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REVIEW ARTICLE

Saving the endangered Mary River turtle: Enhancing conservation outcomes through community engagement

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Abstract

Australian biodiversity is facing an extinction crisis; yet, government spending on conservation is wholly inadequate. The involvement of local communities in fundraising, direct actions, and habitat restoration is becoming vital in the fate of threatened species. Here, we review the research outputs and impact generated from 22 years of conservation-driven collaboration between researchers and a local community focused on saving the endangered Mary River turtle (*Elusor macrurus*). The study found that this collaboration generated a significant body of research that advanced the ecological knowledge of the species and ensured the findings were being applied towards the conservation of the turtle, locally and nationally. While the national listing status of *E. macrurus* as endangered has not changed over the past 22 years, the knowledge gained about the turtle's biology and its use to better advise development and water resources in the catchment suggests that the species' future is brighter than when it was first discovered in 1994. This review demonstrates the potential of local communities in driving and supporting conservation initiatives and provides a blueprint for scientific endeavours that inform adaptive community conservation programmes for threatened species.

KEYWORDS

Australia, citizen science, conservation, *Elusor macrurus*, freshwater turtle, management, threatened species

INTRODUCTION

Australia is facing a biodiversity extinction crisis, with an ever-increasing number of plants and animals meeting the EPBC listing criteria for vulnerable, endangered, and critically endangered (Sills et al., 2021; Wintle et al., 2019). While there are a few success stories, most species do not show sufficient recovery to be delisted, and the list grows yearly (Nott et al., 1995; Recher & Lim, 1990; Watson, 1995). Government spending for protecting and recovering threatened species is insufficient (Howell & Rodger, 2018). The total annual expenditure from all Australian government agencies is estimated to be less than 15% of what is required (Cresswell et al., 2021). Consequently, the protection and conservation of

many threatened species in Australia rely ever more on the actions of self-funded community groups (Bremer & Graeff, 2007; Western, 2001). In fact, the level of participation of the local community seems ever more critical to many threatened species' survival (Bremer & Graeff, 2007; Western, 2001) and community-scientist collaborations are being recognized as essential drivers of conservation success for those species and ecological communities (Garnett et al., 2018).

Australia has a diverse freshwater turtle fauna (Cann, 1998; Cann & Sadlier, 2017; Georges & Thomson, 2010). However, almost half of Australia's freshwater turtles are listed as vulnerable or worse (SPRAT accessed March 2023). This rate is concerning because freshwater turtles are considered important to the overall health of freshwater ecosystems through seed dispersal, nutrient cycling and storage, and being vital consumers and bioturbators of soils (Lovich et al., 2018; Santori et al., 2018). Australian freshwater turtles have a cultural, medicinal, and resource role for first nations people and are historically depicted in Aboriginal art (Turtle Conservation Coalition, 2018). Turtles have become popular pets, and many community-driven turtle conservation schemes exist worldwide due to contemporary society's natural affinity for turtles and tortoises (Chen, 2017).

Community turtle conservation programmes often involve protecting nests to reduce the impact of predators and poachers, reintroductions, and habitat restorations (Chan, 2013; Chen, 2017; Dodd Jr & Seigel, 1991; Stanford et al., 2020). However, understanding the relative success of community-led conservation can become challenging because community practitioners may not have the relevant skills and resources to undertake robust data collection, monitoring, statistical analysis, and effective writing and reporting. Such shortfalls can be addressed through collaboration with research scientists, yet understanding how to instigate and sustain such collaborations can be challenging.

Here, we aimed to provide insight from a long-standing (22 years) collaboration between a local community group and scientists to study a freshwater turtle species found only in a single river system in Queensland, Australia. *Elusor macrurus* (Mary River turtle) was formally described as a new species in 1994 (Cann & Legler, 1994) and nationally listed as endangered in 2001 (EPBC Act, 1999). Since the listing, a community group has been actively involved in the turtles' conservation and management. Here, we reviewed the published scientific literature to assess the impact of community involvement on the research direction and outputs and evaluated if this body of work had impacted catchment development and natural resource planning. We also undertook a questionnaire-type survey of Mary River catchment residents to assess how the wider community perceived the turtle and its conservation. This study provides a framework for how collaboration between community and scientists can be sustained over a long period and the synergistic benefits gained for threatened species management.

