

Final Project Report (to be submitted by 15th September 2022)

Instructions:

- Document length: maximum 10 pages, excluding this cover page and the last page on project tags.
- We welcome the submission of Annexes (i.e. bachelor or master thesis, references, species lists, maps, drawings, pictures) to further HeidelbergCement's understanding and future use of your findings, however they will not be reviewed by the Jury, and we kindly ask for these to be sent separately to the National Coordinators.
- Please use the attached template for species data collected during the project and submit with the project report.
- Word/PDF Final Report files must be less than 10 MB.
- If you choose to submit your final report in your local language, you are required to also upload your final report in English if you wish to take part in the international competition.
- To be validated, your file must be uploaded to the [Quarry Life Award website](#) by **15th September 2022** (midnight, Central European Time). To do so, please log in, click on 'My account' / 'My Final report'.
- In case of questions, please liaise with your national coordinator.
- **You should not publish additional private information in your final report (e.g.: address, day of birth, email-address, phone number), just complete the categories we ask for below under "Contestant profile".**

The final reports should comprise the following elements:

For research stream projects:

- Abstract (0,5 page)
- Introduction :
 - For projects that are building upon a previous project, write a summary of actions that were already completed in the previous project.
 - Project objectives
- Methods: a detailed description of the methods used during the project is required.
- Results: the results of the project should be outlined and distinguished from the discussion.
- Discussion:
 - Results should be analysed and discussed with reference to region/country taking into account other publications.
 - Outline the added value of the project for science and for the quarry / company.
 - Recommendations and guidance for future project implementation and development on site is requested. Where possible, please mention the ideal timing and estimated costs of implementation.
- Final conclusions: a short summary of results and discussion.

For community stream projects:

- Abstract (0,5 page)
- Introduction
 - For projects that are building upon a previous project, write a summary of actions that were already completed in the previous project.
 - Project objectives
 - A short description of the site and the team members and the targeted audience of the project.
- Actions and activities: a detailed description of planned or implemented actions and outreach activities done to elaborate the project, list of stakeholders involved.
- Discussion:
 - Project teams should discuss the pros and cons and illustrate experiences.
 - Outline the added value of the project for biodiversity, the society and the quarry / company.
 - Deliverables: practical implementation and development recommendations of the project are required. Where possible, please mention the ideal timing and estimated costs of implementation.
- Final conclusions: a short summary of the project findings and discussion.

1. Contestant profile

▪ Contestant name:	Danny Reddan
▪ Contestant occupation:	Coordinator
▪ University / Organisation	Darebin Creek Management Committee
▪ Number of people in your team:	26

2. Project overview

Title:	Growling Grass Frog Habitat Assessment and Restoration
Contest: (Research/Community)	Community
Quarry name:	Hanson Wollert



Abstract (max 0.5 page)

Text in Arial 10

The Darebin Creek Management Committee (DCMC) led a collaborative citizen science project monitoring endangered Growling Grass Frogs (*L. raniformis*). Community volunteers monitored *L. raniformis* populations and assessed wetland habitat condition in the Darebin Creek Valley. This involved the coordination of volunteers across the catchment to monitor through listening for calls during mating season and searching for frogs in the later summer months. DCMC analysed the data collected, historical population data and habitat condition records to determine population size and trajectory. This project ran in parallel with the Department of Environment Land Water and Planning's (DELWP) assessment of *L. raniformis* populations within Melbourne's northern urban growth boundary. By working with DELWP we were able to extend the geographical spread of the survey and engage the local community in the process. It was the DCMC-led monitoring that covered the largest portion of the Darebin Creek Valley including the identification of the largest populations in the Darebin Creek Valley at the Hanson Wollert Quarry and the nearby Plantwise nursery. The analysis by the DCMC, along with the DELWP monitoring across Melbourne's north showed a decline in populations of *L. raniformis* and a trajectory towards regional extinction underpinning the need for conservation action. Further surveys during the summer breeding season at Hanson Quarry and Landfill are needed to complete the study. Recommendations are made for the future monitoring and management of the Quarry and Landfill and surrounding areas.



A Growling Grass Frog at the Hanson Quarry

Final report (max 9 pages)

Introduction – summary of actions already undertaken, objectives, description of site, team members and targeted audience.

