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EDITED BY
Melissa Haeffner,
Portland State University, United States

REVIEWED BY
Melanie Rohse,
Anglia Ruskin University, United Kingdom
Erin Louise O'Donnell,
The University of Melbourne, Australia
Raul Pacheco-Vega,
Facultad Latinoamericana de Ciencias Sociales, Argentina

*CORRESPONDENCE
Jessica M. Reeves
✉ j.reeves@federation.edu.au

†These authors have contributed equally to this work and share first authorship

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Implementing a participatory model of place-based stewardship for inclusive wetland management: A community case study

Jessica M. Reeves[1*†] and Patrick R. Bonney[2†]

[1]Future Regions Research Centre, Federation University, Gippsland, VIC, Australia, [2]Research and Innovation Capability Urban Futures, RMIT University, Melbourne, VIC, Australia

The inclusion of local values and an appreciation for different ways of knowing are increasingly considered core principles in wetland management but can be difficult to achieve in practice. This Community Case Study describes the development and impacts of a participatory action research (PAR) project focused on the creation of a community-led stewardship and knowledge sharing in a rural coastal community in Victoria, Australia. The project, Living Bung Yarnda, was designed around four dimensions: vision, knowledge, narrative, and capacity—that align with key principles of PAR and guided the process of knowledge building and exchange. Working with a range of stakeholders, including environmentally-focussed community members, government agencies and Traditional Owners groups, we aimed to discover pathways for the inclusion of local knowledge, lived experience, and acts of care by community members in governance processes. The case description illustrates how embedded knowledge in this community is currently undervalued by management agencies but, if harnessed, can contribute to more holistic and equitable forms of wetland management. We conclude with reflections on the development of the project, emphasizing the role of academic researchers in fostering relationships between community and management authorities that is built on trust, humility and a willingness to find a common language.

KEYWORDS

participatory action research, environmental stewardship, multiple ways of knowing place, waterway management, water justice

1. Introduction

Water is perhaps the most essential natural resource: connecting people and place, as well as playing a vital role in supporting all forms of life. Water invites expressions of diverse cultural values, beliefs, emotions and ways of knowing, which may conflict with dominant scientific knowledge and command-and-control approaches to waterway protection (Taylor and de Loë, 2012). Waterway management based solely on a conventional, reductionist paradigm is considered no longer adequate to deal with the complex social and environmental challenges currently facing society (Mach et al., 2020), particularly in a time of climate crisis. However, it is natural science and its anthropocentric susceptibilities that are foremost drawn upon to inform water policy and practices of waterway management, restoration and repair (Brierley, 2019). This raises important questions about how to foster

approaches to waterway management based on a mindset of water environments as complex socio-natural hybrids rather than as predictable entities or collections of components (Brierley, 2019).

Waterways–rivers, lakes, and wetlands—flow through social-scapes, providing not merely amenity, but connection, engagement and sense of place (Bradbury and Waddell, 2019). Within any given community, connections will be understood and expressed in different and sometimes conflicting ways. This increasing awareness has stimulated research efforts aimed at exploring how diverse knowledges that constitute hydrosocial territories can contribute to more equitable, integrated and inclusive water governance, while promoting more holistic understandings of and responses to social and environmental change (Finewood and Holifield, 2015). While hydrosocial justice is typically concerned with enabling equitable access to water or issues of water quality, here we focus on empowering community members to undertake acts of care for a local waterway. Within this context, participatory action research (PAR) is a useful approach to research that promotes inclusive knowledge gathering and action to facilitate improved practices and both environmental and community outcomes.

In Australia, there is rising interest in societal engagement in the processes of scientific research and stewardship practices. Current policy documents, such as Protecting Victoria's Environment—Biodiversity 2037 strategy (Department of Environment, Land, Water and Planning, 2017), advocate for ways in which citizens can "act for nature". Over the past decade there has also been an increased focus of incorporating broader community values around water management, in particular through the development of Water for Victoria (Department of Environment, Land, Water and Planning, 2016). This has been facilitated through a range of mechanisms, such as community-facing groups (e.g., Waterwatch, EstuaryWatch and Landcare, Field and Game clubs, Birdlife Australia) as well community advisory committees for Catchment Management Authorities and place-based consultation with respect to specific policies and strategies, including integrated water management plans.

