult surveys were conducted at appropriate times (December), and while tadpole surveys were conducted inside the recommended survey season (March), GEM recommended that future tadpole surveys be conducted earlier (late December to January).

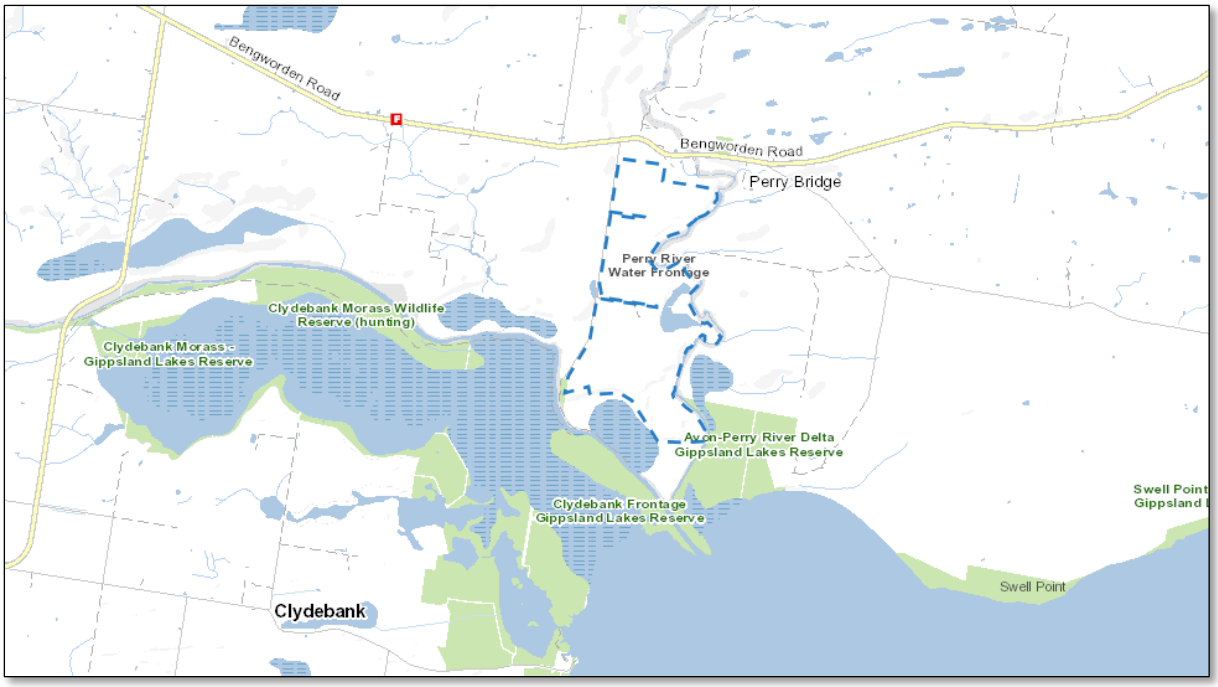
GEM survey results from the monitoring rounds summarised above are provided in Section 3.1 below.

This report additionally includes results from the most recent round of targeted surveys for GGF, conducted by Ecocentric during the summer breeding season of 2024-25. The targeted surveys were conducted using call playback, dip-net and bait trap methodologies, in accordance with Federally approved survey guidelines, and as required by the respective GGF EPBC OMPs. Results from this round of surveying are provided in Section 3.2, compliance progress with the GGF EPBC OMPs is reported in Section 4, and the status of the Offset wetlands is provided in Section 5.

The property is identified as 191 Springberg Lane, Perry Bridge 3862 and comprises multiple parcels (SPI: 1\PS818354; 0B~5\PP3982; 10C~5\PP3982; 11~5\PP3982 & 13~5\PP3982; see also Appendix 8.2 GIS aerial mapping). The property is within a Farming Zone (FZ), and has numerous overlays including: Bushfire Management Overlay (BMO) (small area in the NE); Design and Development Overlay (DDO6) (whole property); Environmental Significance Overlays (ESO1 and ESO2) (southern sectors), and a Floodway Overlay (FO) and Land Subject to Inundation Overlay (LSIO) (Perry River

riparian corridor). The riparian sector of the property is also identified as being within an area of Aboriginal Cultural Heritage Sensitivity.

Figure 1. Property location



Please note that this report concerns itself **primarily with monitoring and reporting obligations associated with the New Epping development**. An additional report has been prepared by Ecocentric for the Aurora development (Ecocentric 2025).

1.1 ECOLOGY OF GROWLING GRASS FROG

The Growling Grass Frog is one of the largest frog species in Australia. It reaches up to 104 mm in length, with females usually larger (60-104 mm) than males (55-65mm) (EPBC SPraT Database online 2025). Recent genomic analysis has identified that *Litoria raniformis* comprises northern and southern lineages, identified as two sub-species; *L. r. raniformis* for the northern lineage and *L. r. major* for the southern lineage (Voros *et al.* 2023). There are numerous colour morphs identified in the field for each of the sub-species, but specimens consistently display a clearly demarked line with a black lower margin that runs from the nostril through the eye along the dorso-lateral margin to the groin (see also Voros *et al.* 2023 for photoplates of colour variations).

GGF is largely associated with permanent or semi-permanent still or slow-flowing water bodies. There is a strong correlation between the presence of the species and key vegetation attributes, particularly a diversity of emergent, submerged and floating vegetation (DEPI 2013; Hamer & Organ 2008). Hamer & Organ (2008) noted that occupied waterbodies had a greater proportion of submerged vegetation, a higher pH, and were situated close to other occupied waterbodies, generally less than 200m apart (NB: a higher pH may facilitate the establishment of aquatic vegetation and may not therefore be in itself a determinant factor for GGF occupancy).

GGF is dependent upon permanent freshwater lagoons for breeding and is observed in amplexus at the shallow margins of wetlands where there is generally a complex vegetation structure. Submerged vegetation is also important for breeding success as it provides sites for egg-laying, calling stages for males, and food and shelter for tadpoles (EPBC SPraT Database online 2025; *Growling Grass Frog*

Habitat Design Standards[4] DELWP 2017). Favourable habitat features include abundant aquatic vegetation, rock piles around the margins and in the shallows, minimal tree canopy cover, moderate to low water salinity levels, and water for at least six months of the year over the breeding season.

GGF living in water bodies with warmer water temperatures (up to 27 degrees) and moderate salinity have been found to have lower rates of Chytrid Fungus infection and mortality compared with those living in colder and fresher water sites. Wetlands with warm, moderately salty water also appear to act as refuges from Chytrid Fungus for the resident GGF populations, which therefore have a lower probability of extinction (Heard *et al.* 2014, Heard *et al.* 2015).

It is also understood that GGF utilise habitat areas that surround the breeding wetlands where they take refuge over colder months, over-wintering in soil cracks, fallen timber, debris and dense vegetation, and in muddy sites of low, frequently inundated floodplains (DELWP 2017; *GGF SPraT profile*; Garvey (2021)). Garvey (2021), using radio-tracking, identified that GGF will travel hundreds of metres from breeding wetland habitat in order to find suitable over-wintering habitat such as understorey habitat within remnant woodlands, and that where vegetation beside dams was limited, individuals abandoned waterbodies post-breeding, spending on average over half of the non-breeding season within remnant patches of eucalypt woodland. Total length of movement declined with increasing terrestrial vegetation cover within riparian zones, supporting the use of waterway buffers and retention of proximate remnant patches of dry eucalypt woodland to encourage long-term attendance at breeding sites within modified landscapes (Garvey 2021).

The photograph below is of GGF in amplexus on site (courtesy of Martin Potts, Greening Australia); note prominent dorsal strip and darker morph common to this area.

Figure 1: GGF photographed on site

[4] DELWP (2017). *Growling Grass Frog Habitat Design Standards* (Melbourne Strategic Assessment). Department of Environment, Land, Water and Planning, Melbourne.

1.2 PERFORMANCE TARGETS

The overall objective is to maintain a healthy population of GGF within the wetlands identified on site, which will serve as a meta-population for the species within the region.

The New Epping GGF EPBC OMP (Ecology Australia 2019) (and also the Aurora GGF EPBC OMP (Biosis 2018)) will be judged on the following:

- Maintenance of the relative cover of aquatic flora used for GGF breeding and surrounding scrub / woodland habitat used for over-wintering;
- Successful management of threats to the GGF population on site;
- Maintenance of the causeways and water flows on site;
- Completion of the monitoring programs set out in the OMPs.

This monitoring report provides details of the progress made on delivery of these performance targets; results are provided in Sections 3 and 4 below.

We note also that additional management programs, including maintenance of fences and exclusion of stock, plus weed and feral animal control programs, are also being implemented by the landowner in accordance with the conservation covenants on Title; annual management and monitoring reports regarding these are available on request from the landowner.

2. METHODOLOGY

Methods employed for this project included desktop review, assessments of the study area and targeted surveys for GGF in accordance with the OMP requirements and EPBC survey methodologies; as detailed below.

2.1 DESKTOP REVIEW

A desktop review was undertaken as the first component of this project. This involved a review of online data resources available from relevant Victorian and Commonwealth departments, and a review of available management reports and documentation from other sites within the region.

Existing datasets, modelling and mapping for the site that were reviewed and interrogated consisted of the following:

- NatureKit layers for extant and pre-1750 EVCs, Bioregions, Location Risk and Strategic Biodiversity Values (SBVs) within the property and surrounds (DEECA 2025[5]);
- EVC benchmarks (DEECA 2025[6]);
- Victorian Biodiversity Atlas (VBA) online database, recording location datapoints of significant flora and fauna in the region (DEECA 2025[7]);
- The Commonwealth's Environment Protection & Biodiversity Conservation Act 1999 (EPBC Act – Cwlth) Protected Matters Search Tool (PMST) database, modelling distributions of significant flora, fauna and vegetation communities in the region (DCCEEW 2025[8]);
- The Victorian government's open data platform (DataVic 2025[9]) for GIS mapping layers of DEECA species distribution and habitat importance models, as produced for the Victorian *Guidelines 2017 Offset* policy (DELWP 2017b);
- Aerial imagery to determine habitat extents and linkages (Google and ESRI streaming layers and LASSI imagery[10]);
- Property and Planning Scheme information (DTP 2025[11]); and
- Publicly available geospatial datasets.