METHODS

Study species

Elusor macrurus is one of the six freshwater turtle species inhabiting the Mary River catchment (QLD, Australia; Cann, 1998; Cann & Sadlier, 2017; Limpus, 2008) and is one of only two Australian freshwater turtle species where males are larger than females. The males of this species are among the largest freshwater turtles in Australia (Figure 1a; Cann & Legler, 1994). Although *E. macrurus* is only found in a single river system in Queensland

FIGURE 1 (a) Adult male Mary River turtle (*Elusor macrurus*); (b) Home-made chocolate Mary River turtles sold as a component of community fundraising activities; (c) Local community members and landholders building electric fencing to protect *E. macrurus* nests from cattle trampling and predators; (d) Bronze statue of *E. macrurus* erected in the main street of Tiaro (Bruce Highway, QLD, Australia) to raise community awareness about the turtle.

(Australia), many Australians have kept one as a childhood pet (Cann, 1998; Cann & Sadlier, 2017). Eggs of this species were collected in their thousands (~12 000 eggs per year) from the 1960s until the late 1980s. The hatchlings sold throughout the pet trade in Sydney, Melbourne, Adelaide and Brisbane were mistakenly identified as another common species (Cann, 1998; Cann & Sadlier, 2017). Early ecological studies compared the number of nesting females in the late 1990s with the historical number of eggs collected and concluded that the contemporary population had been reduced by as much as 95% (Flakus, 2002). A lack of recruitment is considered the primary factor preventing recovery despite the cessation of egg harvesting (Campbell et al., 2020; Flakus, 2002; Limpus, 2008). The EDGE (Evolutionarily Distinct and Globally Endangered) of Existence programme (edgeofexistence.org), which globally prioritizes species for conservation, ranked *E. macrurus* 30th on the reptile list. The species is nationally listed in Australia and the State of Queensland as Endangered (EPBC Act, 1999; IUCN, 2016).

Study area

The Mary River catchment is on the northern fringe of the southeast Queensland region (Australia). The river flows northwards from the headwaters in the Conondale and Blackall ranges, passing the towns of

Kenilworth, Gympie, Tiaro, and Maryborough (Figure 2). The catchment crosses the countries of three Traditional Owner groups: the Jinibara, Kabi Kabi, and Butchulla people. The catchment comprises about 3 000 km of major streams and covers 9 595 km^2, from Maleny to the river mouth west of K'gari (Fraser Island). The estuary forms part of the Great Sandy Marine Park, including Ramsar-listed wetlands, and is the southernmost catchment of the Great Barrier Reef. The land through which the Mary River flows is fertile, and Europeans first settled the area in 1843 for sheep and cattle farming (Brizga et al., 2004; Stockwell, 2001). During early European settlement, the river was used to transport timber (Brizga et al., 2004).

The discovery of gold in Gympie in 1867 led to significant immigration and the river becoming heavily polluted (Dhindsa et al., 2003). The port of Maryborough was one of Australia's busiest ports because the Mary River was essential for immigrants, settlers, and cargo import and export.

