Growling Grass Frog Surveys – Lake Moodemere

Goulburn Murray Water – Connections Project

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Contents

Executive Summary

The Goulburn-Murray Rural Water Corporation (GMW) Connections Project (the Project) has been established to carry out large scale irrigation infrastructure modernisation within the Goulburn-Murray Irrigation District (GMID). The operation of Lake Moodemere, a naturally forming lake on the River Murray floodplain near Wahgunyah, presents a potential opportunity to realise water savings. Currently, the hydrologic regime of the lake is influenced by the regulation of flows in the River Murray and by the operation of pumps and regulators to manage inflows to the lakes to supply the Sunday Creek Irrigation Syndicate (SCIC). The SCIS has identified a series of alterations to the irrigation infrastructure that may improve operational efficiency and potentially yield water savings.

The GMW Connections Project has been requested to investigate the feasibility of the possible alterations, direct the approvals process and to manage construction works if required. To support this, GMW need to establish the likelihood that the works associated with the Lake Moodemere project would represent a 'significant impact' on Growling Grass Frog populations. The Growling Grass Frog is listed as Vulnerable under the Federal EPBC Act 1999, is Listed under Victoria's Flora and Fauna Guarantee Act (FFG) 1988 and Endangered on DEPI's Advisory List of Threatened Vertebrate Fauna in Victoria. Although there are no records of Growling Grass Frogs from the Lake Moodemere area on the Victorian Biodiversity Atlas (VBA) (DELWP 2017), the area is classified under the Protected Matters Search Tool (DoEE 2018) as potentially supporting the species or providing suitable habitat for the species.

Surveys were conducted in accordance with the methodology described in Heard *et al.* (2010) and as recommended by the EPBC Act Policy Statement 3.14 (DEWHA 2009). All surveys were carried out in December, which is within the peak calling period for Growling Grass Frogs (Heard *et al.* 2010). In total, four different potential sites were surveyed in the study area.

Growling Grass Frogs were not recorded from the study area during the current survey program. Although confirming absence from an area is difficult, we have a high degree of confidence in the findings of this survey program for a number of reasons. First, the surveys were carried out at a time of year when Growling Grass Frogs would be expected to be active and calling. Second, the weather conditions during the two surveys were suitable to detect the species if they were present. Based on work completed in southern Victoria, according to Heard *et al.* (2010) the current survey program would have had a 95% chance of detecting Growling Grass Frogs had they been present at a site. If Growling Grass Frogs do persist in this study area, our failure to detect them during the current survey program suggests that they are in extremely low abundance.

Although Growling Grass Frogs were not recorded, a relatively diverse assemblage of frog species was noted. Four species were recorded in the area; the Spotted Marsh Frog (*Limnodynastes tasmaniensis*), Peron's Tree Frog (*Litoria peronii*), Plains Froglet (*Crinia parinsignifera*) and the Pobblebonk (*Limnodynastes dumerilii*). Each of these species is considered common and widespread and do not have any special protection under state or federal legislation.

Important note about your report

The sole purpose of this report and the associated services performed by Jacobs is to undertake a survey for Growling Grass Frogs in the Lake Moodemere area in accordance with the scope of services set out in the contract between Jacobs and Goulburn Murray Water – Connections Project. That scope of services, as described in this report, was developed with Goulburn Murray Water – Connections Project.

In preparing this report, Jacobs has relied upon, and presumed accurate, any information (or confirmation of the absence thereof) provided by Goulburn Murray Water – Connections Project and/or from other sources. Except as otherwise stated in the report, Jacobs has not attempted to verify the accuracy or completeness of any such information. If the information is subsequently determined to be false, inaccurate or incomplete then it is possible that our observations and conclusions as expressed in this report may change.