Existing ecological investigations undertaken at the site were also reviewed. These include the following:

- *Aurora Growling Grass Frog Offset Management Plan (EPBC 2007/3524): 191 Springberg Lane, Perry Bridge, Victoria.* Report to Development Victoria and Lendlease Communities (Australia) Limited by Biosis, Melbourne (hereafter the **Aurora GGF EPBC OMP**) (Biosis 2018).
- *Offset Management Plan: 191 Springberg Lane, Perry Bridge (EPBC 2016/7755)*. Report to Verve Projects by Ecology Australia, Melbourne (hereafter the **New Epping GGF EPBC OMP**) (Ecology Australia 2019).
- *Growling Grass Frog Survey – Robert Cromb*. Report to the landowner by Gondwanan Ecosystems Management Pty Ltd (GEM 2022).
- *Growling Grass Frog Survey – Robert Cromb*. Report to the landowner by Gondwanan Ecosystems Management Pty Ltd (GEM 2023).
- *Growling Grass Frog Survey – Robert Cromb*. Report to the landowner by Gondwanan Ecosystems Management Pty Ltd (GEM 2024a).
- *Growling Grass Frog Survey – Robert Cromb*. Report to the landowner by Gondwanan Ecosystems Management Pty Ltd (GEM 2024b).

[5] https://www.environment.vic.gov.au/biodiversity/naturekit
[6] https://www.environment.vic.gov.au/biodiversity/bioregions-and-evc-benchmarks
[7] https://vba.biodiversity.vic.gov.au/vba/ - /
[8] https://www.dcceew.gov.au/environment/epbc/protected-matters-search-tool
[9] https://www.data.vic.gov.au/
[10] https://maps.land.vic.gov.au/lassi/
[11] https://www.planning.vic.gov.au/schemes-and-amendments/browse-planning-schemes

Maps of the study areas were developed from the respective GGF EPBC OMPs in the project GIS and were referred to on site during the assessment. Aerial photography of the site was generated from Google, ESRI and LASSI mapping sources and overlaid with the Title boundary data and GGF covenanted areas as defined by the EPBC OMPs and respective Title Plans.

2.2 STUDY AREA

The study area includes three main wetlands within the low-lying floodplains of the property adjacent to the Perry River, and a fourth site that comprises a chain of 14 wetland pondages being fed from a permanent water spring in the west of the property. Waters flow from the north of the site south to wetlands not included in this study, and from there into the Perry River.

Figure 2 (overleaf) identifies the four wetland systems, Perry River and the property cadastre boundaries.

Figure 2: Property and wetland systems

2.2.1 WETLAND COMPLEX 01 (CENTRAL): AURORA OFFSET

This wetland complex comprises three cells (wetland units) that are separated by causeways. The total Wetland 01 (central) covenanted area equates to 13.48 hectares. The northern and central wetland units comprise 4.05 hectares and 8.92 respectively (not including the causeway that separates them) and are characterised by Estuarine Wetland (EVC 10) and Aquatic Herbland (EVC 653), with Tall Marsh (EVC 821) at the margins, and with Swamp Scrub (EVC 53) in patches at the margins. The third, southernmost wetland unit of this complex comprises an additional 0.25 hectares (excluding the causeway) and is dominated by a Sandy Flood Scrub (EVC 141) / Swamp Scrub mosaic where it outflows to the Perry River south of this site.

The northern and central cells of this wetland complex are split by a central causeway that results in two main pondages. Water flow is via groundwater aquifers through the causeway. There is capacity to deliver additional waters to the northern pondage from a spring to the west of this complex (see also Section 2.2.4 below).

The second causeway near the southern end of the complex similarly manages the flow of waters via a raised standpipe that maintains water depths in the central wetland unit, and which drains to the Sandy Flood Scrub and Swamp Scrub habitat at the system's outfall; see also Biosis' (2018) Aurora GGF EPBC OMP mapping for details.

The floor of the northern and central wetland units is relatively flat, with open water areas that grade from 0.4m to 1.2m in depth (depending on seasonal rainfall events). The southern wetland unit is more ephemeral in nature, as reflected in the dominance of Swamp Paperbark (*Melaleuca ericifolia*) at this location.

Wetland complex 01 (central) looking NW from southern bank (Nov. 2024)

2.2.2 WETLAND 02 (NORTHERN): NEW EPPING OFFSET

Wetland 02 is fed by a permanent water spring in the northwest corner of site, as well as by surface / sub-surface waters and overland flows from the Perry River. Aquatic Herbland dominates the open water areas, with patches of Tall Marsh within and at the wetland margins. The open water area has varying depths ranging from less than 0.2m (which dry out in drier seasons) to approximately 1m. There are mature Gippsland Red Gum (*Eucalyptus tereticornis*) at the northern extent, as well as areas of dense sapling regeneration / revegetation, the result of works conducted by Trust for Nature prior to the commencement of this OMP. Pasture grasses dominate areas around the wetland, however there are ground logs that offer over-wintering habitat for GGF. Wetland 02 is approximately 4.05 hectares in area, and feeds waters to the Perry River.

Wetland 02 (northern) looking north from southern bank (Nov. 2024)

2.2.3 WETLAND 03 (SOUTHERN): NEW EPPING OFFSET

Wetland 03 receives water from surface / sub-surface waters and overland flows from the Perry River, and is comprised of Aquatic Herbland with Tall Marsh at the margins, with a narrow band of Swamp Scrub which fringes, and in some sites overhangs, the wetland's margins. There is a stand of remnant Gippsland Red Gum with regenerating understorey shrubs and graminoids at the southern extent. Wetland 03 is approximately 1.05 hectares in area, and feeds waters to wetlands downstream (which were not assessed as part of this study) as well as the Perry River. The base of this wetland increases in depth from 0.2m at the margins to approximately 1.2m in the centre.

Wetland 03 (southern) looking NE from above southern bank (Nov. 2024)

2.2.4 WETLAND SYSTEM 04 (WESTERN): NEW GGF HABITAT

There is a string of 14 recently (2023) constructed wetlands that are fed by a permanent water spring at the western extent of the complex. The wetlands have been constructed in accordance with guidelines set out in the *Growling Grass Frog Habitat Design Standards* (DELWP 2017), including provision of rocks at the wetland margins for GGF basking, as well as vegetated aquatic margins and submerged and emergent aquatic flora for breeding purposes. The wetland ponds are fenced and protected from stock, with a total area comprising approximately 4.95 hectares. The complex drains east to the northern wetland unit of Wetland 01 (central) site, with good connectivity to the broader wetland systems within the floodplain.

Wetland system 04 (western) looking south from northern bank (Nov. 2024)

2.3 GGF TARGETED SURVEYS

Targeted surveys for GGF commenced at the beginning of the 2025 breeding season in November 2024. Due consideration was given to the prevention of introduction or spread of amphibian Chytrid Fungus and the associated Chytridiomycosis. Assessor footwear was cleaned and sterilised prior to and after site visits, all equipment used was clean, dry and sterilised, and at no point were frogs handled or moved (see also DECC 2008).

Suitably warm and humid/wet weather was chosen to conduct surveys for GGF at a time when this species where being recorded at other sites in the region. Surveys were conducted by ecologists

familiar with GGF and the species' ecological characteristics and habitat preferences / requirements. Surveys were also conducted at reference sites known to support GGF populations on the same nights using the same methods. Ecocentric also receives on-line notification of GGF call-back surveys conducted during the breeding season by our ecological colleagues surveying other sites across Victoria via the Ecological Consultants Association of Victoria (ECAV) GGF record update website (available online[12]).

Numerous survey methodologies were conducted on site in accordance with the *Significant impact guidelines for the vulnerable growling grass frog* (Litoria raniformis) (DWEHA 2009[13]) and the *Survey Guidelines for Australia's Threatened Frogs* (DEWHA 2010[14]); as summarised below.

Pre-survey assessments

The property was assessed prior to GGF surveys commencing in order to identify suitable habitat areas across the property, develop an understanding of the wetland typology and nature of water flow / wetland interactions, and in order to assess habitat values that are available for the target species. Wetland access points were also determined in order to facilitate nocturnal activities and safe work practices.

Call playback

The call playback technique involved broadcasting an mp3 audio-file of a calling GGF male via a hand-held speaker and then listening for replies over a period of at least five minutes. This broadcast/listening process was conducted at least three times at each of the survey sites over a half hour period (see GIS aerial mapping in Appendix 8.2).

Listening

Listening was conducted by periodically pausing and remaining still and silent for several minutes, to listen for the male GGF's distinctive call. The location and number of individuals calling were recorded to the GIS.

Spotlighting/active searching

A hand-held spotlight was used to carefully search for adult frogs within and near the water's edge, including areas within and around submerged and floating aquatic vegetation and in terrestrial areas within 10 metres of the water's edge. This method included searching for the yellowish-orange reflection from the frogs' eye-shine under spot-light, and active searching for adult frogs.

Metamorph surveys: bait traps with fluorescent lures were deployed overnight and the vegetated aquatic margins were dip netted over several cycles at each survey location searching for GGF tadpoles, metamorphs and/or juvenile frogs. Dip-netting was deployed at the margins of wetlands where access was available and where sufficient water depths to support metamorph development were present. Tadpole identification was consistent with Anstis (2007), looking for the distinctive green tinge common to this species.

Pre-survey assessments of Growling Grass Frog habitat values across the property were conducted on 21st and 22nd November, 2024. Call playback, listening and spotlight surveys were also commenced on the night of 21st November, with follow-up surveys on 21st December, 2024. Growling Grass Frog were also recorded on both of these nights at Ecocentric's reference site using the same methodologies outlined above. Metamorph surveys were also conducted on 25th and 26th January, 2025 (see also Section 3.2 for weather conditions).

[12] https://ecavic.org.au/growling-grass-frog-calling-and-activity-diary/
[13] https://www.dcceew.gov.au/sites/default/files/documents/significant-impact-guidelines-litoria-raniformis.pdf
[14] https://www.dcceew.gov.au/sites/default/files/documents/survey-guidelines-frogs.pdf

All targeted surveys for GGF were conducted in accordance with the following approvals and permits held by Aquatica Environmental Pty Ltd:

- DEDJTR Wildlife and Small Institutions Animal Ethics Committee (WSIAEC approval No. 11.18);
- Scientific Procedures Fieldwork Licence (No. SPFL20394);
- *Fisheries Act 1995* General Research permit (No. RP1312);
- *Flora and Fauna Guarantee Act 1988* permit to "take protected fish" (No. 10010202); and
- *Wildlife Act 1975* (Vic) Research Permit (No. 10010109).