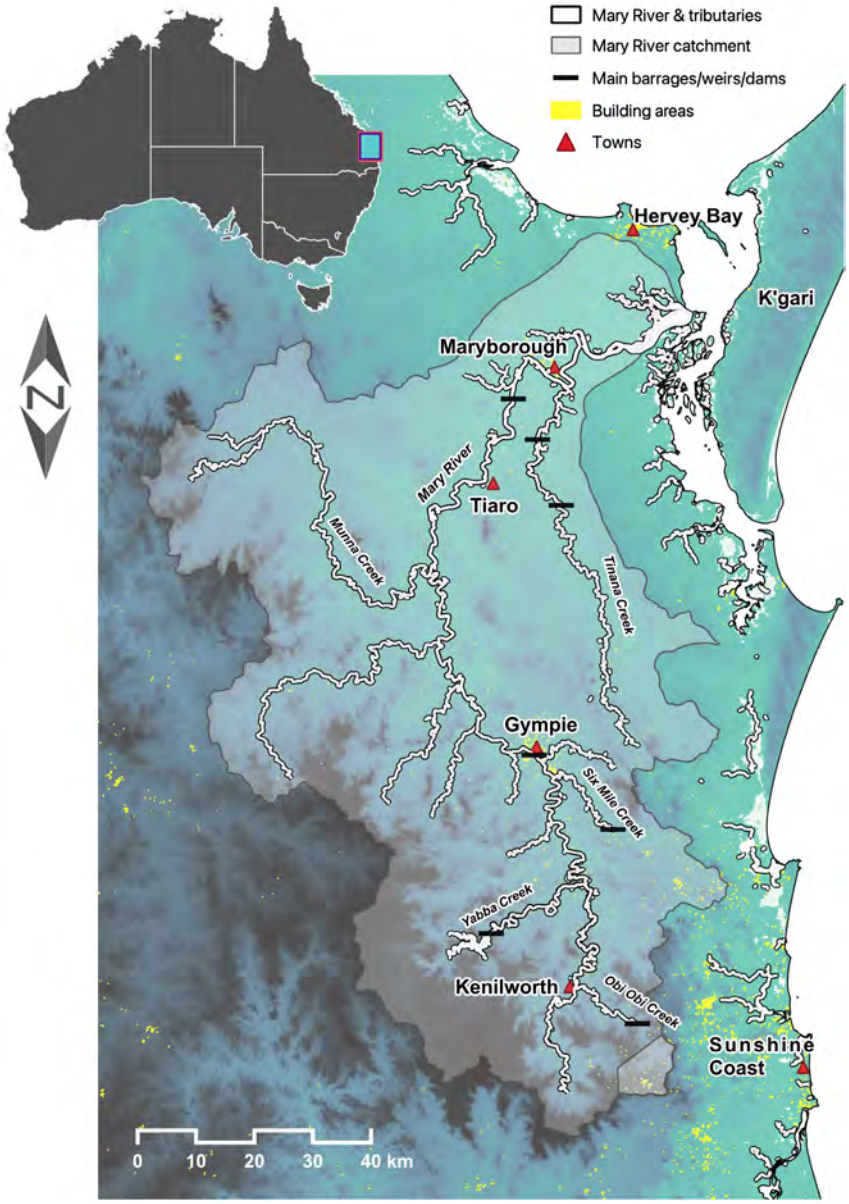

FIGURE 2 The Mary River catchment (Queensland, Australia). The 'upper catchment' is the river and tributaries south (upstream) from the Kenilworth reach, and the 'lower catchment' is north (downstream) from the Tiaro reach.

Consequently, for over 150 years, the catchment has been impacted by various human activities, such as vegetation clearing, gold mining, sand and gravel extraction, and the introduction of exotic plants and animals (Brizga et al., 2004). In more recent times, the rapid growth of nearby urban centres (e.g. Sunshine Coast and Hervey Bay) has led to an approximately fourfold increase in sand extraction from the Mary River (Queensland Department of Primary Industries & Water Resources, 1995). Today, the river is used for domestic and urban water supply, irrigation water for agriculture, and recreational and commercial fisheries (Brizga et al., 2004). The Mary River catchment supports well-established urban communities, rural residential communities, and agricultural enterprises, with the total population of the catchment area being around 150 000 residents. The catchment has three dams, two tidal barrages, eight weirs, and numerous urban-water off-takes (Figure 2). The catchment is adjacent to southeast Queensland, one of the fastest growing regions in Australia, which is hydraulically connected to the Mary catchment via the SEQ water grid. Water can be pumped out of the Mary River catchment to satisfy domestic and industrial water requirements.

