ACSA Submission to the

2026 MDBA Basin Plan Review

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About ACSA

The Australian Citizen Science Association (ACSA) is the national peak body for citizen science in Australia. We represent and support a diverse community of researchers, coordinators, natural resource managers, educators and community participants engaged in citizen science practice. Motivated by a shared commitment to inclusive and impactful public participation in scientific inquiry, our membership spans universities, government agencies, not-for-profit organisations and community groups. ACSA works to strengthen the practice of citizen science across Australia through advocacy, training and collaboration across sectors. Examples of ACSA's advocacy to government can be found here including a submission to the recent *Implementing Australia's Strategy for Nature 2024-2030 Consultation Pape*r.

ACSA welcomes the opportunity to contribute to the 2026 Murray–Darling Basin Plan Review (the Review) and commends the Murray–Darling Basin Authority (MDBA) for the comprehensive and transparent approach it has taken in preparing the Discussion Paper.

Introduction

Citizen science is the active engagement of members of the public in the generation and use of scientific knowledge. It is a rapidly growing and increasingly recognised component of the research, monitoring and policy landscape in Australia and globally. In Australia, citizen science programs have contributed to

advancing scientific knowledge, informing national biodiversity databases, underpinning environmental reporting and building lasting relationships between communities and the natural systems they depend on.[1]

In the Murray-Darling Basin, citizen science is already contributing meaningfully to many of the knowledge and participation priorities identified in the Discussion Paper. ACSA also recognises the positive steps the MDBA has taken in supporting citizen science in recent years e.g., through the Great Australian Wildlife Search and support for citizen science initiatives and research projects through the Basin Condition Monitoring Program. A selection of notable programs currently active in and around the Basin is provided in Table 1 below.

Table 1. A selection of citizen science projects in the Murray-Darling Basin

Program	Description	Geographic focus
WaterWatch	A long-running regional and state-based initiative that has supported communities to monitor the health of waterways for over three decades through water quality and macroinvertebrate data collection. WaterWatch programs currently operate within the Basin in the ACT, New South Wales, Victoria, South Australia and Queensland. Noteworthy is the Upper Murrumbidgee Waterwatch program's "science-first" approach[2], which has led to greater uptake of citizen-generated data in catchment management decision-making and helped secure long-term program funding. South Australia's Waterwatch/ Waterbug Bioblitz programs also contribute essential data to catchment level and state (Department for Environment and Water) environmental reporting and the Marne Saunders Report Card Marne Saunders Catchment Community | FLOW.	State-based and regional programs within the MDB
FrogID	A national citizen science frog identification program, led by the Australian Museum. Since 2017, it has accumulated nearly one million expert-validated frog records covering 88% of Australia's known frog species. Frog monitoring provides direct information about wetland and aquatic habitat condition.	National
Citizen science fish tagging	A program led by Charles Sturt University and OzFish Unlimited have piloted community and First Nations participation in Passive Integrated Transponder (PIT) fish tagging across the Murray–Darling Basin.	Basin-wide

[1] Hansen B, Bonney P. (2023) Learning from successful long-term citizen science programs. *Pacific Conservation Biology* 29, 292–299. https://doi.org/10.1071/PC21065 ; Roger, E, Kellie, D, Slatyer, C, Brenton, P, Torresan, O, Wallis, E and Zerger, A. 2023. Open Access Research Infrastructures are Critical for Improving the Accessibility and Utility of Citizen Science: A Case Study of Australia's National Biodiversity Infrastructure, the Atlas of Living Australia (ALA). Citizen Science: Theory and Practice, 8(1): 56, pp. 1–15. DOI: https:// doi.org/10.5334/cstp.564 ; Gallagher, R., Roger, E., Packer, J., Slatyer, C., Rowley, J., Cornwell, W., Ens, E., Legge, S., Simpfendorfer, C., Stephens, R., & Mesaglio, T. (2025). Incorporating citizen science into IUCN Red List assessments. Conservation Biology, 39, e14329. https://doi.org/10.1111/cobi.14329

[2] O'Reilly, W., & Starrs, D. (2023). Science citizen: shifting to a "science-first" approach and recognising the trade-offs between objectives in a long-term citizen science program. *Frontiers in Environmental Science*, *11*, 1270247.