3. RESULTS

This section outlines the results of previous and current GGF monitoring conducted on site. Further discussion is provided in subsequent sections.

We note here that the Green and Golden Bell Frog (G&GBF, *Litoria aurea*) was also recorded during this survey and monitoring program. Whilst the focus of this report is on GGF, the presence of this species, also listed as Vulnerable under the EPC Act (effective 16-July-2000), is also of import, as discussed below in Section 4.5.3.1.

3.1 GGF SURVEY RESULTS 2022-2024

Gondwanan Ecosystems Management (GEM) have conducted three seasons of GGF monitoring at the site; the first two at the Wetland 01 (central) complex for EPBC Permit 2007/3524, and the third at the Wetland 01 (central) complex but also additionally at the Wetland 02 (northern) and Wetland 03 (southern) complexes for EPBC Permit 2016/7755. Details of these survey are available in the respective reports, and as summarized in the GIS aerial mapping that accompanies this report (Appendix 8.2 GIS mapping).

Results for each of the GEM survey rounds are detailed in Table 3 (season 2021-22), Table 4 (season 2022-23), and Tables 5 – 7 (season 2023-24), below.

Table 3. Season 2021-22, Wetland 01 (central) complex

SURVEY PHASE	DATE [1]	# ADULTS (CALLBACK / SPOTLIGHTING RESULTS)	# METAMORPHS (DIPNETTING / SPOTLIGHTING RESULTS) [2]	WATER QUALITY EC (mS/CM)
All	23 May 2022	1 GGF 0 G&GBF	0	2.3 – 9.9
	24 May 2022	0 GGF 0 G&GBF	0	-

Notes
1: Surveys conducted over two nights – unclear which night the results come from.
2: Gathered from 40 samples (20 locations x 2 nights each).
GGF: Growling Grass Frog (*Litoria raniformis*).
G&GBF: Green and Golden Bell Frog (*Litoria aurea)*.

Table 4. Season 2022-23, Wetland 01 (central) complex

SURVEY PHASE	DATE	# ADULTS (CALLBACK / SPOTLIGHTING RESULTS) [1]	# METAMORPHS (DIPNETTING / SPOTLIGHTING RESULTS) [2]	WATER QUALITY EC (mS/CM)
Adults	04-05 Dec. 2022	11 GGF 21 G&GBF	-	-
	06-07 Dec. 2022	1 GGF 2 G&GBF	(8 G&GBF tadpoles incidentally identified)	-
	11-12 Dec. 2022	9 GGF 29 G&GBF	-	-
Metamorphs	19 Jan. 2023	-	0	-
	20 Jan. 2023	-	0 GGF 1 G&GBF tadpole 3 G&GBF young	-
	21 Jan. 2023	(1 GGF adult incidentally identified)	0 GGF 2 G&GBF tadpoles 2 G&GBF young	-
Water quality	23 Feb. 2023	-	-	9.3 – 11.2

Notes
1: Total records over three December nights = 21 GGF + 52 G&GBF -> GEM population estimate = 11 GGF + 24 G&GBF.
2: Gathered from 23 samples (19 locations over 3 nights). Note zero records of GGF metamorphs.
GGF: Growling Grass Frog (*Litoria raniformis*).
G&GBF: Green and Golden Bell Frog (*Litoria aurea*).

Table 5. Season 2023-24, Wetland 01 (central) complex

SURVEY PHASE	DATE	# ADULTS (CALLBACK / SPOTLIGHTING RESULTS) [1]	# METAMORPHS (FUNNEL TRAPPING RESULTS) [2]	WATER QUALITY EC (mS/CM)
Adults & water quality	11-12 Dec. 2023	10 GGF 71 G&GBF	-	2.0 – 2.5
	13-14 Dec. 2023	1 GGF 1 G&GBF	-	
	14-15 Dec. 2023	1 GGF 48 G&GBF	-	
Metamorphs & water quality	Mar. 2024	-	0	8.0 – 12.2

Notes
1: Total records over three December nights = 12 GGF + 120 G&GBF (although GEM summarises as 28 GGF + 98 G&GBF) -> GEM population estimate = 19 GGF + 63 G&GBF.
2: Gathered from 5 samples (5 locations over 1 night).
GGF: Growling Grass Frog (*Litoria raniformis*).
G&GBF: Green and Golden Bell Frog (*Litoria aurea*).

Table 6. Season 2023-24, Wetland 02 (northern) complex

SURVEY PHASE	DATE	# ADULTS (CALLBACK / SPOTLIGHTING RESULTS)	# METAMORPHS (FUNNEL TRAPPING RESULTS) [1]	WATER QUALITY EC (mS/CM)
Adults & water quality	11 Dec. 2023	1 GGF 2 G&GBF	-	1.9
	13 Dec. 2023	0	-	2.0
Metamorphs & water quality	08 Mar. 2024	-	0	1.9 – 2.2

Notes
1: Gathered from 2 traps (2 locations over 1 night).
GGF: Growling Grass Frog (*Litoria raniformis*).
G&GBF: Green and Golden Bell Frog (*Litoria aurea*).

Table 7. Season 2023-24, Wetland 03 (southern) complex

SURVEY PHASE	DATE	# ADULTS (CALLBACK / SPOTLIGHTING RESULTS)	# METAMORPHS (FUNNEL TRAPPING RESULTS) [1]	WATER QUALITY EC (mS/CM)
Adults & water quality	11 Dec. 2023	0	-	2.3
	14 Dec. 2023	0	-	2.4
Metamorphs & water quality	10 Mar. 2024	-	0	9.0
	11 Mar. 2024	-	0	9.2

Notes
1: Gathered from 2 traps (1 separate location over each of 2 nights).
GGF: Growling Grass Frog (*Litoria raniformis*).
G&GBF: Green and Golden Bell Frog (*Litoria aurea*).

Following the most recent round of surveys, GEM made note that despite changes in timing and in methodology for tadpole surveys, there continued to be challenges in the detectability of GGF tadpoles. Further adjustments could be made to survey methodologies, but GEM further noted that perpetuity of a population is a better measure of reproductive success, given that successful breeding of tadpoles doesn't necessarily equate to them reaching reproductive age.

All three wetlands weren't surveyed until the third round of surveys, which found a continuing population of GGF at the central wetland complex, a single GGF at the northern wetland, and no GGF at the southern wetland. The central wetland complex, as well as the northern wetland in smaller numbers, was also found to contain the EPBC-listed Green and Golden Bell Frog (*Litoria aurea*) (EPBC SPraT Database 2025[15]).

[15] http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=1870

3.2 GGF SURVEY RESULTS 2025

A total of two call-back / spotlight surveys were conducted over two nights during the GGF calling period, and one bait-trap / dip-net survey was conducted at the end of the GGF breeding season as part of this study (see also Section 2.3 for details).

Call-back surveys were conducted at two sites at the Wetland 02 (northern) system, and two sites at the Wetland 03 (southern) system, on 21st November and 19th December, 2024. Spotlight transects were also conducted at each of the four sites following call-back surveys (and after a quiet listening period) on both nights, with active searching for GGF eyeshine across the wetlands.

A total of four bait-traps were also placed across three locations within the Wetland 02 (northern) system, and four bait-traps at one location within the Wetland 03 (southern) system, on the evening of 25st January 2025. These were then removed for survey on the morning of 26th January 2025. Water levels within the wetlands had dropped considerably since the call-back surveys (see Section 3.2.1 below) and as a result, placement was based on sites of sufficient water depth for survey purposes.

Figures 3 and 4 (overleaf) identify the call-back locations, spotlight transects, bait-trap locations (and number of traps) and dip-net transects that were conducted at the Wetland 02 (northern) and Wetland 03 (southern) systems. The results of the call-back / spotlight surveys are provided in Tables 8 and 9.

Figure 3: Wetland 02 (northern) complex: call-back / spotlight / bait-trap / dip-net sites and transects

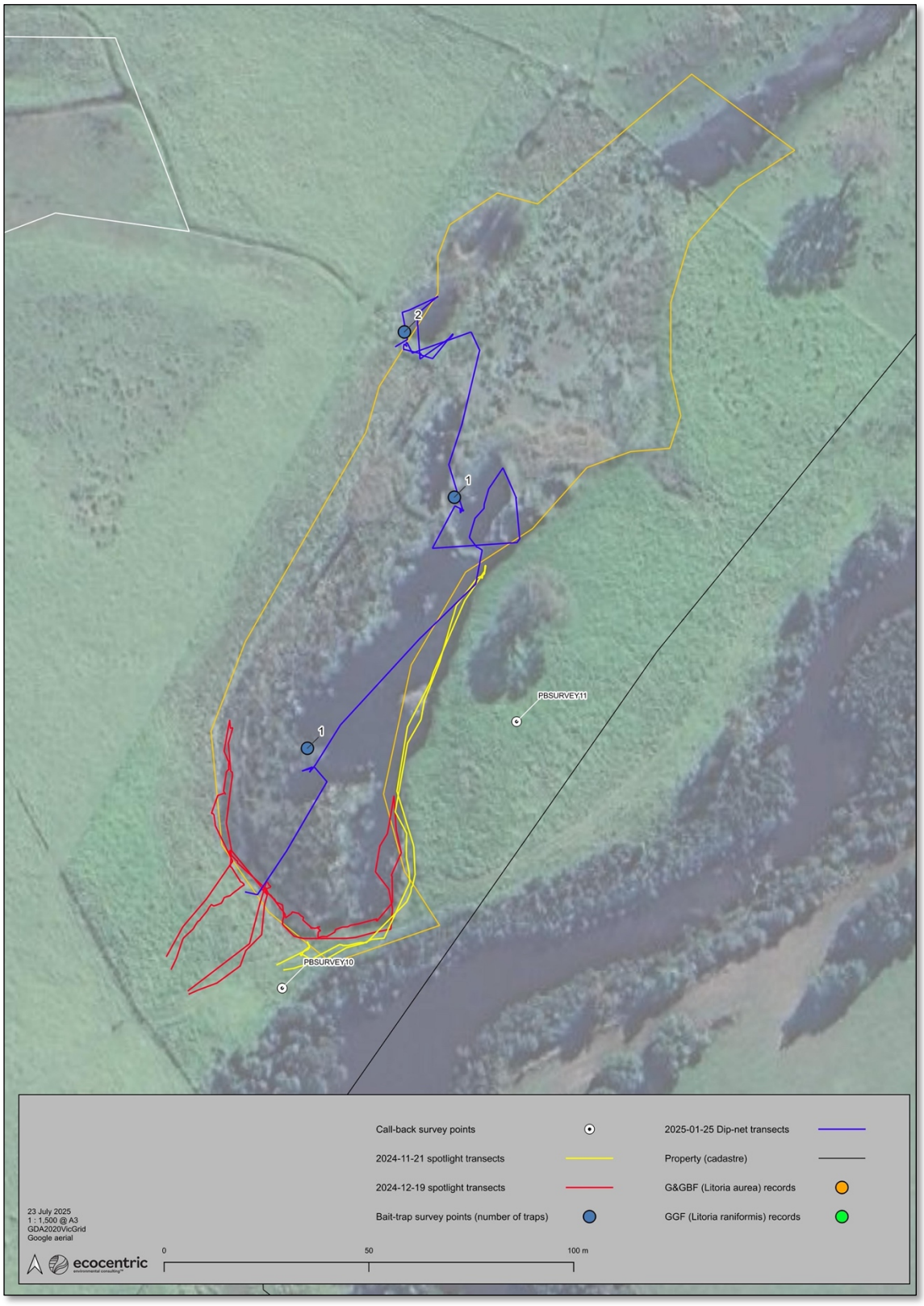


Figure 4: Wetland 03 (southern) complex: call-back / spotlight / bait-trap / dip-net sites and transects