The Growling Grass Frog (*Litoria raniformis*), is listed as endangered on the IUCN Red List of Threatened Species and endangered under the Victorian Flora and Fauna Guarantee Act. A large and charismatic frog, up to 85 mm long, *L. raniformis* is known for its distinctive growling call over the spring and summer mating period. Previously common, the population has been in sharp decline since the 90s, thought to be due to the impact of the Chytrid fungus (*Batrachochytrium dendrobatidis*) and habitat loss.

DCMC contacted the Hanson Wollert Quarry and the Plantwize nursery in 2021 in the recognition of the significance of *L. raniformis* populations at these sites. Coincidentally, The Department of Land, Water, Environment and Planning (DELWP) in partnership with the Melbourne Strategic Assessment (MSA) commissioned an assessment of the *L. raniformis* populations in Melbourne's northern growth corridor which is recognised as a high priority for the species. The MSA requires the protection of areas along 12 waterways and the creation and management of dedicated wetlands to support viable populations. The monitoring included listening for frog calls, active searching and habitat assessment. The monitoring sites included many long-term monitoring sites first surveyed in the 2001/2002 season and last monitored during the 2016/17 season. DCMC saw an opportunity to extend the DELWP's monitoring by engaging citizen scientist volunteers through the Friends of the Darebin Creek and local community to survey a wider area across the Darebin Creek Valley.

L. raniformis displays a classic metapopulation distribution with sub-populations dispersing across networks of connected suitable habitats of large, deep ponds. Leading in to the 21/22 summer survey in the Darebin Creek Valley, DCMC were aware of four current metapopulations, two located in the north of the catchment around the Hanson Quarry site in Wollert and the Plantwize nursery at nearby Mernda, then further down the catchment, another in Bundoora associated with the now filled Bundoora quarry and constructed offset wetlands to the east around Bramble Crescent; and the southernmost at Bundoora Park and the nearby Beenac Reserve.

Historical data suggested the Wollert Quarry and adjacent landfill was the most important site for *L. raniformis* on the Darebin Creek. *L. raniformis* has been found in the quarry pits on every survey and the Wollert Quarry is the likely source for *L. raniformis* historically found breeding in dams and ponds along adjacent sections of Darebin Creek. It may also have been the original source for the population on the Plantwize nursery north of Masons road.

By surveying the quarry pits in the old quarry we intended to determine the stability of the population while surveys of the newer pits south of Bridge Inn Rd could indicate their ability to colonise as the newer section is only two years old. This is also the corridor they would move on to get to Darebin Creek and so the habitat condition of the corridor may also be important. Understanding habitat needs and capacity for colonisation is of interest for management of quarry sites once extraction ends.

DCMC understands that part of the southern section of the Hanson Quarry is likely to be left as a reserve for the proposed E6 freeway and would like to explore options for retention of *L.raniformis* habitat. It is likely that new wetlands will also need to be constructed for the species to persist in the catchment.

DCMC wants to avoid the experience downstream at the Bundoora Quarry where the quarry was closed and filled and the constructed wetlands may prove to be ineffective for sustaining *L. raniformis* in the long term.

According to the Guidelines for managing the endangered Growling Grass Frog in Urbanizing landscapes (Heard et al, 2010), Growling Grass Frog populations require three key habitat features to persist, wetlands with an extended hydroperiod or near year round water with a depth of more than 1.5m, connectivity to a network of other suitable waterbodies and native aquatic vegetation. The deeper water is necessary to avoid the wetland being overgrown with Phragmites or Cumbungi, the vegetation for cover from predators and to hunt prey and the connected ponds for dispersal as mentioned. These guidelines have informed the MSA's Growling Grass Frog Habitat Design Standards which outlines wetland design for *L. raniformis*. Melbourne Water have had some early success with their constructed wetland in Melbourne's west being colonised by 15 *L.raniformis*

In addition to these features, a higher salinity and warmer temperatures assist with controlling one of the key threats, the Chytrid fungus, so they are helped by water unshaded by larger riparian vegetation. The relative naturally high salinity of Darebin Creek volcanic geology provides an advantage for the frog. They also require rocks for basking in the warmer months and cover for over wintering. Tussock cover from graminoids also provides valuable cover.