The passage of time, manifestation of latent conditions or impacts of future events may require further examination of the project and subsequent data analysis, and re-evaluation of the data, findings, observations and conclusions expressed in this report. Jacobs has prepared this report in accordance with the usual care and thoroughness of the consulting profession, for the sole purpose described above and by reference to applicable standards, guidelines, procedures and practices at the date of issue of this report. For the reasons outlined above, however, no other warranty or guarantee, whether expressed or implied, is made as to the data, observations and findings expressed in this report, to the extent permitted by law.

This report should be read in full and no excerpts are to be taken as representative of the findings. No responsibility is accepted by Jacobs for use of any part of this report in any other context.

This report has been prepared on behalf of, and for the exclusive use of, Goulburn Murray Water – Connections Project, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and Goulburn Murray Water – Connections Project. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this report by any third party.

1. Introduction

The Goulburn-Murray Rural Water Corporation (GMW) Connections Project (the Project) has been established to carry out large scale irrigation infrastructure modernisation within the Goulburn-Murray Irrigation District (GMID). The objectives of the project are to recover water delivery losses from the GMID, to provide water for the environment, improve reliability of water supply to irrigators and to provide a sustainable irrigation system into the future. The objectives are to be met whilst providing net environmental gain to the region.

The operation of Lake Moodemere, a naturally forming lake on the River Murray floodplain near Wahgunyah, presents a potential opportunity to realise water savings. Currently, the hydrologic regime of the lake is influenced by the regulation of flows in the River Murray and by the operation of pumps and regulators to manage inflows to the lake to supply the Sunday Creek Irrigation Syndicate (SCIS). The SCIS has identified a series of alterations to the irrigation infrastructure that may improve operational efficiency and potentially yield water savings.

The GMW Connections Project has been requested to investigate the feasibility of the possible alterations, direct the approvals process and to manage construction works if required. To support this, GMW need to establish the likelihood that the works associated with the Lake Moodemere project would represent a 'significant impact' on Growling Grass Frog populations. The Growling Grass Frog is listed as Vulnerable under the Federal EPBC Act 1999, is Listed under Victoria's Flora and Fauna Guarantee Act (FFG) 1988 and Endangered on DEPI's Advisory List of Threatened Vertebrate Fauna in Victoria.

Although there are no records of Growling Grass Frogs from the Lake Moodemere area on the Victorian Biodiversity Atlas (VBA) (DELWP 2017), the area is classified under the EPBC Act Protected Matters Search Tool (DoEE 2018) as potentially supporting the species or providing suitable habitat for the species. The frog community of Lake Moodemere was assessed by Australia Ecosystems in 2011. Four common species were recorded; the Common Froglet (*Crinia signifera*), Sloane's Froglet (*Crinia sloanei*), Plains Froglet (*Crinia parinsignifera*) and Spotted Marsh Frog (*Limnodynastes tasmaniensis*). Australian Ecosystems undertook their survey in winter, and noted that other species could be active at other times of year, including the Growling Grass Frogs (*Litoria raniformis*).

1.1 Project objective

Jacobs has been engaged by GMW to establish the likelihood that the works associated with the Lake Moodemere project will represent a 'significant impact' on any Growling Grass Frog populations within the area. To do this, Jacobs undertook nocturnal surveys in accordance with the methodology described in Heard *et al.* 2010 and as recommended by EPBC Act Policy Statement 3.14 (DEWHA, 2009) to assess the presence of Growling Grass Frogs in the study area.

2. Method

2.1 Study area

Lake Moodemere is located in northern Victoria, approximately 6 km west of the town of Rutherglen. Water level in Lake Moodemere is controlled by a regulator structure on the Murray River and a pump station.

The proposed construction area for the works that may be required to realise the water savings for the Lake Moodemere project have been determined. These are:

1. New pump station: Located within Murray River reserve (Managing Organisation: Parks Victoria).
2. Pipeline and outfall: Located within Murray River reserve (Managing Organisation: Parks Victoria) and unreserved crown land (Managing Organisation: DELWP).
3. Hells Gate regulator: Located within Lake Moodemere Lake reserve (Managing Organisation: Parks Victoria).
4. Existing pump station and regulator.