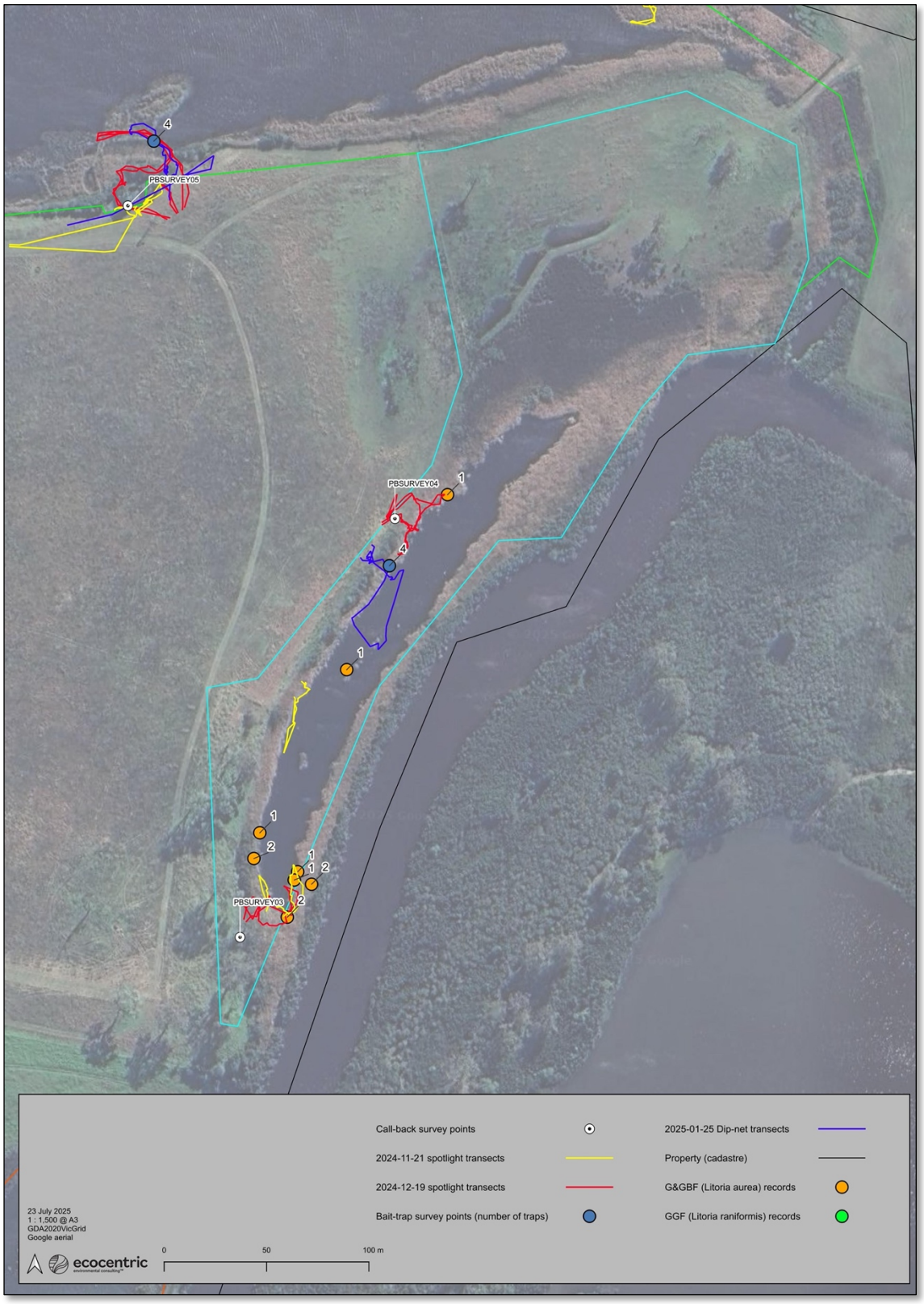


Table 8. Season 2024-25, Wetland 02 (northern) complex

SURVEY PHASE	DATE	# ADULTS (CALLBACK / LISTENING / SPOTLIGHTING RESULTS)	# METAMORPHS (BAIT TRAP RESULTS)	WATER QUALITY EC (µS/CM)	WEATHER CONDITIONS
Adults & water quality	21 Nov. 2024	0	-	No data	Sunny, light cloud (less 10% cover), no wind, 24C max. - 20C min.
	19 Dec. 2024	0	-	No data	Sunny, no cloud (less 1% cover), no wind, 22C max. - 21C min.
Metamorphs & water quality	25 Jan. 2025	-	0	No data	Sunny, no cloud (less 1% cover), no wind, 23C max.

Table 9. Season 2024-25, Wetland 03 (southern) complex

SURVEY PHASE	DATE	# ADULTS (CALLBACK / LISTENING / SPOTLIGHTING RESULTS)	# METAMORPHS (BAIT TRAP RESULTS)	WATER QUALITY EC (µS/CM)	WEATHER CONDITIONS
Adults & water quality	21 Nov. 2024	0 GGF 3 G&GBF	-	No data	Sunny, light cloud (less 10% cover), no wind, 24C max. - 20C min.
	19 Dec. 2024	0 GGF 8 G&GBF	-	No data	Sunny, no cloud (less 1% cover), no wind, 22C max. - 21C min.
Metamorphs & water quality	25 Jan. 2025	-	0	No data	Sunny, no cloud (less 1% cover), no wind, 23C max.

Notes
GGF: Growling Grass Frog (*Litoria raniformis*).
G&GBF: Green and Golden Bell Frog (*Litoria aurea*).

It is noted that no GGF were recorded in either Wetlands 02 or 03 during the most recent 2024-25 breeding season. However, it is also noted that only one GGF had previously been recorded, in the first surveying season of 2023-24, within Wetland 02 (for comparative numbers over the two monitoring seasons, see Figures 5 and 6 below). This first 2023-24 surveying season set a baseline for population monitoring following habitat improvement works within Wetlands 02 and 03, and Gondwanan Ecosystems Management (GEM) noted that the low baseline may have been due to the recent habitat improvement works, to the carrying capacity of neighboring habitat within Wetland 01, and to dispersal dynamics from there. GEM further noted that the availability and abundance of resources at Wetland 01 may be expected to limit the degree to which dispersal towards Wetlands 02 and 03 occurs, until such time as Wetland 01 approaches carrying capacity for GGF.

Figure 5: Wetland 02 (northern) complex: adult male call-back records

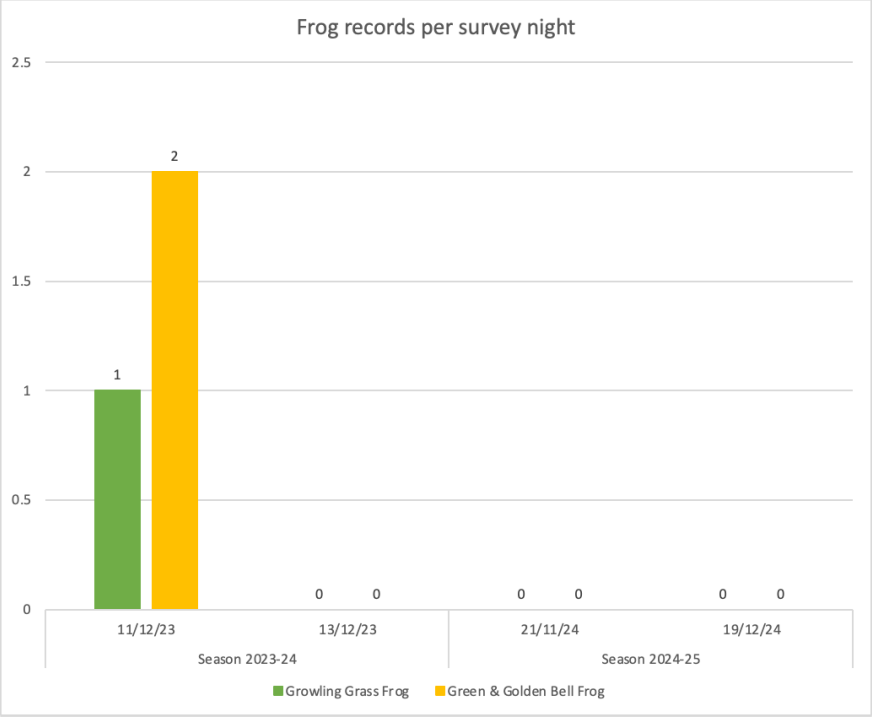
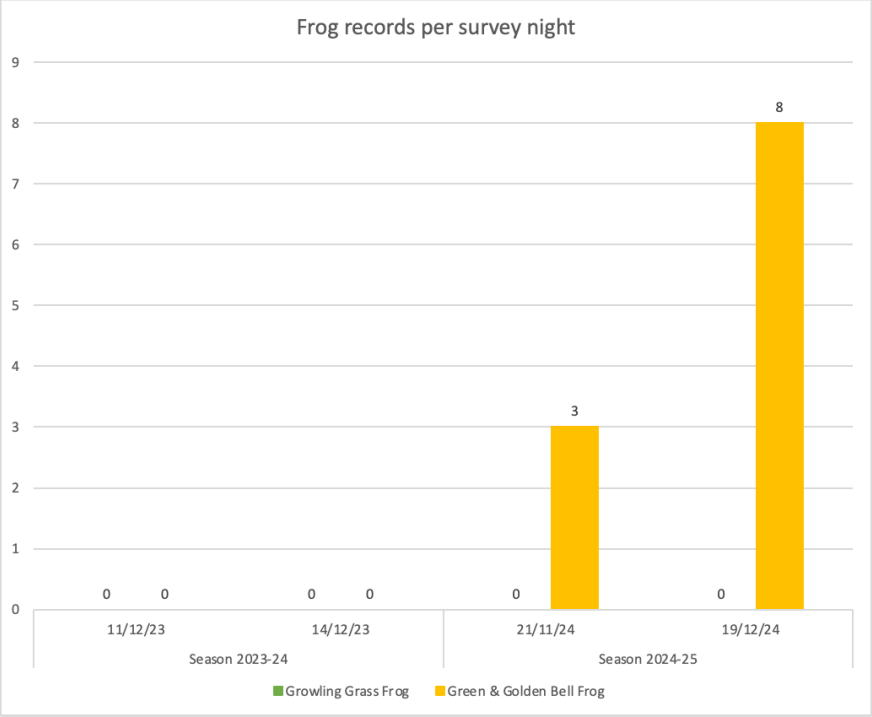