Community

The locality of Tiaro has a population of 778 residents (ABS 2021 Census). Although the township is in an agricultural landscape, 8.5% of the workforce is employed in the agricultural sector. The largest employment sectors are retail and healthcare/social assistance (ABS 2021 Census). Out of those who disclosed their 'highest year of school', ~30% completed Year 12 of school (or equivalent), 37% completed Year 10 (or equivalent), and ~11% finished Year 8 or below. Ten per cent of the valid answers have reported the completion of a Bachelor degree or higher (ABS 2021 Census). The median per-person income was $459 weekly (ABS 2021 Census). In 1997, a group of concerned citizens in the rural district of Tiaro (QLD, Australia) formed the Tiaro & District Landcare Group (TDLG). TDLG members were active in riverbank restoration and, through this process, became aware of the nationally listed threatened freshwater turtle species (*E. macrurus*). In 2001, TDLG initiated the Mary River turtle conservation programme. The programme initiatives included: (i) generating funds (e.g. through the sale of chocolate turtles; Figure 1b), (ii) in situ nest protection (to prevent predation and trampling; Figure 1c), (iii) improving ecological knowledge (e.g. funding and supporting research), and (iv) increasing community awareness (e.g. through talks, school visits, meetings with residents and business and publication of community-focused booklets and pamphlets; Figure 1d).

Literature search

The search for peer-reviewed scientific literature was undertaken using the terms '*Elusor macrurus*' or 'Mary River turtle' in Google Scholar. The articles with either community members on the authorship or referenced in the acknowledgements were selected. Those articles were then organized by study purpose, knowledge generated by the study, and known impacts that had arisen due to the study.

Development applications and natural resource plans

A second search was conducted from proponent projects submitted for referral under the EPBC Act and/or declared coordinated projects under

the *State Development and Public Works Organisation Act 1971* (SDPWO Act) between 2005 and 2022. Natural resource use reports and perspective documents within the Mary River catchment were accessed from the Queensland Government website. A search of the cited references within each of these documents was undertaken. The document was classified as whether it referenced a peer-reviewed scientific article that acknowledged community support.

Mary River catchment residents survey

In 2015, a survey was undertaken to investigate the attitudes of Mary River catchment residents towards the conservation and awareness of *E. macrurus*. Face-to-face interviews were conducted with 202 randomly selected attendees (over the age of 18 years) at the Tiaro Farming and Lifestyle Field Day (18 July 2015), customers at the local rural supplies store, a vegetable seedling nursery (the largest employer in the district), and at the Tiaro town library. Members of TDLG and other natural resource management groups were excluded from the survey.

RESULTS AND DISCUSSION

Almost 30 years ago, the Mary River turtle (*Elusor macrurus*) was first described to science, and 22 years ago was nationally listed as Endangered (EPBC Act, 1999). In the intervening period, 16 peer-reviewed scientific articles and six higher degree research theses have been published describing various aspects of the turtle's biology. All those documents acknowledged the support of the local community, which had been thanked for providing funding, field support, tissue and environmental samples, equipment, access to the property, advice, encouragement, and enthusiasm. This body of research focused on describing aspects of the turtle's population size, critical habitat, and threats (Table 1). The work forms a contiguous and linear path of scientific enquiry over 22 years, which has greatly improved our understanding of the ecology of the Mary River turtle, its status, and its current predicament. This body of published work was cited in both Commonwealth and State threatened species listing advice and used to support a wide range of environmental assessments and planning projects within the Mary River catchment (Table 2). Without this body of research to reference, development and water resource planning initiatives would have been carried out with considerably less understanding and consideration of the ecological requirements of the turtle.

What has been achieved?

The first research on the turtle's ecology was independent of the community and was undertaken by the Queensland State Government (Flakus, 2002). This work provided population data to inform an appropriate national listing and proposed key threats to population recovery (Australian Government, 2016; EPBC Act, 1999). This listing stimulated the community to engage in localized community actions to reduce the predation of the eggs from within the nests by vertebrate pests (dogs, foxes, and pigs). The community realized they required scientific input to assist and set the management agenda adequately. The strategy adopted by the group was to raise funds through the production and sale of chocolate turtles (Figure 1b). Those funds were used to support a Higher Degree Candidate

TABLE 1 Peer-reviewed published research and Higher Degree Research theses undertaken on various aspects of the biology of *Elusor macrurus* since the species was nationally listed as Endangered in 2000.

