

Frogs – Weapons of mass rehabilitation in the Mary River Catchment

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Key Points

- Knowledge gaps in information on threatened species can provide an opportunity to involve local communities in research.
- Fauna species can attract funding that assists communities to rehabilitate essential habitat.
- The presence or likely presence of threatened species can encourage an ethic of care as well as contributing to planning schemes and influencing the manner in which development projects are carried out.

Abstract

Since 2002 the Mary River Catchment Coordinating Committee (MRCCC) has enlisted the federally endangered Giant barred frog *Mixophyes iteratus* to promote restoration of ecologically sensitive riparian zones amongst the local catchment community. While other threatened species are present in the aquatic ecosystems of the catchment, frogs are more easily detected thereby readily available for community involvement in research. They have been instrumental in inspiring an ethic of care and providing access to funding to assist landholders carrying out rehabilitation work. Rehabilitation activities have been extensive within the range of the Giant barred frog, an outcome that is attributed to the MRCCC's long-term extension and engagement in the upper catchment and the funding opportunities that have been accessed. The benefits of addressing the requirements of the Giant barred frog are shared by other species and whole ecosystems. This approach can be readily adopted by other environmental management groups.

Keywords

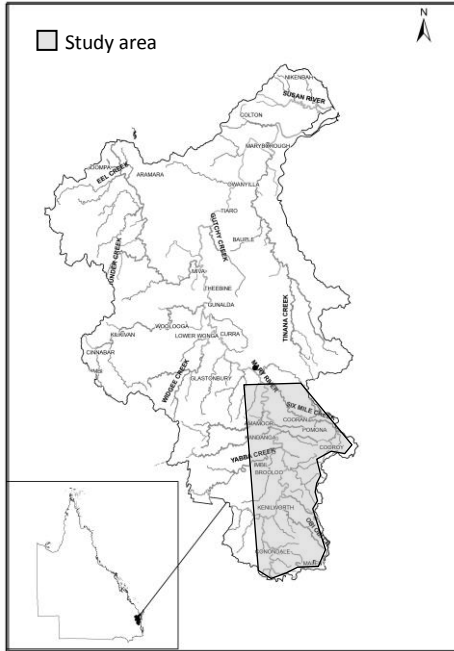
Giant barred frog, Mary River catchment, threatened species, community, riparian, rehabilitation

Introduction

The Mary River catchment in South East Queensland is a river system of high ecological value (Mary River Catchment Coordinating Committee *et al.*, 2014) located close to heavily populated and expanding regions of the state (see Figure 1). Degradation of the river and tributaries is severe along many reaches. Loss of riparian vegetation, riverbank erosion and associated sedimentation has been highlighted as major issues of concern (DeRose et. al. 2002). The Mary River catchment has recently been listed at the 4th worst source of sediments out of 35 sub-catchments that flow into the Great Barrier Reef lagoon (Caring for our Country, 2013).

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Figure 1. Location of the Mary River catchment in Queensland, Australia and MRCCC threatened frog project area.



The Mary River Catchment Coordinating Committee's (MRCCC) aim of 'working towards a sustainable and productive catchment' (MRCCC, 2014) is largely addressed through landholder engagement in undertaking on-ground river restoration activities to

improve habitat value and water quality. With worldwide frog decline and disappearance high on the conservation agenda over the past several decades (Campbell, 1999; Hines et al., 2002; Stuart, 2004) improved knowledge of local frogs and their potential as flagship species became apparent to the MRCCC. This paper provides a case study of how a community catchment organization has utilised an iconic species to arouse interest of the catchment community and attract supportive funding to address catchment condition issues that relate to the requirements of the species.

In developing the 'Living with Threatened Species' program in 2002, the MRCCC focused their attention on the Giant barred frog *Mixophyes iteratus* (listed as endangered under the Environment Protection and Biodiversity Act 1999) due to its dependence on threatened ecosystems, limited distributional information in the Mary River catchment, recorded declines from parts of its range (Hines et al., 2002), potential as a bio-indicator (White, 2006) and its potential to engage with landholders of the upper catchment in areas less likely to be utilised by other iconic, stream-dependent

species.

Through provision of frog-related activities such as a local Frog Forum for landholders attracting experts in frogs and their decline, development of educational material, displays at events and offering frog surveys to volunteers and landholders, a groundswell of community interest in the plight of frogs in this region led to a significant increase in the number of people wishing to be involved in activities which addressed declining frog populations.