Figure 6: Wetland 03 (southern) complex: adult male call-back records



3.2.1 MONTHLY RAINFALL

While little inference can be made about the lack of GGF records against such a low baseline, it is noted that survey results over the four years of monitoring within the adjacent Wetland 01 show a drop in GGF records in the most recent 2024-25 breeding season, as noted in the 2024-25 monitoring report for Aurora Estate, EPBC Permit 2007/3524 (Ecocentric 2025). Whilst this may be cause for concern, the snapshot nature of survey methodology, and the lack of persistent data trends, make it too early to draw any definitive conclusions about the decrease in records.

Of note, the local weather station recorded above average rainfall in the months leading up to and during the GGF breeding cycle for the first three surveyed breeding seasons (2021-22, 2022-23 and 2023-24). In comparison, rainfall in the months leading up to and during the last GGF breeding season (2024-25) – the season that recorded lower GGF numbers – was below average. Local rainfall records are summarised in Table 10 below.

Table 10. Monthly rainfall, Meerlieu weather station[16]

SEASON	OCTOBER (mm)	NOVEMBER (mm)	DECEMBER (mm)	JANUARY (mm)	FEBRUARY (mm)	MARCH (mm)
Median	**55.5**	**59.8**	**54.3**	**41.2**	**38.8**	**42.7**
2021-22	78.9	147.7	54.7	137.0	16.0	n.a.
2022-23	75.1	85.3	66.0	24.2	11.0	47.4
2023-24	154.2	72.4	80.2	n.a.	6.0	27.8
2024-25	26.8	39.8	40.8	53.8	81.0	53.0

Notes
Monthly rainfall totals in green: above median.
Monthly rainfall totals in red: below median.

Annual plots of rainfall from the Meerlieu weather station are also provided in Appendix 8.1.

3.2.2 WETLAND CONDITIONS

This is Ecocentric's first season on site. As a consequence, our assessment of native vegetation cover and habitat extents is based on analysis of aerial photography in the GIS (including Google, ESRI, NatureKit and LASSI on-line resources), consultation with the landowner, and a review of the previous season's monitoring report (GEM 2024b).

A good cover (up to 80%) of aquatic flora remains at the margins of both the Wetland 02 (northern) and Wetland 03 (southern) systems, with Common Reed (*Phragmites australis*) dominating areas of Tall Marsh, and with submerged and emergent species found in and around reedbeds and at the margins of open water areas, including Club-sedge (*Bolboschoenus* sp.; likely *B. fluviatilis*), Rushes (*Juncus* spp.; likely *J. kraussii*), Common Spike-sedge (*Eleocharis acuta*), Creeping Monkey-flower (*Mimulus repens;* recorded on the northern embankment of the springs), Fennel Pondweed (*Stuckenia pectinate*) and Water Ribbons (*Cynogoton procerum*).

The wetland aquatic margins are fringed by areas of Swamp Scrub, dominated by Swamp Paperbark (*Melaleuca ericifolia*), and Brackish Grassland / Wetland, dominated by Saw-sedge (*Gahnia* sp.*; likely*

[16] http://www.bom.gov.au/jsp/ncc/cdio/weatherData/av?p_nccObsCode=139&p_display_type=dataFile&p_startYear=&p_c=&p_stn_num=085167

G. filum), with scattered plants of Australian Salt-grass (*Distichlis distichophylla*), Spiny-head Mat-rush (*Lomandra longifolia*), Beaded Glasswort (*Sarcocornia quinqueflora*), Shrubby Glasswort (*Sclerostegia arbuscula*) and Rounded Noon-flower (*Disphyma crassifolium* subsp. *clavellatum*). The Wetland 02 (northern) complex also includes Gippsland Red Gum in the northeast sector and an establishing area of Plains Grassy Woodland.

As noted above, rainfall totals for the 2024-25 season were low, and the waters were observed to have significantly retreated from the November / December surveys to the January survey.

3.2.3 EASTERN GAMBUSIA

Eastern Gambusia (*Gambusia holbrooki*, also referred to as Mosquito Fish or Plague Minnow) were incidentally recorded at all sites during the dip-net surveys and observed at the margins of the wetlands where water levels were low and warm. Numbers of this introduced, noxious, predatory fish were particularly high within the southern spring pool at the Wetland 01 (central) complex, and they were also recorded within the Wetland 02 (northern) and Wetland 03 (southern) systems; ramifications are discussed in Section 4.4.2.6.

3.2.4 SITE PHOTOGRAPHS

Photographs below are indicative of the wetland and water heights at the start of the GGF call-back surveys, c.f. dry conditions observed during the metamorph surveys.

Table 11. Indicative photographs of wetland conditions

Photo 01 – Looking northeast over Wetland 02 (21-Nov-2024)

Photo 02 – Looking northeast from within Wetland 02; dry conditions (25-Jan-2025)

Photo 03 – Open water at Wetland 03 (southern) (25-Jan-2025)

Photo 04 – Perched wetland at Wetland 02 (northern) (25-Jan-2025)

Photo 05 – Vegetated aquatic margins Wetland 03 (southern) (25-Jan-2025)

Photo 06 – Dry conditions Wetland 02 (northern) (25-Jan-2025)

4. COMPLIANCE WITH EPBC OMP PERFORMANCE CRITERIA

This section details progress towards meeting the performance criteria set out in Section 4.5.2 of the New Epping GGF EPBC OMP (Ecology Australia 2019), that are specific to the monitoring of GGF and GGF habitat at the site.

Please note that a second monitoring report has been prepared in response to the Aurora GGF EPBC OMP (Biosis 2018) targeted survey monitoring and reporting requirements; available on request from the landowner.

4.1 INCREASE WETLAND HABITAT ON SITE

4.1.1 DETAILED ACTIONS / TARGETS

Management actions to increase wetland habitat on site include:

- At the southern offset site (Wetland 03), construct at least three small wetlands to capture surface runoff.
- At the northern offset site (Wetland 02):
  - Construct a small, deep perched wetland adjacent to the existing soak to be fed by overflow from the existing soak.
  - Remove the pipe that allows flow under the causeway, raise the causeway and create a slightly lower, strengthened area to allow for overflows. This will allow the area upstream of the causeway to backfill due to overflow from the existing soak and overland flows, creating a large area of wetland habitat.
- Wetlands to be constructed to minimize damage to GGF habitat, such as construction using a long-armed excavator from outside the offset and avoiding dense vegetation where GGF may be sheltering. Where vegetation may be impacted, pre-clearance searches and relocation may be required.

4.1.1.1 Construct at least three small wetlands (at Wetland 03)

A total of three small wetlands were constructed at the northern end of the Wetland 03 (northern) offset site; the landowner reporting that this occurred approximately 4 – 5 years ago (~2020/2021). Excavation reached a depth of about one metre, stopping once sand was encountered. Clay removed from above the sand layer was then used to reline the wetland bases. These wetlands now retain surface runoff, with water loss occurring only through evaporation.

Topsoil was (re)placed at the top of the banks, which have since naturally regenerated with Rounded Noon-flower (*Disphyma crassifolium* subsp. *clavellatum*), other halophytes and Swamp Paperbark (*Melaleuca ericifolia*).

4.1.1.2 Construct a perched wetland adjacent to the existing soak at Wetland 02 (northern) complex

A perched wetland was constructed in the northwest sector of the Wetland 02 (northern) complex offset site (see also Table 11, Photo 04), the landowner reporting that this occurred approximately 4 – 5 years ago (~2020/2021). The perched wetland is spring-fed with good water quality, and was observed during this study to be approximately 2 – 2.5 metres deep. Good quality habitat values for GGF were observed during both the call-back and metamorph surveys, and it is considered that this site offers relictual habitat during dry times for this species.

The perched wetland retained open water, with an establishing aquatic margin that includes Common Reed and Bull-rush (*Typha* spp.). Water Couch (*Paspalum distichum*) was observed at this site, as

well as Kikuyu (*Cenchrus clandestinus*), and it may be necessary to conduct hand-removal, weed control works targeting these species are observed to be dominating the aquatic margin during future surveys.

4.1.1.3 Adjust causeway to create a large area of wetland habitat (at Wetland 02)

At the southern end of the Wetland 02 (northern) offset site, a clay embankment approximately 1 m high and 15 m long was constructed between the wetland and the Perry River. The material was sourced from clay excavated from the base of the Wetland 02 (northern) complex while it was dry, around four to five years ago (~2020/2021). During this assessment, the embankment appeared stable, well-maintained, and functioning effectively to retain water within the broader wetland system. The landowner also noted that since its construction, the Perry River has not flooded into the wetland system; a finding consistent with the absence of flooding indicators observed during this study.

The outfall drainage pipe that previously drained waters from the Wetland 02 (northern) complex to the Perry River in order to facilitate grazing has also been removed to enable re-watering and re-establishment of the wetland complex; this system now retains water over a larger area, and for an extended period (although extensive drying was observed during this dry season).

4.1.1.4 Minimise damage to GGF habitat during wetland construction works

All wetland construction works referenced above were conducted during dry seasonal conditions to make the works possible, while also minimizing the risks to GGF and GGF habitat. No GGF were observed during or after works – it was assumed that they had retreated to wetter spring-fed soaks during the works period – and no rocks, logs or vegetation was excavated or impacted during the construction program.