The rise in water-based citizen science programs has demonstrated that communities are concerned about their waterways and interested to enhance their knowledge through scientific practice. However, there have been challenges in the utilization of this data by management authorities, often to the disappointment of the volunteer participants (Mussehl et al., 2022). In addition, there are multiple ways to demonstrate care and knowledge of place, through story, journaling, and other arts-based practice. However, undertaking this work effectively and integrating place-based values and knowledge into management planning and activities is challenging (Bradbury and Waddell, 2019).

The project we describe in this Community Case Study, Living Bung Yarnda, explores the diverse ways in which local communities identify and articulate their concerns about the health of waterways to highlight areas where this knowledge and practice can make a positive contribution to policy and management practices. It proposes to extend engagement of stakeholders beyond consultation around allocation of entitlements, values and concerns to include community-led participatory approaches through acts of environmental stewardship. Adopting multiple participatory methods has encouraged environmentally-engaged community members to act for the lake, including observation of various aspects of biodiversity or water quality, such as citizen science, or by sharing stories and understanding of the lake through arts based practiced, nature journaling and story-telling. This approach not only moves beyond predetermined, "invited" forms of public participation, but also considers water justice beyond legal and resource aspects of a waterbody to include acts of care and stewardship and how this can be expressed. The project was facilitated by the authors and led by the Lake Tyers community, referred to here as local residents and members of environmentally-focused community groups. It remains an iterative work in progress that we continue to learn from.

2. Water justice and participatory action research

Central to Living Bung Yarnda is a recognition of the societal relations to waterscapes and how elevating these relations in their many forms is crucial to water justice. This resonates strongly with Brierley's concept of "living with living rivers", which he articulates in his book, *Finding the Voice of the River* (Brierley, 2019). Brierley describes this as "…a cooperative, collaborative, more-than-human (Gaian) approach to living with rivers sees humans as part of nature, conceptualizing the Earth System as a living and emergent superorganism." Through Living Bung Yarnda, community members are encouraged to share their concerns and aspirations, and act for the benefit of waterway health in Lake Tyers—in essence, providing a "voice for the lake".

There are precedents for waterways being awarded personhood status, such as the Whanganui River (Aotearoa/NZ,) the Ganga and Yamuna Rivers (India) and the Atrato River (Colombia) (O'Donnell and Macpherson, 2019). In Australia, there has recently been establishment of the Birrarung Council as a statutory independent voice for the Yarra River in Victoria, through The Yarra River (Wilip-gin Birrarung murron) Act 2017 (Vic). This is in addition to the Victorian Environmental Water Holder, created under Water ACT 1989 (as amended in 2010), as an independent statutory authority to preside over decisions of water entitlement and waterway management throughout the State, effectively acting as an entity on behalf of the rivers (O'Donnell and Macpherson, 2019).

Each of these legal mechanisms incorporate Indigenous water management, albeit to different degrees (O'Bryan, 2019). In Victoria, active inclusion of Indigenous voices has been incorporated into key strategies, such as Water for Victoria (Department of Environment, Land, Water and Planning, 2016) and the Central and Gippsland Region Sustainable Water Strategies (Department of Environment, Land, Water and Planning, 2022). There are now also Indigenous advisory groups to the Catchment Management Authorities as well as stronger representation on CMA Boards and water management committees, such as the Gippsland Lakes Coordinating Committee, as well as positions being created for Indigenous water officers and rangers.