Figure 2-1 shows the locations of the proposed construction works and the proposed pipeline alignment.

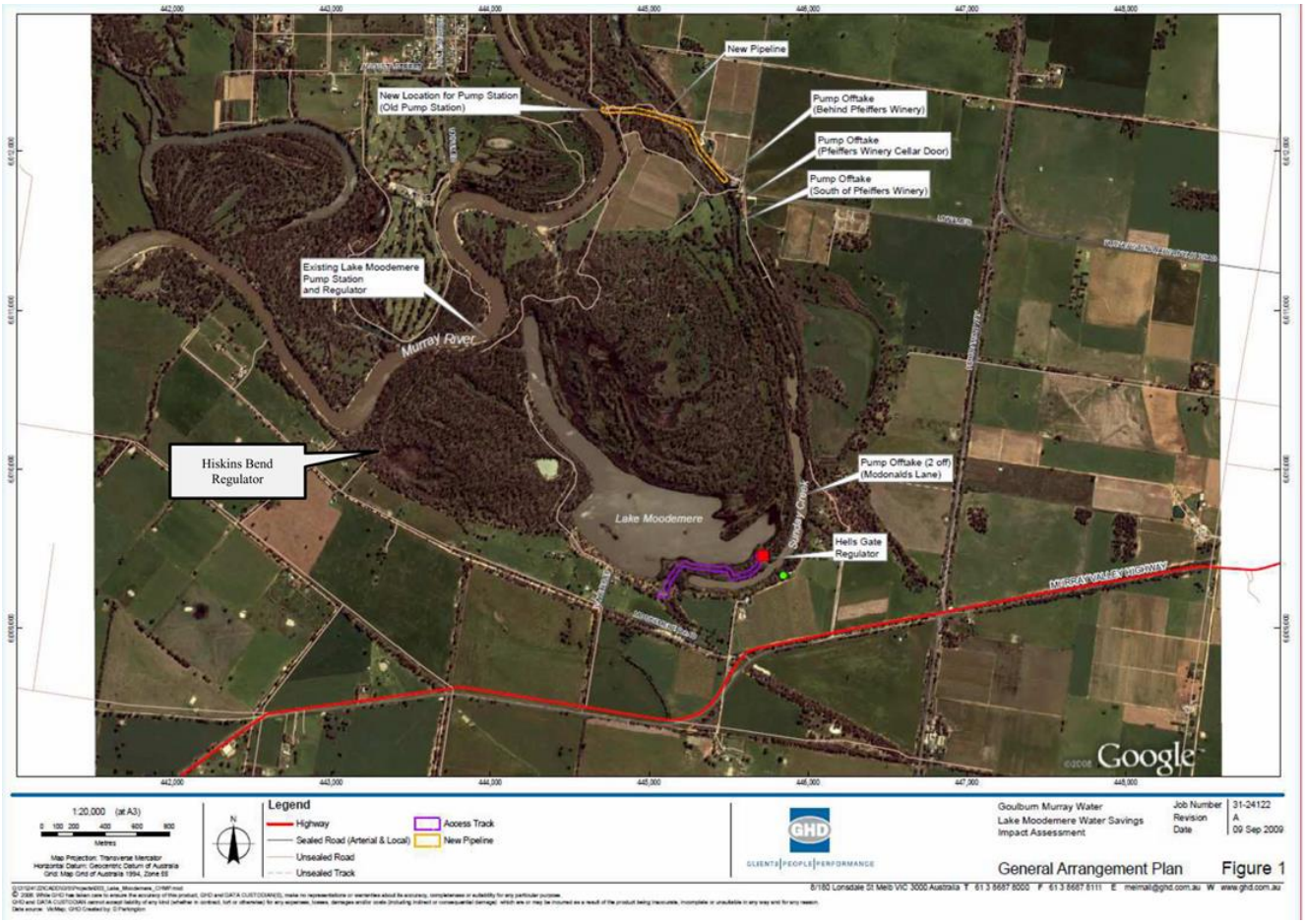

Figure 2-1 Proposed construction areas (image sourced from GMW, DEPI 2014).

