SUBMISSION

Submission to the Department of Climate Change, Energy, the Environment and Water

Submission to the Water Science and Research Review

10 February 2025

The Australian Academy of Technological Sciences and Engineering (ATSE) is a Learned Academy of independent, non-political experts helping Australians understand and use technology to solve complex problems. Bringing together Australia's leading thinkers in applied science, technology and engineering, ATSE provides impartial, practical and evidence-based advice on how to achieve sustainable solutions and advance prosperity.

ATSE has consistently advocated that water policymakers should be informed by the best available scientific evidence as it evolves. ATSE welcomes the current Review of Water Science and Research, as an important lens on addressing an underlying issue in water management.

ATSE has contributed to recent water policy reviews including Delivering the Murray-Darling Basin Plan, the Murray-Darling Basin Plan Implementation Review and its Interim Report, National Water Reform and its Interim Report, and the National Water Agreement and the subsequent consultation Shaping the National Water Agreement – these may be of some use to the Review.

The consultation draft outlines important and complex issues of resourcing, governance, and trust between stakeholders. ATSE thanks Professor O'Kane for considering the comments provided by ATSE Fellows in developing the consultation draft. While in broad agreement with the direction of the consultation draft, this submission outlines additional feedback. ATSE also notes that the recommendations of the Review will require adequate resourcing if they are to be effective at uplifting water science and addressing the issues identified by the Review.

ATSE makes the following recommendations for amendments to the consultation draft:

Recommendation 1: Include a proposal for a renewed independent National Water Commission alongside the proposal for a Chief Water Scientist.

Recommendation 2: Include a proposal for a governance structure founded on an environmental and social governance (ESG) Framework.

Recommendation 3: Recommend an increase in water-related R&D and infrastructure funding including for digital and data platforms.

Recommendation 4: Include water-related metadata sharing in the Water Science and Research Principles.

Recommendation 5: Include in the Water Science and Research Principles the development and enhancement of a diverse, resilient water science workforce, including through scaling up existing successful programs.

Creating appropriate governance structures

A Commonwealth Chief Water Scientist, as proposed by the consultation draft, would signal the importance of water research. Alongside this, ATSE advocates national governance structures that enable this knowledge to inform policy and practice. The re-establishment of a National Water Commission was pledged by Prime Minister Albanese in the lead-up to the 2022 federal election. As expressed in ATSE's contributions to recent water consultations, a modernised National Water Commission would strengthen the link between science and planning, fostering greater national cohesion. The Review's proposed Commonwealth Chief Water Scientist could be housed within a National Water Commission, ensuring the position's independence. ATSE cautions against continuing current approaches that further fragment water governance and responsibility.

Having robust governance structures would also assist with reversing the lack of trust in how water science and research is used, as identified by the consultation draft. ATSE proposes that applying an environmental, social and governance (ESG) framework would holistically and equitably address key aspects of water management including in support of rigorous governance. This would provide a framework to ensure stakeholders, including Aboriginal and Torres Strait Islander peoples and communities, are represented on decision-making and advisory bodies.

Recommendation 1: Include a proposal for a renewed independent National Water Commission alongside the proposal for a Chief Water Scientist.

Recommendation 2: Include a proposal for a governance structure founded on an environmental and social governance (ESG) Framework.

Revitalising water knowledge

ATSE agrees with the concerns captured in the Review that water science is insufficiently funded and lacks funding stability and coordination. It is noted that this is within the context of stagnating research funding across disciplines. Other critically important disciplines, such as energy, also suffer from a lack of research

and development (R&D) investment. ATSE advocates an overall uplift in research investment with longer-term funding stability. The consultation draft does not address where additional funding may be drawn for water research. Given the fragmented nature of the water management landscape across numerous state and federal authorities and agencies, it is important to establish where this responsibility lies. One possible model to be considered is a levy on water users paid by water utilities; this model has been implemented in South Africa and funds coordinated research through the South African Water Research Commission.

ATSE agrees with the consultation draft's inclusion of knowledge beyond the natural sciences, including social sciences research and Traditional Knowledge. This can be a lever to deepen understanding of how Australian water systems have behaved over the very long term, and to build trust in water management, particularly concerning the Murray-Darling Basin. The Review committee may wish to consider referring to 'science, research, and knowledge' in the Review - this would be inclusive of long-term observational knowledge without calling into question the contemporary definition of science.