Type	Citation	New knowledge	Impact
Population assessment			
Mark-recapture	Campbell et al. (2020); Connell (2018); Connell et al. (2018); Flakus (2002)	Population in the lower catchment with no recruitment, but recruitment is shown in the upper catchment	Conservation actions other than nest protection required
Genetics	Schmidt et al. (2016, 2018)	Effective population size	Used to inform uplisting of threat status
Critical habitat assessment			
Nesting habitat	Espinoza et al. (2018); Flakus (2002); Micheli-Campbell (2012); Micheli-Campbell et al. (2011, 2012); Micheli-Campbell et al. (2013a)	Characterization of nesting sites	Informed head starting the programme
In-stream habitat	Collett (2017); Espinoza et al., 2021; Micheli-Campbell (2012); Micheli-Campbell et al. (2013b); Micheli-Campbell et al., 2017	Fine-scale characterization of habitat for adults and juveniles	Improved population surveys
Threatening processes			
River impoundments	Clark (2008); Clark et al. (2008b, 2009)	Diving performance is reduced due to conditions created by impoundments	Rational for a large dam not to be given Federal approval
Invasive species	Beukeboom (2015); Flakus (2002); Micheli-Campbell et al. (2013a); Micheli-Campbell et al. (2013b)	Nest and hatchling predation rates	Informed community-driven nest protection programme
Changes to environmental flows	Espinoza et al. (2018, 2021)	Potential nest inundation; matching of flows with the timing of individual movement	Modified operational rules of upstream water storage
Climate change	Clark (2008); Clark et al. (2008b); Micheli-Campbell (2012); Micheli-Campbell et al. (2011, 2012)	Performance impacted by increases in environmental temperature	Information for head starting
In-stream habitat degradation	Micheli-Campbell (2012); Micheli-Campbell et al. (2017)	Identification of in-stream critical habitat	Information on preferred habitat for juveniles
Small population size	Connell (2018); Campbell et al. (2020); Schmidt et al. (2016, 2018)	Adequate population size, no change in population size	Changes in management strategy

Top-up stipend and assistance with the respective fieldwork by providing equipment, local accommodation, and land access. One of those research projects showed that the community had protected 631 nests, which resulted in 9 465 hatchlings entering the lower catchment of the river since the inception of the nest protection programme (Campbell et al., 2020). However, it also found no turtles from the nest protection surviving within the river. This finding was disheartening for the community—to realize that their nest protection effort had done little to grow and recover the *E. macrurus* population. However, those findings led the community to explore other actions, such as head-starting the juvenile turtles to a size that might be strong enough to survive in the river and investigating in-stream causes of turtle mortality.

TABLE 2 Development and management-related documentation written between 2005 and 2022 that cited the community-supported research on *Elusor macrurus*.

Document type	Purpose	Agencies	Frequency
Environmental impact assessments	Transport infrastructure	State Government, Consultants	16
Environmental impact assessments	Other development	Consultants	9
Environmental impact assessments	Water storage infrastructure	State Government, Consultants	5
Assessment report	Water resource planning	State Government, Consultants and NGOs	6
Plans, strategy and advice	Natural resource management	Commonwealth Government, State Government, Local Council and NGOs	6

Note: There may be additional documents that were not uncovered by this study.