2.2 Study sites

Surveys were undertaken at each of the four proposed construction areas identified above. The following section describes the frog habitat observed at each of the surveyed sites. The sites are shown on an aerial image of the study site in Figure 2-6.

2.2.1 New pump station

The proposed location of the new pump station is the location of a former pump station that serviced a pipeline along an alignment similar to the currently proposed alignment (Annabelle Carters, local resident, pers. comm. Figure 2-2). The only suitable frog habitat was a small rain fed pond adjacent to the pump station. This pond was potentially part of the original pipeline/pump station infrastructure (Annabelle Carters, local resident, pers. comm.). This pool was fringed by grassy vegetation and small woody debris.

Figure 2-2 Location of proposed pump station and adjacent pond.

2.2.2 Pipeline and outfall

The proposed pipeline alignment extends from the proposed location of the new pump station east for approximately 600 m to Sunday Creek. At about this location it appears as though Sunday Creek changes from being an ephemeral anabranch of the Murray River to being permanently inundated, potentially as a result of the level in Lake Moodemere.

The pipeline alignment shown in Figure 2-1 appears to pass to the north of the permanently inundated section of Sunday Creek and then run adjacent to the creek along the eastern bank for approximately 400 m to a proposed pump outfall behind Pfeiffer's Winery.

The frog survey in this area focussed on the upstream end of Sunday Creek, where the creek is permanent, a small arm of Sunday Creek and a series of rainfall fed pools along the proposed pipeline alignment (Figure 2-3).

The small rain fed ponds were inundated at the time of the surveys following heavy rain in the preceding week. These ponds were fringed with grassy vegetation that would provide locations for frog egg attachment.

The main channel of Sunday Creek and the small arm to the east were relatively deep and fringed by emergent reeds and grassy vegetation. The eastern bank was relatively steep sided that made safe access impossible.

In addition to the sites described above, call surveys were undertaken in the vicinity of Pfeiffer Winery, at the southern end of the proposed pipe alignment. The banks were too steep in this area to allow safe access for active searching.

Figure 2-3 Frog habitat at Sunday Creek and along the proposed pipe alignment. Top left and right: Small rain fed ponds to the east of the upstream extent of permanent water in Sunday Creek. Middle left and right: Small arm of Sunday Creek located to the east of the main channel. Bottom left: Sunday Creek, at the upstream extent of permanent water. Bottom right: Sunday Creek, looking south east, towards Pfeiffer's Winery (the Pfeiffer's Winery bridge is visible in the background).

2.2.3 Hells Gate regulator

The Hells Gate regulator is essentially a cut in the bank between Lake Moodemere and Sunday Creek and controls the water level in Sunday Creek under typical conditions (Figure 2-4). The site was accessed by walking from Lake Moodemere Estate on the southern side of Sunday Creek around the downstream extent of the creek and then between the creek and Lake Moodemere.

The predominant frog habitat in the area was found at the fringes of the lake, the creek and Hells Gates. The fringing vegetation was predominantly grassy vegetation and reeds (Figure 2-4). Note that the site was not visited during daylight hours due to the time required to access the site and so the habitat photos are of relatively poor quality.

Figure 2-4 Hells Gate regulator. Left: Aerial imagery of the Hells Gate regulator. Right: Fringing vegetation at Hells Gate.

2.2.4 Existing pump station and regulator

The existing pump station and regulator is located on a narrow embankment between an arm of Lake Moodemere and the Murray River (Figure 2-5). The primary frog habitat at this site at the time of the survey was on the Lake Moodemere side of the regulator. The deep, near permanent water of the lake was surrounded by banks with grassy vegetation. The opposite side of the small arm of Lake Moodemere supported some emergent vegetation (visible in the background of the bottom left photo in Figure 2-5).