Increasingly, issues of water justice are inviting participatory approaches to help understand complex values held by community

and work toward co-design of solutions (Conallin et al., 2017; Lauer et al., 2018; Roque et al., 2022). The development of Living Bung Yarnda aligns with a Participatory Action Research (PAR) approach. Put simply, Reason and Bradbury (Reason and Bradbury, 2006) consider PAR to produce knowledge through a participatory process that empowers people to act, using that knowledge. PAR prioritizes the participants—in this case the community members, in defining the research priorities, active participation in knowledge gathering and exchange; and analysis and reflection on knowledge gathered to facilitate practice change and/or increase agency (Walter, 2009). It has been applied in many settings, particularly involving marginalized groups in areas such as health care and resource management (Baum et al., 2006; Grilli et al., 2021). In Australia, it is increasingly being employed to facilitate active involvement of Traditional Owners in areas of land management (Walter, 2009; Mussehl et al., 2022).

A key element of PAR is the positioning of the researchers as facilitating, rather than directing the research (McTaggart, 1991). This requires reflexivity and humility—and a degree of trust on the part of the participants. Increasingly, researchers are being encouraged to embrace more active participatory approaches, to address the necessary transformations required in the face of global issues, such as climate change (Bradbury and Waddell, 2019). There are also synergies with the approaches of knowledge co-production for sustainability research, which emphasize the place-based nature of the work, makes space for multiple ways of knowing, clearly articulates key goals and allows for iterative interaction between actors (Norström et al., 2020). However, in Living Bung Yarnda we preference the community participants to define the key issues for the lake and the actions they want to undertake to act for its care.

Here, we describe the implementation of a participatory action research (PAR) methodology as a mechanism to develop a community-led environmental stewardship program for Lake Tyers, East Gippsland. The project actively seeks space for community-led action for environmental benefit, within and alongside current management practice. Interested community members are provided an opportunity to not only speak for, but demonstrate acts of care for their environment, through a range of different approaches to suit their capacity and interest. These acts enable people to draw on their lived-experience as an expression of connection to place to promote positive environmental outcomes (Bennett et al., 2018). Through this, Living Bung Yarnda seeks to redress some of the existing power relations and management gaps around the lake and facilitate greater community involvement (Turnhout et al., 2019).

3. Case context

The study was located in the waterway of Lake Tyers (Bung Yarnda), East Gippsland, Australia—a forested, drowned river, intermittently-open and closed estuary lagoon on the Traditional lands of the Krauatungalung clan of the Gunaikurnai people. Bung Yarnda, and its surrounding forest and coastline is a site of great cultural significance for the Gunaikurnai people (Gunaikurnai and Victorian Government, 2018). Historically home to a large timber industry, and now popular recreational fishery and tourist destination, it also supports the livelihoods of three small communities [Nowa Nowa, Lake Tyers Beach and Lake Tyers Aboriginal Trust (LTAT)], each with distinctive socio-political and cultural differences. The LTAT lies on the central peninsula of the lake. Residents of LTAT were granted Land Rights in 1971 after several decades under government administration as a mission and reserve for Aboriginal people taken from across Victoria (Redshaw, 2013).

Lake Tyers is part of the Ramsar-listed Gippsland Lakes, known for their diverse ecology supporting abundant migratory birdlife. Despite several present and impending threats, Lake Tyers is considered by the Ramsar Management Plan to be in near-pristine condition, compared to the other larger and more degraded lakes in the system (EGCMA, 2019). This assessment has contributed to a lack of active governance of the area, which includes no regular monitoring of its overall condition and trends in areas such as water quality and biodiversity.

Other management strategies and policies are centered on the lake as a recreational fishery, such as access and stocking levels, which prioritize utility and resource exploitation over environmental health EGSC, 2015; Parks Victoria, 2021 and fisheries plan (Department of Primary Industries Lake Tyers Fisheries Reserve Management Plan, 2007). Whereas the lands around much of the lake fall under the Joint Management Plan between Gunaikurnai and the Victorian Government (Lake Tyers State Park) (Parks Victoria, 2021), or the Lake Tyers Aboriginal Trust, this does not include the waterway specifically. Whilst in principle there are opportunities for broader community consultation and engagement in developing these strategies, potential for participation in enacting these strategies are currently limited.