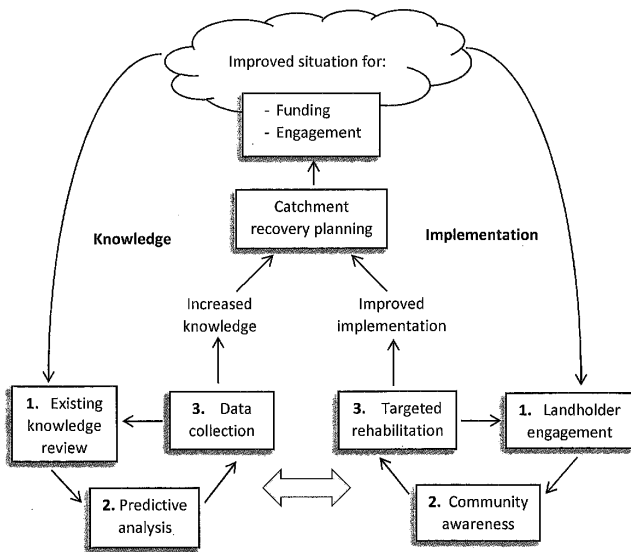
Methods

Approach

The approach taken by the MRCCC is captured in the following flow chart (Figure 2). This has enabled the organization to gain a solid understanding of the natural values of the catchment, and to recognise the potential of natural assets in recovery and opportunities for projects and funding.

Through activities to increase current knowledge of the catchment's natural assets, community involvement has expanded greatly over the past 10 years. The increase in knowledge of species and of the condition of the catchment through this interaction with landholders has provided valuable input into the recently drafted Mary River Threatened Aquatic Species Recovery Plan developed by the MRCCC and the Australian Government (MRCCC et al. 2014). Documents such as this increase the potential to attach funding to address the issues outlined for the catchment.

Figure 2. Approach to waterway recovery through use of a catchment natural asset.



Target species for restoration of ecosystems

In line with the recommendations of the Recovery Plan for Stream frogs of South East Queensland (Hines *et al.*, 2002), which addresses the threats and recovery actions for three threatened frog species in the Mary River catchment known and likely habitat areas were chosen for frog-targeted surveys, with emphasis on the Giant barred frog. This species was chosen as the umbrella species to protect and rehabilitate riparian rainforest due to its known distribution and strong dependence on permanent and semi-permanent streams and their associated riparian vegetation (Hughes, 2005). In this way the endangered Regional Ecosystem 12.3.1; ‘Gallery rainforest (notophyll vine forest) on alluvial plains’ (Department of Environment and Heritage Protection, 2014) and the critically endangered Lowland Rainforest of Subtropical Australia (Department of the Environment, 2014) could be promoted in the community as discrete habitat types worthy of protection and expansion, not only for the Giant barred frog but for all stream associated species and for the quality of the waters locally and downstream. With regard to this approach, all other frogs and fauna would be recorded while undertaking surveys and monitoring.



Giant barred frog *Mixophyes iteratus*
(photo E. Ford, MRCCC)

Study area

Most of the current knowledge in the early 2000s, when this project began, had been gathered from protected areas (Hines *et al.*, 2002). Some information was also available indicating that Giant barred frogs utilise habitats of the valley lowlands (Barden, 1999; H. Hines, 2003 pers. comm.). Based on this information the study area focused on freehold land and road reserves in the upper Mary River catchment south and east of Gympie (see Figure 2). Riparian vegetation along tributaries of stream order 3 to 5 were identified due to their high conservation value (MRCCC, 2001) and likely habitat for the target species (Hughes, 2005). The selected area and targeted waterways would also align with local planning schemes and satisfy funding provider guidelines (e.g. Hydrobiology *et al.*, 2005).

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Data collection

Riparian sites were surveyed at night during the breeding season for most of the frog species of South East Queensland (September to March). The duration of each survey was variable up to three hours as was the length of waterway surveyed. During surveys all fauna species and their abundance were recorded as well as location, habitat condition, water quality and weather information. Species data was collected through call, eyeshine and observational detection. These activities, while collecting essential data for species protection and management, provided an invaluable opportunity to involve landholders and interested community members in an activity that was both novel and educational.

With some experience of the local distribution of the Giant barred frog four long-term, 100 metre monitoring transects were installed between 2005 and 2007. The sites were chosen for their low level of disturbance, good connectivity to large tracts of remnant vegetation and minimal likelihood of direct human impact in the future. The sites were visited for one hour, three times each frog breeding season with no bias for weather conditions. The aim of monitoring these sites was to gather information on stream frog habitat use and population dynamics under varying climatic conditions; knowledge gaps highlighted by Hines *et al.*, 1999. This data would enable determination of 'baseline' trends over a long period for all species present and indicate the possibility of environmental changes.