Along with the Chytrid fungus, habitat degradation and fragmentation, increasing stormwater flows, pollution including ozone and predation from pests including mosquito fish *Gambusia affinis*, cats and foxes threaten the species.



A Growling Grass Frog on a vehicle washdown grill at the Hanson Quarry

Actions and activities

DCMC provided training for *L. raniformis* volunteers on December 1st at the Beenac stormwater pond in Reservoir, recording our first *L. raniformis*. The monitoring methods followed the Guidelines for managing the endangered *L. raniformis* in Urbanizing landscapes (Heard et al, 2010) and used DELWP monitoring templates and instructions for consistency with the government led monitoring. This involved two spotlight surveys conducted at each site across the *L. raniformis* breeding season from October to March. Surveys consisted of recording calls and visual searches of the sites with the aid of spotlights. Surveys were carried out under suitably warm and still conditions to ensure the frogs were active.

Volunteers also recorded habitat condition using the DELWP guidelines, *L. raniformis* Habitat Standards as a guide and took photographs. Using this information, habitat condition was ranked for each wetland. DCMC coordinated citizen scientists to target priority *L. raniformis* sites beyond the scope of the DELWP targeted sites and collated the data.

Seventeen citizen scientist volunteers, two staff from Latrobe University, one Melbourne Water officer, one Hanson officer and five DCMC staff were involved in the effort from November 21 to March 22 covering 45 sites. DCMC project managers communicated regularly with the DELWP led effort to share information and coordinate activities.

Monitoring at the Hanson Wollert Quarry was undertaken in February and March once the Quarry life proposal was accepted, later than the breeding season and frog calling but still the active period for *L. raniformis*.

Discussion -

The DCMC citizen science monitoring was able to identify all populations in the Darebin Creek Valley thanks in part to relationships with landowners at the the Hanson Wollert Quarry and the Plantwize nursery through the Quarry Life Award. Ideally, we would have started earlier in October to cover the entire breeding season but were late due to covid lockdown. Despite missing the breeding season at the the Hanson Quarry, we had three successful surveys locating 7 adults or metamorphs on two evenings across and between multiple quarry holes and 1 adult later in the season. Significantly we identified an estimated 6 *L. raniformis* tadpoles in the northwest quarry hole and metamorphs elsewhere onsite confirming 1 breeding. This was particularly notable as they were in water just 10cm in depth, far less than the prescribed minimum of 1.5m in the habitat guidelines. In the remainder of the Darebin Creek Valley, 4 males were recorded calling at the plantwize nursery with just one at Bundoora Park and one at Beenac Reserve.

Catchment wide DCMC monitoring showed a continual decline in *L. raniformis* populations in the Darebin Creek Valley over the past 20 years consistent with the trend found by the DELWP survey across Melbourne's northern waterways. The Wollert Hanson Quarry and the Plantwize nursery in Mernda remain as likely the last two viable populations in the Darebin Creek valley. This is the first time in 20 years that no *L. raniformis* were found at or

near the old Bundoora quarry site. Two individuals were identified at Bundoora park and the nearby Beenac reserve but it is questionable how sustainable such a small population is.

There are a number of assumptions for why the frogs are thriving at these two sites while disappearing elsewhere in the valley. Both sites include a series of proximate wetlands, or quarry holes, detached from the main waterway, the Darebin Creek. This is important for *L. raniformis* dispersal and probably limits the impact of predatory fish, particularly *Gambusia* on the tadpoles and the impacts of suburban environments including stormwater and domestic pets. Where they differ, is that the Plantwize nursery wetlands are vegetated with aquatic indigenous vegetation, a more idealized habitat compared with the Hanson Quarry holes that are mostly vegetated by invasive weeds and appear superficially less desirable from a conservation perspective. *L. raniformis* also thrives in the latter regardless of environmental aesthetic prejudice, including a vehicle washdown grid. We assume that the success of the frogs at the Hanson Quarry is also linked to the brackish conditions associated with the bore water providing protection from the Chytrid fungus.