In addition, the catchment was severely impacted by the 2019–20 Black Summer fires. Although the townships were spared, the trauma of the event, repeated evacuations and blanketing smoke have caused significant divisions in the community and with management authorities around future fire protection. This has promoted uncertainty and anxiety among some community members regarding the future health of the lake and a desire that the environmental values of the lake are recognized and protected.

4. Living Bung Yarnda: Essential elements

Living Bung Yarnda began with a story, written by Gunaikurnai-Yorta Yorta man, Wayne Thorpe. In *A Story of Bung Yarnda* (Thorpe, 2016), Thorpe uses narrative and vivid imagery that speaks to the natural variability and uniqueness of Lake Tyers while highlighting its cultural significance as spiritual focal point for the Indigenous community. A key focus in this account is encouraging greater respect, patience and observation of the lake's natural cycles. For the lake's management, Thorpe advocates for natural rather than artificial openings of the sandbar (berm) that separates Lake Tyers from the ocean in respect for the natural rhythms of the lake's replenishment. At a presentation of this story at a local event (Stories of Influence) in 2018, Thorpe put out a call for help for the community to be vigilant in their care for the lake. Living Bung Yarnda was created to respond to this call.

The project applies an ethos of valuing multiple knowledges and place-based understandings of local voices, incorporating diverse values and interests, improving access to knowledge and building community and relational capacity, both within community and between community and management authorities (Mackenzie et al., 2012). Specifically, it aims to provide space for other forms of knowledge, including local history, stories and arts-based practice in an effort to build multiple expressions of the lake's ebbs and flows. Importantly, Living Bung Yarnda was not designed to merely fill gaps in scientific knowledge but to discover pathways for environmentally-minded members of the local community to act for the lake and contribute to its protection. In doing so, it facilitates community capacity building, such as training in citizen science monitoring, disseminating knowledge of responsibilities of agencies and their remits, encouraging communication through arts-based practice and identifying the levers and triggers that can be utilized for effective action, and their limitations.

The community members we partnered with self-selected to join Living Bung Yarnda. Many were drawn through affiliations to active environmentally-focussed groups in the region, such as Coastcare group—Lake Tyers Coast Action, Landcare group—Friends of Oneonta, FLOAT artist's collective or were members of the Lake Tyers Aboriginal Trust. Others were non-affiliated and learned about the project through social media or a monthly community newsletter. The project was co-created with these groups to specifically address the issues they identified, and to ensure that the gathered information is easily accessible and widely shared. The researchers took time to get to know the community in place by regularly visiting over a 5-year period (Reeves) and residing in the community for 6 months (Bonney). We viewed our role in this project to include identifying community concerns and values, begin to appreciate community dynamics, communicate management priorities and opportunity for community engagement, facilitating the generation of new knowledge, providing training opportunities, organizing knowledge sharing events and activities and serving as trusted conduits between community members and management authorities. A website was also developed to gather and share knowledge, stories and images (www.livingbungyarnda.net.au), including links to a range of citizen science apps, where participants were encouraged to upload their data.

Overall, the project aims included:

1) Determining the key management priorities for Lake Tyers from a community perspective;
2) Co-designing a methodology to enable community to share their knowledge and lived experience of the environment of Lake Tyers;
3) Empowering the community to act for the lake, through development of a shared language between community and management authorities and enhancing capacity in a range of methodologies;
4) Documenting and communicating the community values of the lake, as well as the process of developing Living Bung Yarnda through various outlets, so learnings can be shared and applied to other settings.

The following section presents our experiences and learnings, recognizing that this project is an ongoing effort to achieve more comprehensive and inclusive wetland management in this community. Specifically, we describe the processes involved in creating this project across its four phases: vision, knowledge, narrative and capacity. Table 1 summarizes these phases and their associated methods, outputs and impacts.