The Great Australian Wildlife Search	An eDNA sampling project co-funded by MDBA's own Basin Condition Monitoring Program. In 2024, over 200 citizen science volunteers collected eDNA water samples at 324 sites across the Basin. The analysis detected 144 species including 17 threatened and 26 invasive fish species. The MDBA described this project as "vital for tracking ecosystem health and supporting conservation efforts across the Basin".	Basin-wide
TurtleSAT 1 Million Turtles TURTLE Project | FLOW	Citizen scientist engagement has provided an augmentation of presence-absence data for freshwater turtles well in excess of data available through formal monitoring programs (over 34,000 records so far. The high expense typical of fieldwork likely limits the scope and detail of on-ground species monitoring possible through formal research, and citizen science-derived data is a viable and cost-effective alternative. Engagement in the program through the mobile phone app, TurtleSAT, has been key to data collection, but has also driven changes in participant behaviour and inspired independent conservation action which have downstream benefits for conservation efforts more broadly. The data and community engagement are managed nationally through 1 Million Turtles and in SA by the TURTLE Project. Turtles play significant ecological roles including maintaining water quality.	National
Frogwatch SA	A number of states have their own on-going citizen science frog monitoring projects that pre-date FrogID. There would be benefits in supporting a collaborative and cohesive environment for all these frog projects to work together and share data and communications.	State-based and regional programs within the MDB
Ispython Polly Tell Us	The community plays a significant role in the conservation of many threatened species within the Basin, including the Murray-Darling carpet python and regent parrot. Contribution of sightings from the public enables the collection of further data such as through tracking and informed on-ground management actions. These projects are coordinated in South Australia by the Murraylands and Riverland Landscape Board, with a range of intra- and interstate partners.	South Australia and Victoria
Project Platypus	Khancoban Landcare Group worked with scientists and the community to monitor platypus in the Swampy Plains River using eDNA and local knowledge. eDNA testing confirmed platypus in the Swampy Plains River, providing important baseline data for the Upper Murray. More than 40 community members joined monitoring activities and the Platypus Night event, building awareness of platypus conservation and river health.	Upper Murray
Birds - Painted Snipe Survey - Key Biodiversity Area Guardians	Various Birdlife Australia projects: ● The Painted Snipe Survey involved participants in collecting information on whether the endangered Australian Painted Snipe are breeding, the state of their habitat (water salinity, water level, whether there are reeds), whether other species that associate with the Painted Snipe are present.	● National - Wetlands ● Key Biodiversity Areas ● Private land

- Birds on Farms	• The main task of KBA Guardians is to carry out Health-checks each Easter, providing a valuable snapshot of the threats and conservation actions in the KBA. • The Birds on Farms program partners with rural landholders to monitor bird species, develop tailored habitat management plans, and support on-ground conservation works, with the long-term goal of enhancing woodland bird populations and diversity while maintaining agricultural productivity.	
Microbats	This successful project provided more microbat data in two summers than had been contributed to state/national databases in the previous 100 years. It also led to the discovery of two new populations of the threatened fishing bat, Myotis macropus at sites on the Murray. Due to funding cuts it is now only run in one small catchment in the SA part of the Basin but could be scaled up at any time if funding was provided. It was also run in the Mallee CMA region for a short time.	SA Murray-Darling Basin, Mallee CMA region
Muscles in the mud	Engaging community power to monitor Lokeri (floodplain mussel) in the Lower Lakes. The citizen-science project is strongly linked to community concern and the significance of Lokeri to Ngarrindjeri culture. Based on anecdotal information, the Lokeri population of the Lower Lakes has not recovered since the Millennium Drought. The project is garnering the interest of landholders, community groups and the Ngarrindjeri community to redress the deficiency in knowledge regarding Lokeri in the Lower Lakes. Project team: Lead - Scotte Wedderburn (Adelaide University), Ngarrindjeri Aboriginal Corporation, Ngarrindjeri community, Julie Jones, Ray Rootsey, Allison Rootsey (River Lakes and Coorong Action Group), Sylvia Zukowski (Nature Glenelg Trust), Rhiannon Van Eck, Bronwyn Gillanders (Adelaide University), Malcolm Connolly, Brenton Zampatti, Laura Markham (CSIRO)	Lower Lakes

Despite the breadth of activity across the MDB, the Discussion Paper stops short of proposing concrete mechanisms to recognise, fund, integrate or expand citizen science within the Basin Plan framework. Citizen science is mentioned only once (pg. 81), among a list of future knowledge priorities. While ACSA broadly agrees with the proposed options, we also consider the treatment of citizen science as insufficient given its current and potential contribution to Basin science and management. Fortunately, the 2026 Basin Plan Review presents a timely opportunity to integrate citizen science more systematically into Basin Plan implementation.