This observation of breeding in shallow water at Hanson Quarry contradicts the current habitat guidelines recommending a minimum depth of 1.5m for *L. raniformis* habitat. What we infer from this recommendation is that the deeper water avoids overgrowth with emergent aquatic vegetation like Common Reed (*Phragmites australis*) or Cumbungi (*Typha* spp.). The constructed wetlands to offset the Bundoora quarry are overgrown with such emergent aquatic vegetation which may have contributed to the frog's decline. An alternative method would be to periodically clear the vegetation. This could potentially be carried out by cultural burning, as practiced by the Wurundjeri Woi-wurrung traditional custodians Narrap (land) unit.

DCMC was able to add value to DELWP's *L. raniformis* monitoring through a holistic project that engaged citizen scientist volunteers in complementary monitoring, expanding the geographical reach and partnering with private landholders, Hanson Quarry and the Plantwize nursery that have the healthiest *L. raniformis* populations.

The citizen science monitoring project connected participants with their natural environment and with each other, providing volunteers with environmental custodianship purpose and associated personal wellbeing benefits. DCMC has found an increasing willingness from the community to engage meaningfully in creek care activities. The project provided purposeful value for volunteers as monitoring was not just for education but collected important data informing potential *L. raniformis* conservation actions. The findings were shared with the volunteers through direct communication as well as social media. Volunteers will be called upon to survey again in 2022/23 including a calling survey at the Hanson Quarry earlier in the season. While DELWP undertake their monitoring once every five years, DCMC intend to make the citizen science monitoring an annual event.

During the course of the monitoring, DCMC explored a grant opportunity with the Australian government on an Environment Restoration Fund for priority species engaging multiple stakeholders focussed on Melbourne's northern waterways. It was decided that the project timeframe of just 11 months was not suitable for

establishing a constructed wetland for *L. raniformis* but we have created an alliance for future opportunities and are in communications with the Australian government to develop another opportunity.

L. raniformis monitoring provided us with the knowledge of priority areas for intervention to conserve populations of *L. raniformis* with benefits for biodiversity more broadly. In addition to recording *L. raniformis* data, monitoring also recorded another six frog species and habitat condition.

The project will inform decisions made by Whittlesea and Darebin Councils and Melbourne Water on investment in *L. raniformis* habitat management. Important for the survival of the Wollert population will be complementary management of the southern quarry site and the adjacent Quarry Hills Regional Parkland

Final Conclusions

The monitoring data, analysis and conclusions assist DCMC and our partners in determining the next steps towards *L. raniformis* conservation in the Darebin Creek Valley. It is clear that the Hanson Quarry and to a lesser extent, the Plantwize nursery are the last two thriving populations of *L. raniformis* in the Darebin Creek Valley. The two populations to the south are declining and their recovery may prove challenging.

To test these assumptions, we need to compare the chemical, physical and biological conditions between sites where *L. raniformis* is thriving at the Hanson Quarry and the Plantwize nursery and those where they are declining or have recently disappeared from in the south of the catchment. Collecting this data can be completed in conjunction with the summer citizen science *L. raniformis* monitoring program.

At the same time, DCMC will explore opportunities with partners for conservation actions including translocation, breeding, habitat enhancement and habitat creation.

The DELWP report report - Growling Grass Frog surveys across Melbourne's Northern Growth Corridor: 2021/2022 Season (Heard, Robertson) recommended securing populations at the Wollert Quarry and Plantwize Nursery. This could involve augmentation of existing wetlands and creation of wetlands for long term retention and translocation of *L. raniformis* within the Quarry to maintain the population. This is an opportunity to work with the Hanson Quarry to find a solution to maintain *L. raniformis* habitat post quarry operation. It is evident from observation of the quarry holes while monitoring *L. raniformis*, that they support an abundance of other life, particularly water fowl and wading birds which would continue with the preservation and or restoration of quarry holes for *L. raniformis*. While monitoring the quarry holes, we have observed Banded Stilts (*Cladorhynchus leucocephalus*), Black Fronted Dotterels (*Euseyonis melanops*), the threatened Blue Billed Duck (*Oxyura australis*) and Black Swans (*Cygnus atratus*) to name a few.

The DELWP report also recommended exploration of the potential to re-introduce *L. raniformis* to locations where it has been lost in recent years, in cases where suitable habitat remains and can be managed. This includes a review of the needs of the metapopulation at Bundoora Park, including options for habitat restoration. Another option could be restoration of the Bundoora Quarry offset wetlands.