4.1. Vision: Mapping community values

The concept of "vision" refers to our efforts to uncover the long-term goals and aspirations of the community with

TABLE 1 Overview of project dimensions, methods, outputs, and impacts.

Project dimension	Description	Methods	Outputs and impact
Vision	Determining the aspirations of participants in relation to understanding and protecting the environment	Engagement and deep listening through interviews and group discussion Participatory mapping	In 19 maps produced across three events; analyzed by the authors to guide design and implementation of future activities
Knowledge	Discovering pathways for connecting local knowledge with management priorities	Interviews and on-ground engagement with management authorities and community Facilitating multiple knowledge sharing events	Recognition of what aspects of the lake community participants are interested in and mechanisms for dialogue with management agencies Multiple forums promoting community-agency connections and building shared understandings of management priorities and knowledge requirements
Narrative	Stories, local histories and experiences of participants	Photovoice External presentations and media communications	67 photographs submitted and exhibited at a local art event hosted by National Gallery of Victoria Two conference presentations and media engagements detailing project aims and impacts, emphasizing role of local knowledge and place-connection in environmental governance. Community participation in Nature-led Recovery Workshop
Capacity	Upskilling and access to resources to build literacy and agency toward community goals and aspirations	Training workshops in citizen science methods Coordinating and obtaining resources for two community-based monitoring projects	Establishment of broadscale water monitoring program Facilitating multi-site vegetation mapping study Recognition of group by local management authorities

whom we partnered. Establishing a shared vision guided the research process to ensure its alignment with community values and priorities. In the early stages of the project, we organized multiple opportunities for community members to share their perspectives, concerns, and aspirations through facilitated meetings and extended conversations.

This visioning process was facilitated through a participatory mapping approach, which is a methodology that enables participants to make visible the connection between people and place through map-making. During three separate sessions with different community groups (Lake Tyers Coast Action, Friends of Oneonta and Lake Tyers Aboriginal Trust), participants were invited to highlight specific areas that were significant to them on maps provided to them using colored dots and annotations to indicate different values (e.g., environmental, social, cultural, and concern). The mapping process revealed places of local importance, assigned intangible values to the physical environment and provided a space for conversations about management concerns and priorities.

In total, 19 maps were produced across the three events, which we assessed to understand the diversity of community interests and concerns. We uncovered several consistencies across the maps, such as concerns water quality, intensive recreation use, invasive species, fire management, and cultural heritage protection, as well as additional areas of great personal connection and social value. The maps were then used to inform future project planning in areas of identified as having local significance and concern to community members.

4.2. Knowledge: Engaging multiple ways of knowing

"Knowledge" refers to the different types of local knowledge and expertise within the community, as well as the potential pathways through which this knowledge is aligned with management actions and priorities. Through extensive engagement with the community prior to, and throughout, the implementation of Living Bung Yarnda, we developed rich insights into the various aspects of the environmental the community is attuned to and their individual knowledge building practices.

Fred, for example, is an expert on the botanical world and has mapped all of the Grevilleas of the catchment, noting their response to fire, and logging events. Another, Harriet, is acutely attuned to birdsong and actively maps the activity of the forest based on the movement and interactions of her feathered friends. Julia, an artist, regularly camps on a property that has been in her family for generations and dyes her canvases by submerging them in the water to collect the hues of tannins and algae. Mark knows the stories of the Old People and the sacred sites of the lake, which he keeps safely to himself. Jeff and Hope have kept meticulous archives and documentary evidence of the lake's history over a period of more than eight decades. Paul runs the local water taxi and has set up an unofficial height gauge for the lake, which he records along with the openings and closings of the berm whereas Rod has various gadgets on his boat recording temperature and depth changes. Tim has been mapping how deer are moving through the catchment, browsing on the new shoots after the fires, whereas Stacey is obsessed with the weeds, many of which have escaped from people's gardens.