Figure 2-5 The existing regulator and pump station. Top left: pipe through embankment, looking towards the Murray River. Top right: Regulator structure controlling water level in Lake Moodemere. Bottom left: Arm of Lake Moodemere facing east, away from the Murray River. Bottom right: Lake Moodemere, near the regulator.

Figure 2-6 Lake Moodemere Growling Grass Frog survey sites.

2.3 Frog survey method

Surveys were conducted in accordance with the methodology described in Heard *et al.* (2010) and as recommended by the EPBC Act Policy Statement 3.14 (DEWHA 2009). All surveys were carried out in December, which is within the peak calling period for Growling Grass Frogs (Heard *et al.* 2010).

At the beginning of each survey, ten minutes was spent listening for frog calls at the water's edge. Within the last five minutes of the ten-minute listening period a pre-recorded Growling Grass Frog advertisement call was played through a megaphone with the intention of eliciting a response call. Each site was then systematically searched for 30 minutes by two investigators (60 person minutes) using headlamps.

For each survey, wind speed was estimated using the Beaufort Scale and air temperature and relative humidity was recorded from the Bureau of Meteorology instantaneous readings from Rutherglen. Cloud cover and rain intensity (when relevant) were also recorded.

According to Heard *et al.* (2010), two surveys at a site conducted under good conditions (air temperature greater than 12°C and no or little wind) in October-December are required to be 95% confident that Growling Grass Frogs would be detected if present (three surveys are required in January-March).

Two surveys were undertaken (9 and 21 December 2017). Conditions during both surveys were ideal, with air temperature during the surveys across both nights being above 12°C and with little or no wind. There was a relatively high amount of calling behaviour of other species noted during both surveys. The atmospheric conditions and survey timings for each survey are outlined below (Table 2-1).

Table 2-1 Atmospheric conditions and survey timings.

Site	9 December	21 December
New pump station	**Start:** 0005 **Finish:** 0045 **Cloud:** Clear **Air Temp:** 14.8°C **Relative humidity:** 78% **Wind:** 0 kph (BoM); Calm (0) (Beaufort Scale)	**Start:** 2305 **Finish:** 2345 **Cloud:** Clear **Air Temp:** 15.1°C **Relative humidity:** 66% **Wind:** 0 kph (BoM); Calm (0) (Beaufort Scale)
Pipeline and outfall	**Start:** 2320 **Finish:** 0000 **Cloud:** Clear **Air Temp:** 14.9°C **Relative humidity:** 72% **Wind:** 0 kph (BoM); Calm (0) (Beaufort Scale)	**Start:** 2350 **Finish:** 0030 **Cloud:** Clear **Air Temp:** 13°C **Relative humidity:** 70% **Wind:** 0 kph (BoM); Calm (0) (Beaufort Scale)
Hells Gate regulator	**Start:** 2010 **Finish:** 2050 **Cloud:** Clear **Air Temp:** 16.4°C **Relative humidity:** 63% **Wind:** 7 kph (BoM); Light breeze (2) (Beaufort Scale)	**Start:** 2110 **Finish:** 2200 **Cloud:** Clear **Air Temp:** 25°C **Relative humidity:** 43% **Wind:** 9 kph (BoM); Light breeze (2) (Beaufort Scale)
Existing regulator and pump station	**Start:** 2100 **Finish:** 2140 **Cloud:** Clear **Air Temp:** 19.6°C **Relative humidity:** 50% **Wind:** 7 kph (BoM); Light breeze (2) (Beaufort Scale)	**Start:** 2220 **Finish:** 2300 **Cloud:** Clear **Air Temp:** 17°C **Relative humidity:** 53% **Wind:** 4 kph (BoM); Light air (1) (Beaufort Scale)

3. Summary of results

No Growling Grass Frogs were recorded in the study area during the current survey program.

Four frog species were recorded from the study area (Table 3-1 and Figure 3-1); Spotted Marsh Frog (*Limnodynastes tasmaniensis*), Peron's Tree Frog (*Litoria peronii*), Pobblebonk (*Limnodynastes dumerilii*) and the Plains Froglet (*Crinia parinsignifera*).