Restoration activities could include clearing of emergent vegetation and deepening of wetlands (during winter when *L. raniformis* are in torpor away from wetlands); revegetation of instream native aquatic vegetation; control of invasive predators such as Mosquito Fish (*Gambusia holbrooki*) and installation of rocks and logs around wetlands.

The first breeding program for *L. raniformis* was launched in July 2022. The Southern Bell Frog (an alternative name for Growling Grass Frogs) Conservation Facility's breeding project, under the Nature Glenelg Trust, received funding through the Australian Government's Murray–Darling Healthy Rivers Program. This is an important step in the conservation of the species and DCMC will explore the opportunity to work with the Nature Glenelg Trust and other organisations with experience including Zoos Victoria and La Trobe University with the potential for translocation to suitable wetlands.

These proposed actions provide the foundation for a collaborative *L. raniformis* recovery project. There is also the potential to extend beyond the Darebin Creek Valley to include other priority habitats in Melbourne's northern waterways. DCMC started this process through the investigation of the Threatened species restoration grant and can now approach the Australian government with a more developed proposal and alliances. Partners could include the Hanson Quarry, Friends of Darebin Creek (FoDC), the Traditional custodians, Wurundjeri Woiwurrung (WWCHAC), Merri Creek Management Committee, the City of Whittlesea (COW), Melbourne Water (MW) and the Department of Environment, Water, Land and Planning (DELWP).

Acknowledgements

DCMC would like to thank all the citizen science volunteers, with a special mention for Sai Haider for multiple visits at the Hanson Quarry, Ken Brown, Hanson Environmental Compliance Officer for coordinating and assisting with monitoring at the Wollert Quarry, Geoff Heard, Peter Robertson and the DEWLP, monitoring team for coordination and sharing of data, Nic Van Roosendael of the Plantwize nursery for access to the property for monitoring and creating a frog friendly habitat, Kathy Preece of Melbourne Water/DELWP for assisting with monitoring and advice and the DCMC team, particularly Therese Grinter for coordination of citizen scientists.



Volunteer Sai Haider at the Hanson Quarry

To be kept and filled in at the end of your report

<p>Project tags (select all appropriate):</p> <p>This will be use to classify your project in the project archive (that is also available online)</p>	
<p>Project focus:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Beyond quarry borders <input type="checkbox"/> Biodiversity management <input type="checkbox"/> Cooperation programmes <input type="checkbox"/> Connecting with local communities <input type="checkbox"/> Education and Raising awareness <input type="checkbox"/> Invasive species <input type="checkbox"/> Landscape management <input type="checkbox"/> Pollination <input type="checkbox"/> Rehabilitation & habitat research <input type="checkbox"/> Scientific research <input type="checkbox"/> Soil management <input type="checkbox"/> Species research <input type="checkbox"/> Student class project <input type="checkbox"/> Urban ecology <input type="checkbox"/> Water management <p>Flora:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Trees & shrubs <input type="checkbox"/> Ferns <input type="checkbox"/> Flowering plants <input type="checkbox"/> Fungi <input type="checkbox"/> Mosses and liverworts <p>Fauna:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Amphibians <input type="checkbox"/> Birds <input type="checkbox"/> Insects <input type="checkbox"/> Fish <input type="checkbox"/> Mammals <input type="checkbox"/> Reptiles <input type="checkbox"/> Other invertebrates <input type="checkbox"/> Other insects <input type="checkbox"/> Other species 	<p>Habitat:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Artificial / cultivated land <input type="checkbox"/> Cave <input type="checkbox"/> Coastal <input type="checkbox"/> Grassland <input type="checkbox"/> Human settlement <input type="checkbox"/> Open areas of rocky grounds <input type="checkbox"/> Recreational areas <input type="checkbox"/> Sandy and rocky habitat <input type="checkbox"/> Screes <input type="checkbox"/> Shrub & groves <input type="checkbox"/> Soil <input type="checkbox"/> Wander biotopes <input checked="" type="checkbox"/> Water bodies (flowing, standing) <input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Woodland <p>Stakeholders:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Authorities <input checked="" type="checkbox"/> Local community <input checked="" type="checkbox"/> NGOs <input type="checkbox"/> Schools <input type="checkbox"/> Universities