As these examples illustrate, this knowledge building was often conducted in systematic ways, such as the meticulous collection of records on the history of Lake Tyers, the mapping of vulnerable plant species or the movement of different bird species and recording of the lake's physical properties. These individuals were keen to share this knowledge with each other and the broader community, but particularly with management authorities. However, they were often frustrated that their knowledge was considered anecdotal and not likely to be considered legitimate in the eyes of management authorities. Thus, part of their motivation for participation in Living Bung Yarnda was to both understand the methods that management authorities draw upon and to use these as a mechanism to communicate their lived experience of place.

As such, significant time was spent engaging with management authorities with lines of responsibility to Lake Tyers to gain an understanding of the current policy and management frameworks governing Lake Tyers and to seek opportunities for greater community involvement. This included East Gippsland Catchment Management Authority, Department of Environmental, Land, Water and Planning, Parks Victoria, Gunaikurnai Land and Water Aboriginal Corporation and East Gippsland Shire Council. We identified the observational databases management agencies draw on for priority planning, quality control processes for data collection and current approaches to community consultation and engagement. This step enabled the development of an understanding of the remit, responsibilities and priorities of each of the agencies, and also has begun to develop a common language that community can relate to. Understanding the triggers and priorities of each agency are key for community to effectively communicate their concerns and have a greater chance of gaining traction.

As an example, in July 2021, we brought community and management authorities together to discuss the topic of fire management. The "Planned Burn Forum" provided an opportunity to discuss the nature and extent of planned burns across the catchment and the decision making involved. At the time, this issue was a high priority for the community and has in the past caused significant conflict with management authorities. The Forum was independently facilitated and held at a local community hall. The forum was attended by approximately 18 community members and nine agency representatives from government departments responsible for fire management and operations. The primary objectives of the forum were to clearly communicate the policy frameworks surrounding planned burns in the region, to understand and address the biodiversity, cultural, and ecological values associated with planned burns, and to explore opportunities for citizen science and other forms of knowledge to contribute to the monitoring of these values.

Feedback from the forum indicated that it was successful in humanizing the fire management and operational staff, providing insight into the planning process of burns, and identifying tangible methods for community members to have their knowledge and concerns about local biodiversity considered in the planning process. The forum also resulted in an agreement to support future knowledge exchange on this topic. However, the forum fell short in providing an adequate space for the community to voice

concerns about future prescribed burns, particularly in the context of the devastating bushfires that greatly impacted the Lake Tyers catchment and community in 2019/2020. As a result of this, a new fire management community liaison has committed to continuing conversations with the Lake Tyers community through Living Bung Yarnda and other groups, acknowledging that there is a wide range of concerns regarding fire in this region.

4.3. Narrative: Stewardship through art and storytelling

We refer to "narrative" as the stories, local histories, and experiences of participants and how these can provide insight into the cultural and historical significance of places and build a shared sense of place-connection. Our intention to incorporate narrative into Living Bung Yarnda was motivated by an awareness that within this community storytelling, arts practices and local history were important ways in which knowledge about, and appreciation for, Lake Tyers was expressed and shared. Our challenge was thus to employ a method that responded to this awareness and would motivate members of the public to participate in sharing their experiences and values to current social and environmental challenges. We undertook a Photovoice activity; a visual research methodology that involves the use of photography as a means of capturing and expressing the perspectives and experiences of individuals or groups (Baldwin and Chandler, 2010). The community was invited to participate in a photographic submission and exhibition, which aimed to capture the sentiment of love and concern for Lake Tyers.

The photographs submitted were shared among participants and discussed to identify key themes, and later featured in an exhibition hosted by the National Gallery of Victoria, in Lake Tyers Beach. The collection of images included a picturesque sunset over the lake, a photograph of the endangered Littoral Rainforest situated within the Lake Tyers catchment, and an image depicting the detrimental effects of logging on the region. Additionally, some photographs highlighted the strong familial and communal ties to the lake, while others were of the area's historical significance. The exhibition provided a platform for community to share their unique perspective, identify common concerns and aspirations, and sparked rich discussions surrounding the issues faced by Lake Tyers and its surrounding region, including the challenges associated with management, such as controlling pest species and the need for improved coordination among management agencies.