Our submission makes the case for a more deliberate and structured role for citizen science across three key areas relevant to the MDBA's knowledge, participation and engagement priorities:

1. Citizen science for **improving the science and knowledge base** needed for effective Basin decision-making
2. Citizen science as a practical lever for **rebuilding trust, participation and community connections** across the Basin

3. Citizen science as a culturally grounded mechanism for **First Nations participation in Basin monitoring and knowledge generation**

Together, these issues and their linked recommendations point to the fact that citizen science is a robust and inclusive - yet currently underrecognised - part of delivering better Basin science and knowledge.

ACSA is willing to assist in providing further information, connecting the MDBA with member organisations and programs, or assist in the design and delivery of any future citizen science practice or policy initiatives.

1. Citizen science for improving Basin science and knowledge

ACSA appreciates that the Discussion Paper is candid about the limits of the current knowledge base needed to inform effective Basin decision-making. As Chapter 11 states, while investment in science and monitoring has grown over the past decade, it has "*often been time-bound, targeting specific issues or events, supplementing what has been a long-term trend decline in capability across the water research sector*" (p. 81).

Within this context, the Discussion Paper identifies a set of future knowledge priorities, including sustained monitoring investment, better integration of condition data with predictive climate models, adoption of new technologies, and the involvement of "*a wider range of knowledge holders in Basin water management, such as through citizen science*" (p. 81).

ACSA welcomes this framing. In particular, we welcome the positioning of citizen scientists themselves not simply as data collectors but as "*knowledge holders"* – a distinction that reflects a more contemporary and inclusive understanding of what community engagement in science can achieve, and one that aligns with ACSA's own advocacy.

It is therefore notable that this framing does not carry through into the options proposed in **Box 11.3.** Of the nine options summarised in that section, none makes specific reference to citizen science. ACSA holds the view that citizen science programs do not materialise or sustain themselves through goodwill alone. Rather, international experience consistently highlights that **effective citizen science programs require investment in program design and coordination, data infrastructure, scientific expertise, and, crucially, in meaningful and sustained volunteer engagement**.

Without a commitment to recognise and resource these requirements, the acknowledgement of citizen science in a future Basin Plan risks remaining aspirational – and, we believe, would represent a significant missed opportunity to strengthen the knowledge base needed for effective Basin decision-making.

Furthermore, the Discussion Paper's treatment of technological solutions to the proposed knowledge priorities warrants further consideration. Adopting satellite sensing, drones and machine learning has been identified as a future knowledge priority (p. 81, Box 11.3). While we view these investments legitimate and valuable in the current context, we argue that an emphasis on data produced by these technologies alone, may limit the ability to **collect more fine-scale, on-ground observations and data that local communities could provide** – for instance, on the early onset of fish kills and localised hypoxic events[3] (Chapters 7 and 8);

[3] https://inlandriversnetwork.org/fish-kill-map-mdb/

the detection of algal blooms in remote tributaries[4]; or the presence of invasive species such as carp disturbing sediments in ways that degrade habitat at the reach scale[5].