4.2 MAINTAIN NATIVE VEGETATION IN THE OFFSET SITES TO PROVIDE HABITAT CONDITIONS PREFFERED BY GGF

4.2.1 DETAILED ACTIONS / TARGETS

Assess the offset site for habitat features preferred by GGF, including:

- Presence of open water with a high cover of floating and submergent vegetation.
- Presence of emergent fringing vegetation. If ponds become clogged with emergent vegetation (>50% cover), vegetation should be removed – noting that only 50% of wetlands in any offset site should have their vegetation/sediment removed within any given twelve-month period.
- Presence of open areas surrounding wetlands, with terrestrial habitat dominated by grasslands.
- Presence of shrubs and trees >2m tall, with recruitment to be controlled where required. If cover within 10m of wetlands exceeds 20%, cover to be reduced to <10%. If cover elsewhere within the offset sites exceeds 50%, cover to be reduced to <20%. Cover of trees >5m tall should not exceed 10% throughout each offset site.
- Presence of rocks and/or logs for calling, perching, basking and overwintering. Place more rocks and logs at each offset site to provide more overwintering sites for GGF.

4.2.2 STATUS

4.2.2.1 Open water and aquatic flora

Water levels within the Wetland 02 (northern) and Wetland 03 (southern) systems were lower than average during the November and December GGF mating period, however, sufficient to maintain open water to the aquatic margins of the wetlands. There was a good cover of emergent macrophytes at the wetland margins which offered good habitat values for perching and calling GGF, with submerged

aquatic flora also observed between tussocks and at the margin of Tall Marsh areas. There were also numerous 'clumps' of emergent macrophytes out in the open water areas (including a central area with stags used for roosting by waterbirds) that offer favorable habitat for calling male GGF.

The 2024-25 breeding season however followed a period of lower than average rainfall. Table 10 above (see also annual monthly rainfall statistics from the Meerlieu weather station provided in Appendix 8.1) highlights the above average rainfall totals experienced for the three breeding seasons preceding this study, c.f. lower than average for this season. As a result, water levels across the Wetland 02 (northern) complex were lower than average (also as confirmed by the landowner), with all but the perched wetland in the NW corner of this complex (see Section 4.1.1.2 above for details) found to be completely dry during the January metamorph surveys (see also Table 11; photo 02 above).

It is noted that the perched wetland in the NW corner of the Wetland 02 (northern) complex retained good quality water, attributed to the spring water source, with suitable aquatic floristic structure to maintain metamorph development. No metamorphs were recorded, however, we consider that habitat values at this perched wetland identify it as a relictual habitat area for GGF (also GGBF).

The Wetland 03 (southern) complex by contrast retained open water habitat through to the January metamorph surveys (see also Table 11, photos 03 & 05), however, water depths within this site were observed to be only 200-300mm in depth (deepest at the middle of this site). Water temperatures and salinity levels are considered likely to be elevated as a result of the reduced volume, and turbidity levels were also observed to be higher than observations made during the November call-back assessments.

4.2.2.2 Emergent vegetation

As noted above, macrophyte cover at the fringes of the wetland units was high, however waters contracted away from these margins as a result of lower than average rainfall levels. Macrophyte health however was not affected and it is expected that the cover rates at the margins will remain and offer good quality habitat values for the up-coming breeding season (see also Table 11, photo 05).

4.2.2.3 Surrounding vegetation

In general, both the Wetland 02 (northern) and Wetland 03 (southern) complexes are fringed by Tall Marsh macrophytes (in particular Common Reed) that intergrade with Swamp Paperbark and Swamp Scrub habitat on higher, drier margins. Swamp Paperbark is a 'pioneer' species (displays clonal growth form (vegetative outgrowths sprouting at a distance from the original plant (Robinson 2007))) and it would not be practical to control this species where it fringes the wetland systems. It is expected that the paperbarks would spread and contract via natural cycles in response to annual drying and wet periods.

There is evidence of Plains Grassy Woodland being established at the northeastern end of the Wetland 02 (northern) complex that is the result of revegetation works conducted by Trust for Nature using plants propagated from seed collected on site. It is expected that a canopy of Gippsland Red Gum will establish at this location given time, however, we note that this woodland area is set well back from the wetland margin and is not expected to overshade the open water areas. Ground logs retained within the revegetated areas, as well as retained fallen branches and leaf-litter offer good overwintering habitat for GGF at this location. The establishment of a canopy will also help reduce the grassy weed cover at this site.

4.2.2.4 Shrubs and trees >2m tall

As noted above, there are Gippsland Red Gum that have been planted to the north of Wetland 02 (northern) complex, however, these trees are not expected to over-shade the wetlands. There is one retained Gippsland Red Gum at the northern margin of this wetland (see also Table 11, photo 01) however the total cover attributed to the significant canopy tree is well below 10%. Furthermore, there were no emergent canopy trees or understorey shrubs observed along the northern extent of the Wetland 02 (northern) complex, and there is subsequently no requirement at this stage to reduce cover rates at this site.

The southern margin of the Wetland 03 (southern) complex is described above as being dominated by Common Reed that is ecotonal with Swamp Scrub and a canopy of Swamp Paperbark. The result is that the cover rates at some sites on the southern margin exceed 20% within 10m of the water's edge. We note however that, being on the southern margin, this has little to no impact in terms of light transmissivity levels to the wetlands, and it is our view that no thinning or vegetation removal is required.

The northern side of the Wetland 03 (southern) complex comprises a bed of Common Reed that is up to 20m in width, and within which there are few, if any, emergent shrubs or canopy tree germinant observed. It is expected that, if this reedbed is maintained, there will be little to no threat of over-shading of this wetland complex, and that basking opportunities for GGF will be maintained.

4.2.2.5 Rocks and logs

The landowner noted that no rocks or logs have been added to the wetland complexes. We note however that ground logs have been retained within the Plains Grassy Woodland areas to the north of the Wetland (northern) 02 complex, and that there was no evidence of GGF overwintering ground habitat values being removed from any of the sites.

The addition of rocks or logs however remains as a habitat improvement option for the future, with limitations noted around the timing of these works; i.e. preferably during the breeding season when GGF are occupied within the wetland systems, and when sites are dry enough to facilitate vehicle access.

4.3 MAINTAIN WATER QUALITY IN WETLANDS AS FAR AS PRACTICAL

4.3.1 DETAILED ACTIONS / TARGETS

Control salinity within the offset sites by:

- Increasing wetland habitat on site (as already detailed in Section 4.1).
- Investigating the potential to fill low areas along the Perry River riverbank to reduce saline inflows to Wetland 03 during dry periods or king tides. Any modifications to bank height to be one sensitively to reduce impacts to GGF and their habitat, such as construction using a long-armed excavator from unvegetated areas of the wetland.
- If salinity is an ongoing problem (>7mS/cm), consider pumping freshwater into the Wetland 03 wetlands, or constructing a continuous low levee along the banks of the Perry River.

4.3.2 STATUS

4.3.2.1 Increased wetland habitat on site

This management action has already been covered above (see section 4.1.2 for details) and includes development of three additional pondages at the northern end of the Wetland 03 (southern) complex. Furthermore, although not considered wetland habitat, the establishment of Plains Grassy Woodlands that will serve as GGF over-wintering habitat in the northeast sector of the Wetland 02 (northern) complex could be considered as increased habitat diversity and extent on site.

4.3.2.2 Potential modification to low-lying Perry River bank heights at Wetland (southern) 03 complex

Perry River bank heights adjacent to the Wetland (southern) 03 complex can't be modified until this site is sufficiently dry to facilitate use of earthmoving equipment if impacts to GGF and GGF habitat is to be minimized. These works are on hold until such time and weather conditions permit.

The landowner has reported that they will investigate the possibility of utilising sediment excavated from the Wetland (southern) 03 complex during construction of deeper pools to fill low points in the riverbank if/when these sites are sufficiently dry to facilitate earthworks.

4.3.2.3 Salinity levels

Salinity levels were not monitored during this study due to a misunderstanding between Ecocentric and the landowner; this is an oversight that will be corrected in the next survey period.

4.4 CONTROL THREATS ON SITE

4.4.1 DETAILED ACTIONS / TARGETS

Management actions that will help maintain and improve GGF habitat quality include:

- Moving the northern fence line at Wetland 02 (northern) approximately 20m northwards so that fencing encompasses the entire offset site.
- Maintaining fences and keeping gates shut to exclude livestock and unauthorized vehicles.
- Monitoring and control of high threat herbaceous weeds so that cover doesn't increase, but preferably, so that cover declines. Springtime monitoring for and control of Tall Wheat-grass (*Lophopyrum ponticum*). Year-round monitoring and control of new and emerging high threat herbaceous weeds so that they don't establish on site.
- Monitoring and control of woody weeds so that they are eliminated from site. Springtime monitoring for and control of Blackberry (*Rubus fruticosus* spp. agg.), and of any other woody weeds encountered on site.
- Controlling rabbits, hares, foxes and deer, plus any new and emerging pest animals (e.g. predatory fish). Rabbit warrens and fox dens to be fumigated and hand collapsed, and carcasses disposed of to prevent native wildlife being poisoned. If wetlands are found to be colonized by predatory fish, they will be allowed to dry out naturally by diverting spring waters – noting that only 50% of wetlands in any offset site will be allowed to dry out within any given twelve-month period.

4.4.2 STATUS

4.4.2.1 Fence line encompassing entire Wetland (northern) 02 offset site

The entire Wetland 02 (northern) complex has been fenced, and there were no signs of stock entering this system (no cattle pugging, browsing or scats observed). A recently constructed fence on the northern boundary was also observed to be generally in alignment with the covenanted boundaries as shown on Title.

4.4.2.2 Maintaining fences and gates to exclude livestock and unauthorized vehicles

Fencing around both the Wetland 02 (northern) complex and Wetland 03 (southern) complex was observed to be well maintained and there was no evidence of stock entering these sites (no cattle pugging, browsing or scats observed). No woody weeds were observed at either location, and there has been some spot-spraying conducted by Greening Australia targeting grassy weeds, such as Kikuyu and Water Couch (pers.comm. Robert Cromb).

4.4.2.3 Monitoring and control of high threat herbaceous weeds

Herbaceous weed cover rates within the Wetland 03 (southern) complex were observed to be at low levels (less than 5%) with a good cover of native flora retained within, and at the margins of the wetland.