Outreach activities for the broader community showcased the project and the community participants. This included presentations at a range of nature-led recovery fora, feature articles in the regional newspaper and radio interviews. Meetings were also facilitated between community members and management agencies around key areas of concern, such as fire management and vegetation monitoring. We are currently planning a community knowledge symposium at the culmination of the funded project, with all relevant management authorities invited.

The incorporation of narrative—through story and image—enables a much broader knowledge base to draw from. Used in conjunction with more conventional scientific methods, this builds a powerful and holistic understanding of the lake and enables space for far greater participation from diverse community members. It also allows for communication of intrinsic and intangible values to be acknowledged, if treated with respect and an open mind. The photos will again be shown at a knowledge sharing forum between community and management agencies, planned for mid-2023.

4.4. Capacity: Mobilizing networks to enable action

"Capacity" refers to the ability of participants to take action and make positive changes toward their goals. It is dependent on their access to resources, skills and networks, as well as their level of empowerment and agency in the participatory research process. In February 2021, we held a series of training and community engagement events that covered various techniques for environmental monitoring. The sessions were led by experts in the various fields recruited from local community-based and government organizations. Over 2 days, the sessions provided basic introductions to relevant methodologies in areas of community interest to support their learning, including practical field experience in birdwatching, water quality testing, fish handling, logbooks, vegetation monitoring, fauna spotlighting and methods of storytelling, and nature journaling. The events were well attended with total of 40 individuals participated in these events, with many choosing to attend three or more sessions. They generated engaging discussions between community members and "experts" about the challenges faced by Lake Tyers and the surrounding region, including issues related to pest species and the need for improved coordination among management authorities.

Building on these training workshops, we then established two scientific monitoring programs: a broad-scale water quality monitoring program and a vegetation monitoring program conducted by a local environmental consultant, with ongoing community monitoring activities and development, by community members, of interpretive signage. Establishing these programs has enabled the generation of new scientific knowledge about the lake based on community concerns, which can be used to inform management decisions. The hope is that the process is two-way, and that an inclusive approach to knowledge generation can combine both local and scientific methodologies (Brierley, 2019), for the benefit of the lake and increased awareness and appreciation of its value.

5. Discussion: Listening to the voices of the lake

Through Living Bung Yarnda, we have demonstrated that there is great capacity for building both social and environmental connectivity and wellbeing through allowing expressions of environmental stewardship through multiple methods. Our model of place-based stewardship reinforces the potential for the role of participatory action research projects and in particular, the roles of researchers in providing the translation service between community, policy, and practice. Such approaches provide an

opportunity to develop a more holistic understanding of water and its management through a broader socio-cultural lens. As we have shown, this can be facilitated through community-agency, including visioning and prioritization, knowledge-sharing, story-telling, and increased capacity for community to act as valued environmental stewards. Participatory research projects can achieve this through developing a ground-up understanding of values around water and its management, enhancing capacity of community and facilitating knowledge-sharing with others, including visitors and agencies. This builds a sense of empowerment that community knowledge is valued as an embodied expression of place.

Through the Joint Management of the Lake Tyers State Park and the recognition of the Lake Tyers Aboriginal Trust, Indigenous voices are increasingly—and rightfully—being incorporated into the management of the Lake Tyers catchment. In addition to Traditional Knowledge, many other long-term community members—both Indigenous and non-Indigenous, have deeply embedded, ecocentric knowledge which can make a positive contribution to ongoing place-based stewardship. Management agencies responsible for Lake Tyers currently miss the opportunity to take advantage of the wealth of knowledge and the on-ground presence of local communities, around the very aspects of the environment they seek to understand and govern.