We encourage the MDBA to consider **citizen science as a complementary and valuable component of the MDBA's future science and knowledge strategy** able to address many of the knowledge gaps the Discussion Paper identifies. This includes:

- **Enhancing water quality monitoring**, which is currently described as "*lacking and requiring urgent attention"* (Chapters 8 and 11). Community-based water quality monitoring programs - including WaterWatch, which has operated continuously in Victoria, the ACT and South Australia for decades - already generate exactly the kind of distributed, longitudinal data that formal monitoring programs struggle to produce at a comparable scale and cost (REFS).
- **Supporting species recovery**, including how flow, habitat and drought refuges can support native fish and other key species populations, is identified in the Discussion Paper. Citizen science monitoring programs have already demonstrated a potential to address such a challenge and drive management action. This includes the rescue and reintroduction of Murray crayfish (*Euastacus armatus*), where community members and agencies have responded to blackwater events by rescuing stranded crayfish and holding them in aquaculture facilities, directly contributing to a collaborative reintroduction program[6].
- **Groundwater knowledge** across the Basin is identified as insufficient to underpin future water management. Novel citizen science approaches to groundwater monitoring are already being developed and tested – including a recently funded project led by Charles Darwin University's Research Institute for the Environment and Livelihoods – offering a low-cost pathway to closing this gap.

These examples above are not intended to be exhaustive but illustrative of the broader principle that **citizen science programs active in and around the Basin are already generating data with direct management relevance**, but without any Basin Plan mechanism to formally recognise or integrate their data into planning and decision-making processes. Closing this gap does not necessarily require building new programs from scratch, but it will require creating the policy, funding and infrastructure conditions for the work that is already underway to be visible, trusted and used.

ACSA recommends that the MDBA:

- Explicitly recognises citizen science and community-based monitoring as core part of the Basin's science and knowledge framework (as noted in Chapter 11 of the Discussion Paper)
- Commits to co-designing, with ACSA, Basin states, First Nations organisations, existing program leads and university partners, a Basin-wide citizen science framework that sets out roles, standards, data pathways and funding arrangements for integrating citizen science into existing basin decision-making, such as in SDL assessments, environmental watering, native fish recovery, and water quality management.

[4] https://citizenscience.org.au/2025/07/18/south-australian-marine-algal-bloom-2025/
[5] https://www.act.waterwatch.org.au/resources/aquatic-flora-and-fauna/feral-fish/carp
[6]https://theconversation.com/the-worlds-second-largest-freshwater-crayfish-was-once-plentiful-in-australias-longest-river-were-bringing-it-back-236520

2. Citizen science to rebuild trust and community connection

Beyond its scientific potential, citizen science is proven to be **highly capable at building new and strengthening existing relationships** between communities, agencies and local environments, particularly when projects are run over long time scales. Having local/regional coordinators for citizen science projects (like the original nationwide **Waterwatch program**) greatly aids this process. The need to build or rebuild trust is consistently mentioned in the Discussion Paper and ACSA argues citizen science is a key tool in achieving this outcome[7].

Effective citizen science projects ensure that data is returned to participants and usually the wider community in accessible formats. This provides evidence of the use of the data which tends to lead to on-going participation, and also increases their understanding of the broader context in which they participate. A good example of this is the **Marne Saunders Report Card** produced by the Murraylands and Riverland Landscape Board SA in collaboration with the local community integrating government and citizen science data and community stories to provide a comprehensive but easy to read score of catchment health. Feedback from the community indicates that the report card has led to an increased understanding of what people in other parts of the catchment are experiencing, an appreciation that 'everyone is now on the same page', a reinforcement of the changes they are seeing around them reflected through the data, the ability to better contribute to water policy discussions through increased knowledge of the catchment, and a new interest in finding out more about what they (landholders) can do themselves and together to improve catchment health and the sustainability of their livelihoods.

While individual citizen science projects and programs and their long term funding can achieve great outcomes, of fundamental importance is also the organisational "infrastructure" that supports effective and meaningful citizen science. We need citizen science focused organisations (many of them volunteer or community based) that can drive and sustain public participation, connect people to science and technology, build relationships, ensure standards, consistency and ethical practices and advance policy, funding and vision. Core funding, as distinct from project based funding, for the "backbone" roles (e.g. project management, coordination, advocacy, teaching, communication, knowledge brokering) that these types of organisations undertake is very limited, and often has to be negotiated within project specific funding and often on a short-term basis - limiting the scale, reach and effectiveness of citizen science activities.

ACSA recommends that the MDBA:

- Commit to supporting long-term and place-based citizen science projects within Basin planning priorities that are explicitly designed to rebuild trust and foster collaboration between communities, First Nations groups and water management agencies, including core funding for citizen science focused organisations to support the effectiveness and scale of these projects.