Grassy weeds are more of a problem at the Wetland 02 (northern) site. Kikuyu in particular was observed to be at high cover rates (up to 70% in sites) with deep thickets observed at the southern and western margins of the wetlands.

Water Couch was also observed at the margins of the perched wetland that has been constructed in the northwest corner of this system. On-going control of this species is required, taking care to ensure that there are no unintended off-target impacts. Control works at the margin of the perched wetland in particular may require hand-control efforts in order to ensure maintenance of water quality.

4.4.2.4 Monitoring and control of woody weeds

As noted above, woody weeds are at less than 1% cover (effectively absent) at both the Wetland 02 (northern) and Wetland 03 (southern) complexes. Further details of on-site weed management actions are reported upon in the annual monitoring reports that are provided to Trust for Nature; also available on request from the landowner.

4.4.2.5 Controlling pest animals

Hog Deer were observed during the November and December surveys and there is evidence of long-term presence in the form of scats, tracks, game-trails and some bark rubbing; Hog Deer game trails were particularly notable at Wetland 03 (southern), less so at Wetland 01 (central). Two groups were observed within proximity of the Wetland 01 (central) complex, the first a group of 8 just north of this wetland, and the second a group of 12 on its northern bank. Several Sambar deer were also observed, including 3 to the east of the Wetland 01 (central) complex.

Further feral deer control work is required in order to avert impacts associated with sediment entrainment and browsing of vegetation at the wetland margins.

4.4.2.6 Controlling Eastern Gambusia

We note that the control of Eastern Gambusia is not a management requirement of the OMP. Eastern Gambusia were however recorded incidentally during the surveys across all of the wetland systems during this survey. This introduced fish species has been shown to kill or injure tadpoles, predate on frog eggs and exert some influence over frog habitat selection (NPWS 2003).

It is unknown if Eastern Gambusia were recorded during previous surveys. Neither the New Epping GGF EPBC OMP (Ecology Australia 2019) nor the 2022-2024 GGF survey reports (GEM 2022; GEM 2023; GEM 2024a & GEM 2024b) make mention of this introduced species. It is assumed therefore that Eastern Gambusia are a new and emerging pest that may have to be controlled in accordance with the EPBC GGF OMP dictates. One option in this regard may be the drag-netting of the perched wetland in the northwest corner of Wetland 02 (northern) complex prior to the commencement of the GGF breeding season.

4.5 COMPLETE SCHEDULED MONITORING ACTIVITIES

4.5.1 DETAILED ACTIONS / TARGETS

Annually monitor GGF population and habitat condition, utilsing:

- At least two night-time breeding season surveys for adult GGF, conducted in November / December under suitable conditions (day temperature >15ºC, night temperature >12ºC, only moderate to no wind throughout), utilising callback and spotlighting.
- A post-breeding season survey for GGF tadpoles and metamorphs, conducted in January / February, utilising dip-netting in suitable tadpole habitat sites, or bait traps if dip-netting is unsuccessful.
- Assessment of any major changes to habitat variables preferred by GGF, involving assessment of:

- Area and cover of fringing, emergent and submergent vegetation.
- Floristic assessments, assessing species and cover along two transects per wetland.
- Presence of weeds, recording location of any infestations requiring control.
- Water quality (temperature, electrical conductivity, salinity, pH, turbidity, dissolved oxygen).
- Average depth of each wetland and how full (%) each is
- Sedimentation of the ponds.
- Terrestrial habitat assessments along two transects per offset site.

4.5.2 STATUS

These management actions and targets are all covered in the sections above; following is a summary of findings from this assessment, please refer to sections above for further details.

4.5.2.1 GGF surveys for 2024-25 breeding season

GGF surveys will continue to be conducted on site in accordance with conditions set out in the respective GGF EPBC Offset Management Plans (OMPs).

4.5.2.2 Obvious changes to habitat characteristics

There were no notable changes to habitat conditions observed during this survey. We note however that this is Ecocentric's first season on site. Whilst this is a limitation, we have consulted extensively with the landowner, and analysis of aerial imagery form the project GIS suggests that habitat conditions have been well maintained on site.

4.5.3 OTHER MATTERS

Two other matters were identified during the surveys that may have bearing on the long-term prospects of GGF at this site; namely, the presence of Green and Golden Bell Frog (G&GBF), being a positive indicator of GGF, and the possible presence of Chytrid Fungus, being a contra-indicator (if present). These are discussed below.

4.5.3.1 Green and Golden Bell Frog

The Green and Golden Bell Frog (*Litoria aurea*) (G&GBF) is a large dull olive to bright emerald-green frog reaching 85 mm in length (Cogger 2018). Of the same genus as GGF, G&GBF is closely related and both taxa are considered to be sympatric where they exist in the same geographic area and thus frequently encounter one another. G&GBF occurs mainly along coastal lowland areas of eastern NSW and Victoria, from Yuraygir National Park (NP) near Grafton on the North Coast of NSW (White & Pyke 2008 in SPraT Database 2025), to the most southern extent of the species' distribution in the vicinity of Lake Wellington, just west of Lakes Entrance in south-eastern Victoria (Gillespie 1996 in SPraT Database 2025).

G&GBF is listed as vulnerable (listing advice 16-July-2000) under the EPBC Act (EPBC SPraT Database online 2025[17]), but is not listed under the FFG Act in Victoria.

The habitat and ecology of G&GBF has many aspects in common with the GGF; not least of which is a preference for lentic (still water) wetlands with fringing woodland habitat for over-wintering, and mostly permanent (but also some ephemeral) water bodies. Threats to G&GBF are common to GGF and include predatory fish (such as Eastern Gambusia; see Section 5.1.6 below), Chytrid Fungus (see also Section 5.1.8 below), habitat loss and loss of habitat connectivity.

[17] http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=1870

G&GBF are recorded in higher numbers c.f. GGF across the whole property in general. On site this species appears to be more tolerant of saline waters than GGF, as evidenced by records from the Wetland 03 (southern) site. G&GBF may also be more tolerant of over-shading by vegetation since it has been recorded by the landowner in large numbers (100-120 individuals) up in the canopy of Swamp Paperbark shrubs adjacent to the southern spring at the margin of Wetland 01 (central) site feeding on moths at night.

The co-presence of G&GBF is significant at this site however since it is suggestive that habitat connectivity between the wetland sites is well maintained, and, given that G&GBF and GGF are sympatric[18], the maintenance of a G&GBF population suggests that GGF will persist at this site in future also.

4.5.3.2 Chytrid fungus

Chytrid Fungus is listed as a threatening process to GGF (Heard *et al.* 2012; DEWHA 2009; Clemann & Gillespie 2012) and has been listed as a contributing factor in the decline of GGF populations in Melbourne (Heard *et al.* 2012).

GGF living in water bodies with warmer water temperatures (up to 27 degrees) and moderate salinity have been found to have lower rates of Chytrid Fungus infection and mortality compared with those living in colder and fresher water sites. Wetlands with warm, moderately salty water also appear to act as refuges from Chytrid Fungus for the resident GGF populations, which therefore have a lower probability of extinction (Heard *et al.* 2014, Heard *et al.* 2015).

It is accepted that the coastal proximity of this site, and latent salinity levels with the wetland units would confer some protections to the GGF population against this agent. Ecocentric is however unaware of any sampling that may have been conducted on site, and we are unsure of the status of this threat to the extant GGF population.

We recommend therefore that eDNA sampling be undertaken at this site as part of the next round of monitoring. If this disease is found to be absent then we recommend that quarantine measures be put in place in an effort to reduce the likelihood of its introduction. Measures that could be implemented include the following:

- Signage at the main access gate (to the east of the existing dwelling and sheds on site) that identifies all wetlands within the floodplain as conservation areas.
- Locks on the gate to prevent unauthorised access to the floodplain (including residents on site).
- Signage to ensure that no amphibians, water, or aquatic flora are introduced from outside sources.
- Provision of a quarantine station with suitable disinfecting agents for cleaning of boots, survey equipment and vehicles.

Further details of suitable quarantine processes, methods and outcomes are available within the *Hygiene Protocol for the Control of Disease in Frogs* DECC (2008); available online at: https://frogwatchsa.com.au/files/618_hyprfrog.pdf?v=982

If Chytrid Fungus is recorded on site already then measures can be taken to prevent its spread from the site, such as ensuring that no frogs are relocated and that water is not transported off-site.

[18] (of animals or plant species or populations) occurring within the same or overlapping geographical areas

5. CONCLUSIONS AND RECOMMENDATIONS

The below average seasonal rainfall during this 2024-25 breeding season is likely to have had a negative impact on the GGF population on site, and on the species' breeding success. Whilst a dry season may not be considered a climate change event, Wassens *et al.* (2008) identified that the probability of GGF occupancy increased with increasing cover of emergent and submerged vegetation, and also that wetlands that had been subject to annual flooding were more likely to support GGF than those flooded less frequently.

We consider it likely therefore that the GGF population will persist at this site, as the G&GBF population has persisted, and that the population in general will recover after an average rainfall season. Furthermore, the successful breeding of GGF within the Wetland 04 (western) complex is promising since it suggests that adults from this site will be available for (re)colonising the Wetland 01 (central) system in response to higher rainfalls.

There are several management options identified in this report that could be considered for this site in the event that dry conditions persist on site, and GGF numbers are not observed to be recovering. Consideration of the implementation of these options, as summarised below (see also details in the relevant sections above), must only occur in consultation with Trust for Nature, DCCEEW and Ecology Australia Pty Ltd.

Voros *et al.* (2023) identified threatening processes that affect GGF populations, including disease (specifically Chytridiomycosis) as having the greatest impact on this species. Currently it is unknown if Chytrid Fungus is present on site, and we therefore recommend that analysis using eDNA assessment methods be undertaken as part of the next round of annual surveys.

Eastern Mosquito fish, an introduced species known to predate on GGF, were observed within shallow warm water at the spring pools and at the margins of the larger, open water wetlands. It is accepted that little can be done regarding Eastern Mosquito within the large wetlands, however, there is an option to 'drag-net' the smaller spring pools and the surrounding bunds pondages. Draining these pools would, in this instance, be impractical since they continually fill from groundwater sources. Drag-netting just prior to the GGF breeding season however may help lower predation pressure from this invasive species. Any works of this nature must occur under supervision of a qualified and experienced aquatic ecologist, taking care to ensure that there are no off-target impacts such as (not limited to) GGF (adult, egg or metamorph phases), G&GBF, other amphibian or native fish species. If these works were to occur, then these should be implemented just prior to the GGF call-back activity being recorded onsite, continuing as required to accommodate GGF breeding success.