Within Lake Tyers, each community member is attuned to different aspects of the lake and its catchment, their knowledge represents an embedded connection to and care for place. They are keen to share this knowledge with each other and the broader public—but particularly with management authorities. They are frustrated that their knowledge is considered anecdotal and not grounded in the scientific method. Part of their motivation for participation in Living Bung Yarnda is to both understand the methods that management authorities draw upon, and to use these to substantiate their lived experience of place. The citizen science practices and platforms give their knowledge a legitimacy and way of recording information that can then be utilized by others. However the difference here, is that the areas of concern are determined by the community.

The development and implementation of Living Bung Yarnda has by no means been a straightforward process. As researchers in a consciously community-led place-based project, we find ourselves constantly employing adaptability and humility to work through challenging situations, as they present (Bonney and Reeves, in press). These include resourcing for the project, divisions within community and between community and management, finding people within community to take ownership of various methodologies, cultural sensitivities and permit approvals—not to mention, the limitations presented by the COVID-19 pandemic and trauma of the Black Summer bushfires.

Work of genuine participation is hard—in terms of gaining trust of community and management agencies, understanding the motivations and constraints of the various actors and enabling conduits to be formed. But it is important work that, if successfully implemented, benefits not only the participants and management, but importantly, can have beneficial environmental outcomes for the lake. Acts of care and sharing of stories by the community invites greater participation—from local community and visitors alike. This can then build support for management attention and investment. In remote regional areas, such as East Gippsland, having knowledgeable people on-ground can decrease the burden of managing such a vast asset, or quickly bring to attention areas of concern. This reinforces the crucial role of participatory research projects and the roles of researchers in providing the translation service between community, policy and practice.

Lived experience of place provides a more holistic expression of the health of a waterway than occasional visits by discipline-specific scientists or implementation of management plans determined from a distal head office. Finding ways to integrate these ways of knowing are surely for the greatest benefit of the waterway in question and its community. This work requires deep listening to the values, priorities and limitations of each of the actors—as well as translation of policy—before common ground can be found. Currently this process is being facilitated by the researchers, however as capacity and mutual trust builds, this agency is increasingly being shifted to the community to speak on behalf of the lake and work with management authorities for mutual benefit. A planned knowledge-exchange workshop between community and management agencies is planned for mid-2023 to take this project forward.

6. Conclusion

Our modern society has forced a separation of people from the environment—our habitat. This split from nature is in itself, unnatural. We have an innate desire to care for place, but many have either lost the knowledge or don't feel they have the opportunity or permission to act for nature. This is an intrinsic value maintained by many Indigenous cultures who consider caring for country a fundamental act (Berkes, 1999). For waterway management to be most effective, both for the health of the waterway and its community, the cultural and socioeconomic values must also be considered (Johnson et al., 2016). However, communities must first be empowered to have their contributions heard.

The experiment of Living Bung Yarnda is ongoing and requires further refinement and articulation. However, it has demonstrated that there is great capacity for building both social and environmental connectivity and wellbeing through allowing expressions of environmental stewardship through multiple methods. In particular, integrating conventional scientific methodologies with arts practice, story-telling, journaling and observation can provide waterway management a rich tapestry to understand the complexity of a natural system and how it is valued by its community. This embedded knowledge and lived experience of the lake can make a valuable contribution to the overall understanding and on-ground actions required for the effective management of the waterway. In doing this, we can engage a far greater cross-section of the community through making space for different ways of knowing, care and concern to be expressed and the voice of the lake be heard.

Data availability statement

The datasets presented in this study can be found in online repositories. The names of the repository/repositories and accession number(s) can be found below: www.livingbungyarnda.net.au.

Ethics statement

The studies involving human participants were reviewed and approved by Federation University Australia Human Research Ethics Committee. The patients/participants provided their written informed consent to participate in this study.

Author contributions

JR and PB contributed to the project design, implementation, and manuscript preparation. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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