3. Citizen science to enhance First Nations participation in Basin governance

[7] Skarlatidou et al, How can bottom-up citizen science restore public trust in environmental governance and sciences? Recommendations from three case studies, Environmental Science & Policy, Volume 160, 2024, https://doi.org/10.1016/j.envsci.2024.103854.

Citizen science is **a powerful tool for enhancing First Nations Peoples' participation in environmental research and management**, including the "weaving" of Indigenous knowledge with other forms of knowledge[8]. Citizen science programs offer a low-cost mechanism for engaging First Nations Peoples directly in on-Country environmental works, which directly enables knowledge sharing and exchange. Citizen Science also provides opportunities for First Nations Peoples to engage with government agencies, and is therefore a mechanism to help them directly influence policy.

The **1 Million Turtles Program** has demonstrated these benefits for First Nations Peoples in two specific examples. Firstly there was a collaboration between the Program, the Ngarrindjeri Aboriginal Corporation (NAC), the Department for Environment and Water (SA-DEW) and the Murraylands and Riverland Landscape Board (MRLB) in South Australia. The First Nations community were invited to a series of Thukabi (turtle) Yarning Circles held in various locations where elders and young community members held conversations and shared knowledge with turtle scientific experts. This has led to NAC running an annual Thukabi monitoring program supported by Adelaide University, DEW and MRLB in the Lower Murray. Theongoing program is the only regular monitoring of turtles in the SA Murray River catchment. It is providing crucial evidence on current status of turtles, and the First Nations community are also now well-equipped to provide input into priority areas for on-ground action, and the state management plan for turtles, which is in development.

In Victoria, The Duduroa Dhargal Aboriginal Corporation (DDAC) and North East Catchment Management Authority (NECMA) in Victoria are also working together with the Program to restore environmental flows to Ryans Lagoon, near Wodonga. In that project, the 1 Million Turtles Program worked with DDAC to develop novel methods of reducing fox predation on turtle nests, and it has supported their proposals for restoring environmental flows, and collaborated on ongoing turtle monitoring as a response to environmental flows. The research from the collaboration is being prepared for publication in a Q1 peer-reviewed journal.

A further example of citizen science supporting Traditional Owner objectives around water is the **Murrabul Yaluk Water Quality Monitoring Program**, a partnership Corangamite CMA, Wadawurrung Traditional Owners Aboriginal Corporation and Waterwatch Victoria. Although this project was implemented outside the Basin, the program highlights the …

The partnership began with community fishing day to build relationships and exchange aspirations before evolving into a fully community-led water quality monitoring program. What the program demonstrated above all is that shared aspirations between Traditional Owners and water managers is crucial for genuine co-management.

The program has enabled the Wadawurrung to embed their cultural values directly into seasonal watering plans, including identifying environmental flow releases that protect culturally significant species and deep pools of cultural importance. Water monitoring data is compiled into a community report that integrates

[8] Maria Tengö, Beau J Austin, Finn Danielsen, Álvaro Fernández-Llamazares, Creating Synergies between Citizen Science and Indigenous and Local Knowledge, *BioScience*, Volume 71, Issue 5, May 2021, Pages 503–518, https://doi.org/10.1093/biosci/biab023

water quality results and cultural values, which as one Wadawurrung participant described[9], is "driving our ability to regain agency over our waterways and hopefully ultimately manage them".

Together, these examples show that where citizen science programs are designed with First Nations self-determination at their foundation, and where relationships are built on trust over time, they can **serve as a crucial vehicle for supporting Traditional Owners in water governance**. ACSA argues that this is an outcome directly aligned with the Discussion Paper's stated aspirations for First Nations partnership.

ACSA recommends that the MDBA:

- Explicitly recognise citizen science as a mechanism for First Nations participation in Basin governance, including its potential to support the bridging of Indigenous and western knowledge systems.
- Support the co-design and resourcing of citizen science programs with First Nations communities, ensuring that programs are structured around Traditional Owner priorities, enable community ownership of data, and are sustained over timeframes sufficient to build genuine trust and partnership.

[9] Murrabul Yaluk Water Quality Monitoring Program (https://www.youtube.com/watch?v=lfwIiU21CR8)