The research outputs supported by the community have been incorporated within infrastructure development and water resource planning at the local, state, and Commonwealth levels of government. A 'now infamous' infrastructure development that was thwarted by the presence of the Mary River turtle was the Queensland Government's Traveston Crossing Dam Project (QWI, 2009). The Federal Government rejected the go-ahead for the dam construction on the grounds that it would irreversibly harm *E. macrurus* and other threatened species (press release Garrett, 2009). The scientific data to support this decision was generated from the research funded by a scholarship provided by the local community (Clark, 2008; Clark et al., 2008a, 2008b, 2009). The research found that *E. macrurus* hatchlings collected a significant amount of oxygen from the water through a specialized aquatic respiratory system in its cloaca. The damming of the river would have significantly affected their survivorship by reducing water quality (aquatic oxygen levels and water temperatures) within and downstream of the dam leading to alterations in turtle diving physiology and behaviour. Further research (also supported through another community-sponsored HDR-candidate scholarship) revealed that the turtles were highly selective to the physical and biological properties of the river stream and sandy riverbanks, which would likely be inundated or altered through changes in river flows caused by impoundments (Micheli-Campbell, 2012; Micheli-Campbell et al., 2011, 2012; Micheli-Campbell et al., 2013a; Micheli-Campbell et al., 2013b).

Although the Traveston Crossing Dam was never built, two large tidal barrages dam the tidal reaches of the Mary River system. One is located on the main trunk of the river, and another on Tinana Creek (a major eastern sub-catchment). Obi Obi Creek, a major tributary to the Mary River, is dammed at Baroon Pocket, as are Six Mile Creek and Yabba Creek (Figure 2). During periods of drought, the continuous connection of river downstream of these impoundments can be broken, and further augmented by water extraction activities. Some ecological disruptions of water impoundment and extraction can be alleviated with controlled releases or environmental flows. Community-scientist collaborative research found that environmental flows were important in assisting with turtle movement during breeding and nesting periods to access mates and nesting banks (Espinoza et al., 2021), and the magnitude of the environmental flow and the likelihood of *E. macrurus* nest inundation was assessed (Espinoza

et al., 2018). Water authorities have used these data to develop targeted and legislated environmental flow releases.

The community-supported research has built a much greater holistic understanding of *E. macrurus* resource requirements in which management actions can be guided. The research found that adult *E. macrurus* feed on bivalves, gastropods, and aquatic insects only available within rocky riffles (Micheli-Campbell et al., 2017). The juveniles inhabit shallow backwaters above fast-flowing shallow riffle areas, presumably to access food and reduce the time they are transiting between the riverbed and the surface to reduce the potential for predation (Micheli-Campbell et al., 2013b). River impoundments change fast-flowing shallow sections of the river to slow-moving deep lentic waters, and the community-supported research has provided strong evidence for protecting these rocky riffles as a critical habitat for the survival of *E. macrurus*.

Over 100 members of the community have assisted scientists and research students in conducting the monitoring of *E. macrurus*. This involvement has provided the local community with experience and knowledge in identifying turtle species, handling turtles, taking scientific measurements, downloading acoustic receiver data, and tracking animals. They have also gained knowledge of relative species abundance in specific river reaches, which has been especially significant for landholders whose property was used to support the research activities (Connell, 2018; Connell et al., 2018). The research partnerships have exposed this rural community to tertiary education, the scientific process, and how to develop evidence-based conservation strategies, often beyond the scope of community groups (Legge, 2015).

The absence of ecological outcome monitoring leads to ineffective expenditure targeting and a continuance of biodiversity declines (Walsh et al., 2014). The collaboration between the local community and scientists to undertake conservation-driven research has transferred knowledge and skills that will likely have implications beyond turtle management. The researchers have benefited by having continuous on-ground support, local advice and a small but stable funding revenue over many years. Beyond the community group involved directly with the conservation programme, there has been increased awareness of the turtle and its plight. Almost everyone living within the wider Mary River catchment has heard of the Mary River turtle (*E. macrurus*) and the conservation programme (Table 3). Even a bronze statue in honour of *E. macrurus* was erected on the Brisbane to Cairns Highway in Tiaro (Figure 2d), which has become a popular rest and photograph spot for tourists travelling through the town.

Here, we present a summary of the 22 years of community-scientist collaborative research focused on the Mary River turtle (Figure 3). Based on our experiences, we described six discrete research phases that were synergised by the collaboration. These phases not only established a baseline

TABLE 3 Responses from a questionnaire-type survey of 220 inhabitants of the Mary River catchment to assess the impact of the communities' awareness activities.