Data was also collected as part of community training workshops using surveys to assist the training and engagement of community and land managers. 32 dedicated frog workshops and numerous other threatened species, water quality and restoration related workshops and forums have been held in the Mary River catchment over the past 10 years.

All surveys and monitoring visits have involved the participation of landholders, community volunteers, community groups, tertiary and school students and agency staff. Hundreds of participants have been involved in surveys during the life of the Living with Threatened Species program. All data collected from surveys, monitoring visits and incidental data collection was entered into the WildNet database administered by the Queensland Government Department of Environment and Heritage Protection.

Results

Since 2003 the following data in Table 1 has been collected through the MRCCC Survey and Monitoring program expanding the knowledge of frog species distribution and population status in the area. The upper Mary River catchment has emerged as a stronghold for the endangered Giant barred frog in terms of the number of sites and streams supporting the species (H. Hines, 2014 Pers. Comm.).

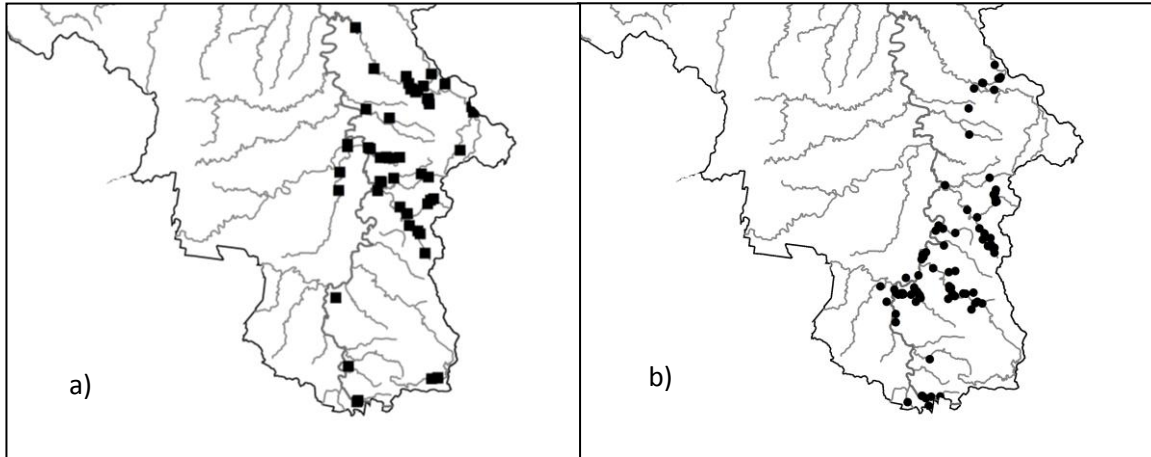
Parameter	Number
Frog-targeted incidental and monitoring surveys	993
Sites surveyed	339
Frog species recorded	34
Frogs recorded	13,865
Threatened frog species recorded	6
Giant barred frog records	511
Giant barred frog locations	58
Giant barred frog locations on freehold	35
Giant barred frog locations on road reserve	10
Giant barred frog locations on Council or state reserve	13

Table 1. Summary data for MRCCC frog surveys from 2003 to 2013.

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The following map shows the locations of Giant barred frog records collected during surveys in the upper Mary River catchment.

Figure 3. Recorded Giant barred frog locations a) and MRCCC restoration project sites b) within the study area.



Application of knowledge in protection and rehabilitation

While data collection is vital to increasing knowledge of threatened and currently secure fauna of any species, without application of that knowledge the exercise is of little value. Patterson *et al.* (1999) emphasises the importance of riparian management to the future of threatened frog species in the Belli Creek system of the Mary. The MRCCC has utilised the survey and monitoring program and the knowledge gained to engage with landholders and land managers, and to influence the level of protection and restoration that occurs within riparian ecosystems. While site selection for on-ground works is often a direct result of Giant barred frog presence or likelihood, investment in site rehabilitation is also influenced by other factors such as:

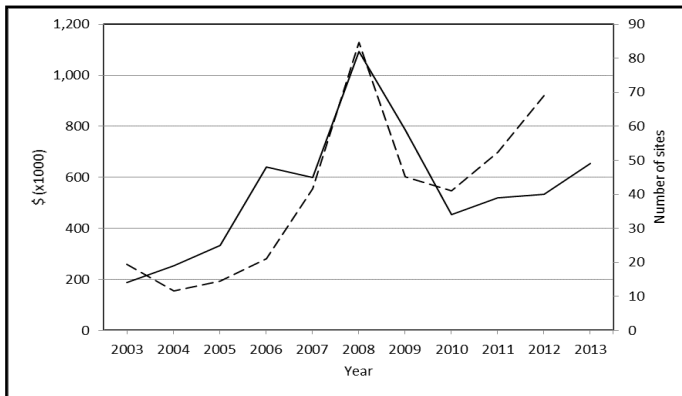
- the funding available through other MRCCC programs such as Waterwatch, Healthy Habitats, Rivercare, Reef Rescue, and by programs of other organisations such as Land for Wildlife and voluntary covenanting of land,
- the availability of landholders who make long term commitments to improving and protecting ecological conditions in priority reaches in the catchment on their own properties.