The location of all adult male calling GGF records, from this season's survey and monitoring as well as the 2021-22, 2022-23 and 2023-24 seasons (GEM 2022, GEM 2023, GEM 2024a & GEM 2024b) are shown in the GIS aerial mapping that accompanies this report. On-going monitoring, as a condition of the EPBC Permit 2007/3524, will provide further insights into the long-term viability of GGF at this significant wetland location.

6. LIMITATIONS

This report relies on contributions from several consultancies and information provided by the landowner, as available on the Federal EPBC Act public notices portal (accessed online 2025[19]), as well as on-line, publicly available database and mapping resources. Findings contained herein are therefore based on the reports provided at the date of publication; Ecocentric will not be held accountable for post-publication variations associated with report updates from external consultancies, agencies or parties.

This report assumes that the reader is familiar with the EPBC Offset Management Plans and EPBC Permit conditions which have brought about the requirement for this study.

[19] http://epbcnotices.environment.gov.au/publicnoticesreferrals/

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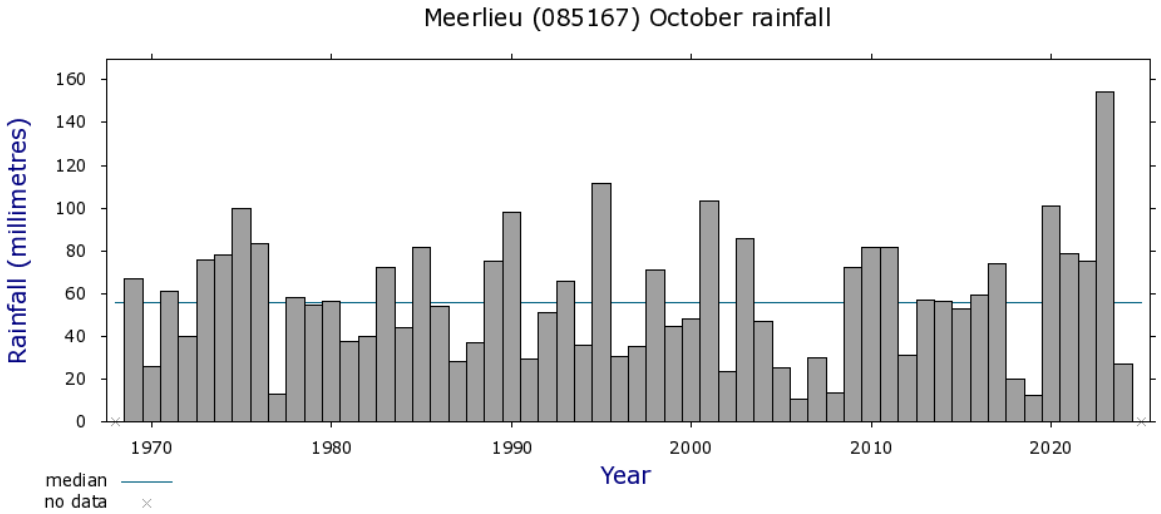
8. APPENDICES

8.1 ANNUAL MONTHLY RAINFALL DATA



Climate Data Online, Bureau of Meteorology
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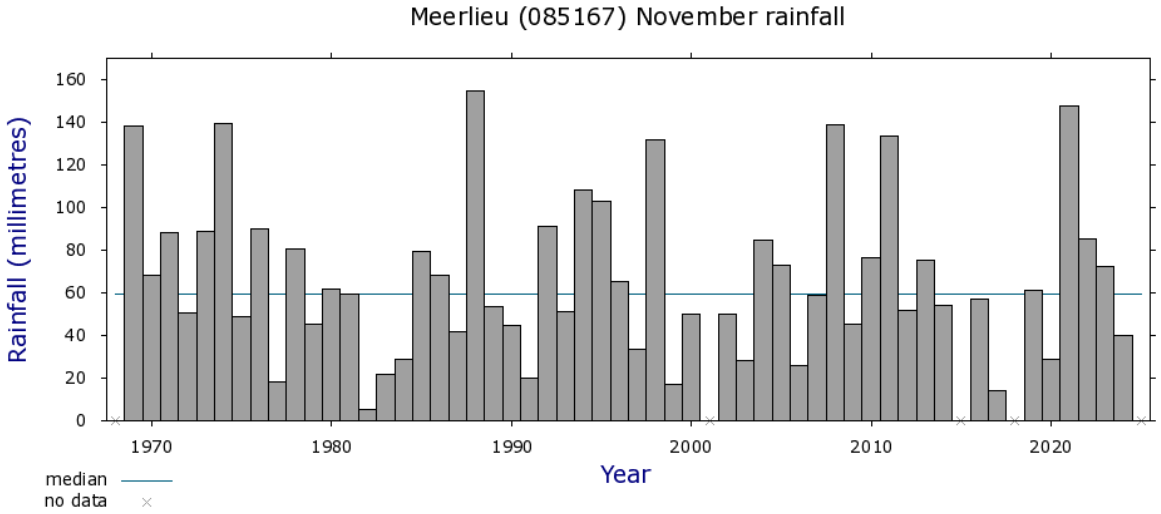

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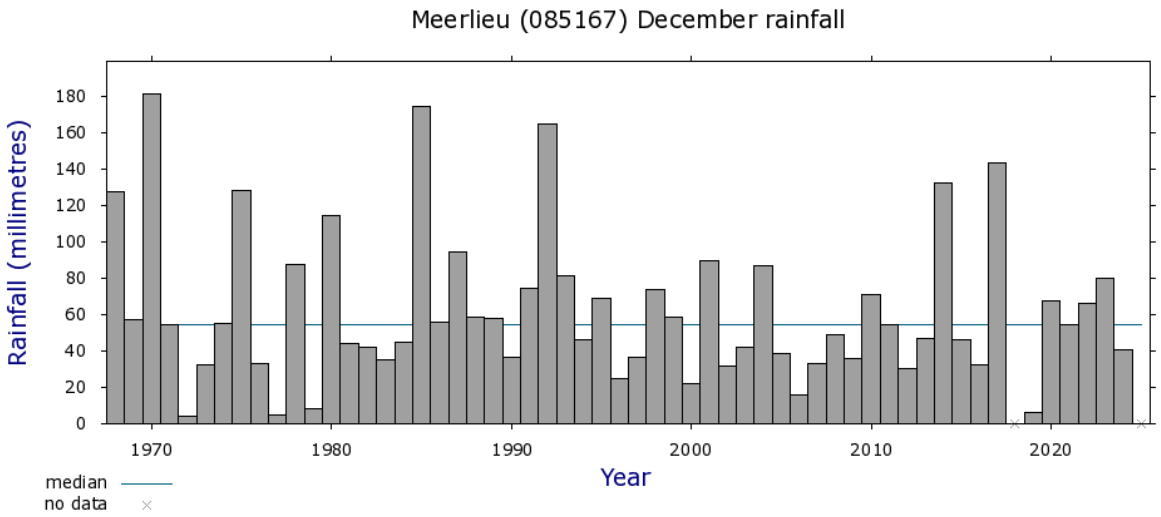

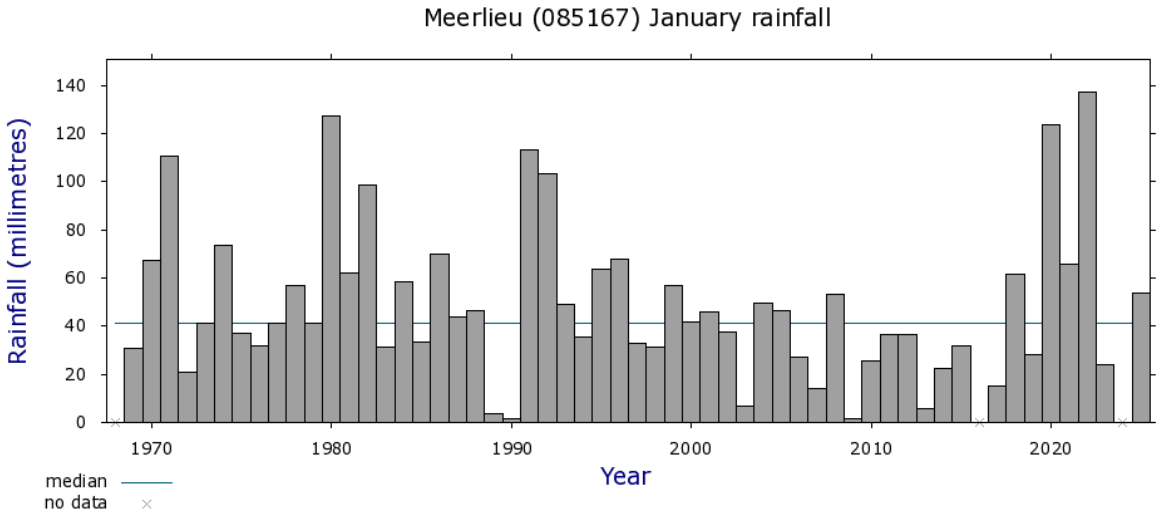

8.2 MAPPING

The following GIS aerial and schematic maps were produced using Quantum GIS (QGIS 3.34) and were developed from various datasets including:

- Aerial photography available through LASSI, ESRI and Google Maps;
- VicMap layers (Parcel, Roads, Waterways and Contours);
- GPS based data collected in the field.

Unless otherwise indicated all GIS mapping layers use the GDA2020VicGrid (EPSG:7899) mapping datum.

2023-12-11 (1)
2024-12-20 (3)
2024-11-22 (1)
2024-11-22 (1)
2023-12-12 (2)
2023-12-12 (1)
2023-12-12 (1)
2022-05-23 (1)
2024-11-21 (3)
2023-12-14 (1)
2023-12-15 (1)
2023-12-12 (5)
2022-12-11 (1)
2022-12-05 (5)
2022-12-05 (3)
2022-12-11 (2)
2024-11-21 (1)
2022-12-05 (2)
2022-12-07 (1)
2022-12-05 (1)
2022-12-11 (2)

22 August 2025
1:4,500 @A3
GDA2020VicGrid
Google aerial

ecocentric
environmental consulting™

0 100 200 m

Wetland 01 (central)
Wtland 02 (northern)
Wetland 03 (southern)
Wetland system 04 (western)

Growling Grass Frog records
(number of individuals)
2022
2023
2024