Survey question	Yes (%)	No (%)	Indifferent/Unknown (%)
Have you heard of the Mary River turtle?	98	2	
Have you heard about the Mary River turtle community conservation programme?	66	26	8
Do you support the Mary River turtle conservation programme?	88	2	10
Would you be upset if the Mary River turtle became extinct?	49	41	10

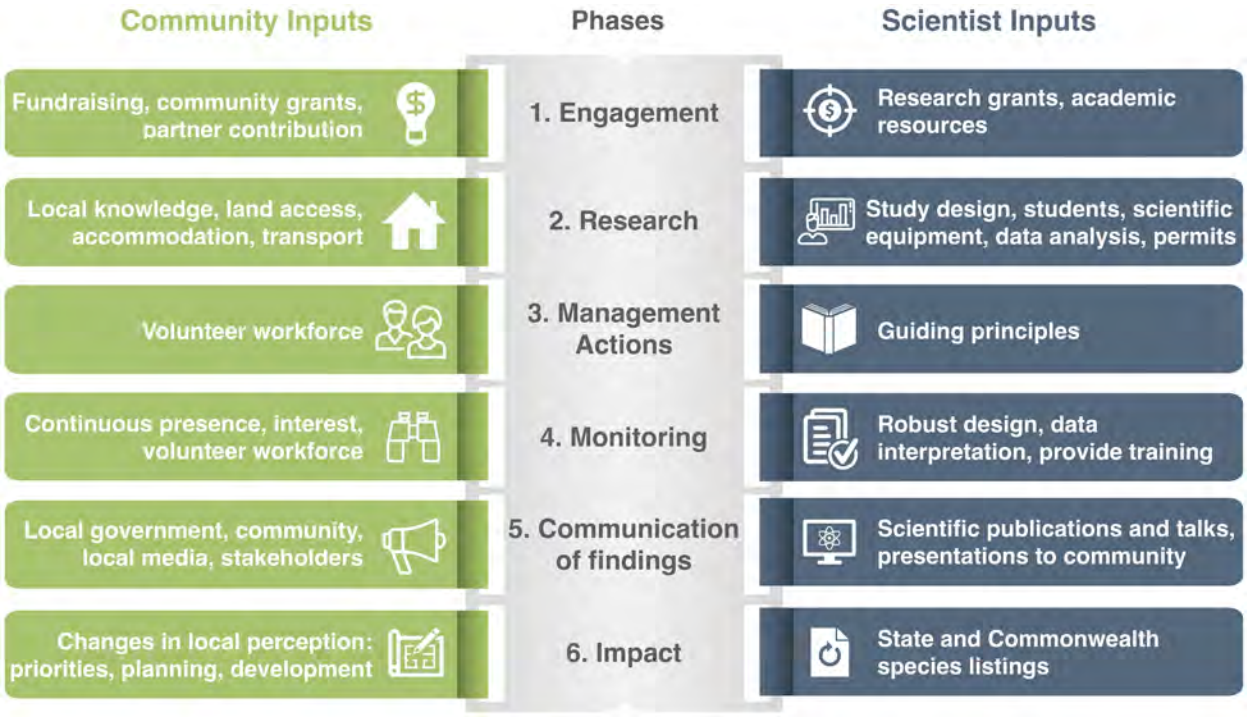

FIGURE 3 Schematic diagram highlighting the six phases of the collaborative journey and the inputs from the community and scientists.

to guide the quality of future management actions that could be measured but also generated a positive feedback loop that supported knowledge generation followed by rapid communication of findings to residents, local businesses, industries, and policymakers. By playing to each other's strengths and working together, the collaboration between the community and scientists has created a considerably more positive outlook for the Mary River turtle.

What remains to be discovered?