Figure 4 shows how threatened species funding, with emphasis on threatened frogs, has been secured since 2002 and how, correspondingly, the number of restoration sites has increased since the inception of the Living with Threatened Species program. There is a direct relationship between on-ground action and funding obtained as a result of frog presence, in this case the Giant barred frog. Figure 4 shows how the distribution of project sites correlate with Giant barred frog locations.

The presence of frogs allows catchment and extension staff to utilise a species that captures the empathy of people rather than relying on the potential appeal of ecosystem conservation alone. The use of a particular species as a flagship and umbrella species as well as a bio-indicator (White 2006, Caro *et al.*, 1999) provides a multi-use tool with which to attract funding, attention, and a desire for action. As suggested by (Ehman, 1999) 'While the wider community does not distinguish between threatened and "non-threatened" frogs they can contribute significantly to the recovery of threatened species.' Anecdotally the frog fauna of the Mary River catchment and in particular the Giant barred frog, has continued to arouse enthusiasm for waterway restoration and helped to nurture a strong community ethic of care.

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Figure 4. Funding obtained (—) and number of project sites undertaking habitat restoration for threatened frog species (- - -) in the Mary River catchment.



Projects developed with landholders to target habitat critical to the Giant barred frog and supported through funding have included fencing to exclude stock from riparian zones, provision of off-stream watering infrastructure to control stock movement, and environmental weed control, encouragement of natural regeneration and revegetation to strengthen riparian vegetation and protect waterway integrity. Essential habitat features such as canopy cover, undercut banks and abundant leaf litter have been preserved, enhanced and created. Projects have also

included management of nutrients and sediments coming off farms through stock movement control, diary effluent management and pasture management.

Over the past 10 years the MRCCC has witnessed a dramatic increase in landholder involvement in conservation through the blending of research with community engagement. Sub-catchment property ‘clusters’ have become common where aggregations of landholders in close proximity are undertaking similar activities. This has paved the way for the formation of neighbourhood groups and Landcare champions that will further provide momentum to catchment health projects.

Level	Activity examples
MRCCC	<ul style="list-style-type: none"> Professional development to increase knowledge Development of locally relevant educational material Funding acquisition
Community	<ul style="list-style-type: none"> Forums, workshops, extension, landholder incentives
Other Non-government organisations	<ul style="list-style-type: none"> Project partnering
Local councils	<ul style="list-style-type: none"> Planning scheme development Land for Wildlife support through workshops Involvement in planning and monitoring of major projects e.g. road and bridge construction Bushland and road reserve management
Regional groups	<ul style="list-style-type: none"> Contribution to planning and prioritisation projects e.g. Great Sandy Links
State Government	<ul style="list-style-type: none"> Contribution to planning and prioritisation projects e.g. Back on Track Involvement in planning and monitoring of major projects e.g. road and bridge construction
Federal Government	<ul style="list-style-type: none"> Development of Mary River Threatened Species Recovery Plan

Table 2. Examples of engagement opportunities with all levels of the community in protection and restoration of species.

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In addition to restoration project development the Giant barred frog and other threatened species have provided many opportunities to contribute to planning schemes at all levels of government. The above table provides some examples of the types of activity that have been available during the Living with Threatened Species program period. It can be seen that there are ample opportunities for involvement in community activities that help to protect ecosystems and species other than on-ground projects. One key application of species distribution information is that of input into the planning and monitoring of major works projects carried out by all levels of Government.

Conclusions

Frog surveys are useful to initiate contact with landholders while increasing knowledge of species' distribution, population levels and persistence.

Flagship and umbrella species can be successfully utilised to obtain funding and provide experiential learning that engages landholders in restoration activities that benefit other species and whole ecosystems.

The Giant barred frog has directly and indirectly accelerated waterway protection and restoration through a long-term program of education, extension and landholder involvement in frog distribution research.

This approach can be utilised by many catchment management organisations through investigating the possibilities available to their particular region, and by maintaining an advocacy and extension presence in the community for the benefit of that community and the natural assets.

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7ASM Full Paper

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