Table 3-1 Results of frog surveys.

Site	9 December	21 December	Summary of species recorded
New pump station	Low numbers of Peron's Tree Frog (*Litoria peronii*), Spotted Marsh Frog (*Limnodynastes tasmaniensis*), Plains Froglet (*Crinia parinsignifera*) calling from the vegetation surrounding the small dam adjacent to the old pump station.	Low numbers of Peron's Tree Frog heard calling in the distance (not from the site), Spotted Marsh Frog visually recorded from the site.	- Peron's Tree Frog - Spotted Marsh Frog - Plains Froglet
Pipeline and outfall	Large number of Peron's Tree Frogs calling in the area from Sunday Creek and from the rain-filled ponds. Spotted Marsh Frogs calling, predominantly from the rain filled ponds, with egg masses visible. Pobblebonks and Plains Froglet recorded calling from nearby habitats.	Relatively lower numbers of Peron's Tree Frogs heard calling and visually recorded in Sunday Creek and the rain-filled ponds that were starting to dry at the time of the second survey.	- Peron's Tree Frog - Spotted Marsh Frog - Plains Froglet - Pobblebonk
Hells Gate regulator	Spotted Marsh Frog, Peron's Tree Frog, and Plains Froglet all recorded calling. Peron's Tree Frog and Spotted Marsh Frog also visually recorded. Pobblebonk seen, but none recorded calling.	Spotted Marsh Frogs and Peron's Tree Frogs recorded visually but relatively view recorded calling.	- Peron's Tree Frog - Spotted Marsh Frog - Plains Froglet - Pobblebonk
Existing regulator and pump station	Peron's Tree Frog and Spotted Marsh Frog recorded calling. Peron's Tree Frog visually recorded from the vegetation surrounding the lake near the regulator.	No frogs recorded calling. Peron's Tree Frogs visually recorded in relatively high numbers along the bank of the lake near the regulator.	- Peron's Tree Frog - Spotted Marsh Frog

Figure 3-1 Frogs observed during the survey. Top left: Pobblebonk; Top right: Peron's Tree Frog; Bottom left: Spotted Marsh Frog (photo not taken as part of this survey); Bottom right: Spotted Marsh Frog egg masses observed at the rain filled ponds at the 'Pipeline and outfall' survey site near the upstream permanent extent of Sunday Creek.

4. Discussion

4.1 Presence of Growling Grass Frogs

Growling Grass Frogs were not recorded from the study area during the current survey program. Although definitively proving absence is by definition difficult, a number of factors mean that we have a high degree of confidence in the findings of this survey.

First, the current survey program was carried out at a time of year when Growling Grass Frogs would be expected to be active and calling. Second, the weather conditions during both surveys were suitable to detect frogs calling (greater than 12°C and little or no breeze; Heard *et al.* 2010). Based on work completed in southern Victoria, according to Heard *et al.* (2010) the current survey program would have had a 95% chance of detecting Growling Grass Frogs had they been present at a site. These results concur with the lack of historic Growling Grass Frog records from the area.

Given the above factors, we can confidently conclude that Growling Grass Frogs are highly unlikely to be present at the sites surveyed as part of the current survey program. If Growling Grass Frogs do persist in the study area, our failure to detect them during the current surveys, suggests that they are in extremely low abundance.

4.2 Frog assemblages of the study area

Although Growling Grass Frogs were not recorded, the current survey program showed that the area supports a relatively diverse assemblage of frog species. Four common species were recorded; Spotted Marsh Frog, Peron's Tree Frog, Plains Froglet and Pobblebonk. rose

5. Acknowledgements

We thank Annabelle Carters, Michael Chambers for Lake Moodemere Wines and the staff from Pfeiffer's Winery for access to their properties and for sharing valuable information about the area. We also gratefully acknowledge the assistance of Stephen Lawless from GMW.

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