A key question that has yet to be resolved is why there has been such low recruitment of juvenile *E. macrurus* into the lower catchment of the Mary River, despite large numbers of hatchlings entering the river every year for the past 20 years. Although small turtles are shy, cryptic and can be challenging to capture in the river, we are confident in our methods, which have proven effective in capturing juveniles of the other five species present in the river (Connell et al., 2018). The method also captured juvenile *E. macrurus* in the upper catchment of the Mary River. The higher ratio of juvenile to adult *E. macrurus* within the mid and upper catchments, despite lower volumes of nests and no dedicated long-term conversation efforts, strongly suggests that the lack of recruitment is due to total in-stream mortality of juvenile *E. macrurus* in the lower catchment of the Mary River (Campbell et al., 2020; Connell et al., 2018). This mortality could be through top-down (predation) and bottom-up (lack of resources) processes within the river. A previous community-supported biotelemetry study of *E. macrurus* juveniles reported high levels of in-stream predation in this section of the river (Micheli-Campbell et al., 2013b). Determining the predators responsible, understanding why the predator/prey relationship is unbalanced in the lower catchment, and developing an effective management strategy to overcome this should

be an immediate area of future research and one the community is looking into.

Further research should assess broader habitat preferences, such as riparian and in-stream vegetation. Such data would facilitate riverine habitat restoration activities and inform the design of instream infrastructure, such as road crossings and water supply infrastructure. A comprehensive sampling of the entire Mary River catchment to better illustrate the actual natural distribution of this species is also required. The replication of the community survey, but on a much larger geographic scale, would also assist in monitoring the community's attitude towards species conservation and investigating if the scientific findings adequately reach the public.

CONCLUSION

This review demonstrates the power of the local community in facilitating research for informed management and conservation initiatives. The profile of *Elusor macrurus* has been raised so that most of the community supports the efforts to ensure its preservation. The research has revealed new areas for investigation with tenable solutions to increase *E. macrurus* recruitment. However, *E. macrurus* is still listed as Endangered (EPBC Act, 1999; IUCN, 2016) and was recently nominated to be uplisted to Critically Endangered under the EPBC Act, 1999. Therefore, a question asked by the community is: 'Have all our efforts been in vain?' We argue on the contrary: that the outlook for *E. macrurus* is more favourable than it was when first listed 22 years ago, and the uplisting in conservation status is due to increased knowledge rather than an increased risk of extinction. The collaboration has enabled national priorities to be set for *E. macrurus* and ensured that findings are incorporated into local water resource planning and strategic development throughout the Mary River catchment. The advent of similar collaborative community-researcher conservation projects, such as the '1 Million Turtles' (1millionturtles.com) and the 'Turtles Forever' (Streeting et al., 2022; facebook.com/bellsturtles) programmes, advocates that the future is looking brighter for Australia's freshwater turtles.

AUTHOR CONTRIBUTIONS

Mariana A. Campbell: Conceptualization (equal); data curation (supporting); formal analysis (supporting); methodology (supporting); project administration (lead); visualization (lead); writing – original draft (equal); writing – review and editing (equal). **Marilyn J. Connell:** Conceptualization (equal); data curation (lead); methodology (supporting); project administration (supporting); validation (equal); visualization (supporting); writing – original draft (equal); writing – review and editing (equal). **Natalie J. Clark:** Data curation (equal); investigation (supporting); methodology (supporting); validation (supporting); writing – original draft (equal); writing – review and editing (supporting). **Tom Espinoza:** Investigation (supporting); methodology (supporting); validation (supporting); writing – original draft (equal); writing – review and editing (supporting). **Samantha P. Flakus:** Investigation (supporting); methodology (supporting); validation (supporting); writing – original draft (equal); writing – review and editing (supporting). **Sydney J. Collett:** Investigation (supporting); methodology (supporting); validation (supporting); writing – original draft (supporting); writing – review and editing (supporting). **John Cann:** Investigation (supporting); validation (supporting); writing – original draft (supporting); writing – review and editing (supporting). **Craig E. Franklin:** Conceptualization (supporting);

investigation (supporting); validation (supporting); writing – original draft (equal); writing – review and editing (supporting). **Hamish A. Campbell:** Conceptualization (lead); data curation (lead); formal analysis (lead); investigation (lead); methodology (lead); validation (equal); visualization (supporting); writing – original draft (lead); writing – review and editing (equal).

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ETHICS STATEMENT

The community survey was completed under the University of New England Human Research Ethics Permit (HE15-164).

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