ATSE endorses the Review's recommendation that climate change and climate extremes are included in all water modelling and planning. Understanding different scenarios and their probabilities will be key to effective water management under increasingly challenging conditions. As outlined by ATSE's explainer *Building a Resilient Australia*, understanding the probability of different risks, including natural events and the effects of climate change, enables decision-making to build in robustness and redundancy where it will be needed most. Relatedly, ATSE agrees with the Review's proposed principle that research and science is never certain or complete, and that modelling is not definitive, and that decisions should not be deferred until the science is considered more certain. An ESG framework would be complementary to the usage of research to inform water management.

The consultation draft highlights that the hydrological modelling platform used for the Murray-Darling Basin is outdated, which will be increasingly challenging over the coming decades if not addressed. Up-to-date computing infrastructure is of paramount importance. This includes computing facilities with applications beyond water research, such as climate modelling. A step-change uptake in the deployment of digital tools is fundamental to water science research that would underpin resilient water management as also identified in ATSE's Murray-Darling Basin essay collection.

The role of the Chief Water Scientist, as proposed by the consultation draft, includes ensuring that Australia is a leader in water research. ATSE considers that this role could be leveraged internationally for knowledge exchanges with nations facing similar challenges, including impacted Asia-Pacific nations.

Recommendation 3: Recommend an increase in water-related R&D and infrastructure funding including for digital and data platforms.

Expanding data sharing

ATSE agrees with the consultation draft's suggestion of a national commitment to open data, supporting the cross-jurisdictional nature of water management. Successful implementation of this would require centrally managed spaces for data sharing, in addition to all stakeholders adopting an approach of open by default. This was also reflected in ATSE's recent Murray-Darling Basin essay collection, where several recommendations refer to transparent, evidence-based and data-driven decision making; as well as a central water data custodian; and a single central public domain.

ATSE also emphasises the importance of also collecting and sharing metadata, which is frequently lost when sensor technologies are used. As discussed in ATSE's 2022 report Technologies for Water Management, water metadata provides contextual information for stakeholders to enable better informed data analysis and interpretation. ATSE's report also recommends developing modelling technologies that can accommodate imperfect data. If data collection and sharing is expanded, as recommended by the consultation draft, improving modelling techniques would become an increasingly important area of research.

The importance of metadata could be conveyed in the consultation draft's Water Science and Research Principles with the following amendments indicated in italics:

> "All science, modelling, data *and metadata* should be made openly available and readily accessible for scrutiny, even if it is very complex (complexity is not a good reason for limiting access and third part scrutiny)."

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> "Excellent curation and management of water and water-related data *and metadata* (including data from previous research projects and centres) are vital for informing longitudinal research and modelling and visualisation."

Recommendation 4: Include water-related metadata sharing in the Water Science and Research Principles.

Strengthening the skills base

The Review identifies the lack of strategy and coordination behind water research training, with consequential skills gaps. It outlines attributes for a research training program. ATSE notes the possibility of expanding and leveraging existing successful higher education programs such as ATSE's Elevate: Boosting Diversity in STEM scholarship program could support access and retention for women and non-binary people to become water researchers. Programs can also support research training access for other priority groups, including Aboriginal and Torres Strait Islander people.

In addition to growing the water science skills base, water science will need to continue to attract and retain skilled professionals. As noted in ATSE's 2024 Submission to the National Water Agreement Consultation, there has been a failure to maintain institutional knowledge and expertise in Australian water science. This is also hinted in the consultation draft, which conveys stakeholder views on water agencies and programs lapsing. This has implications not only for knowledge creation but also for maintaining, and enhancing, the workforce engaged in water research. Workforce development and retention are fundamental to empowering a resilient skills base and merit inclusion in the consultation draft's proposed principles.

The consultation draft's recommendation concerning research training would require significant resourcing. The source of this is not addressed in the consultation draft. The draft also does not address if these programs would be for domestic students only, or if they might be a mechanism to attract and develop overseas talent.

Recommendation 5: Include in the Water Science and Research Principles the development and enhancement of a diverse, resilient water science workforce, including through scaling up existing successful programs.

ATSE thanks the Department of Climate Change, Energy, the Environment and Water (DCCEEW) for the opportunity to respond to the consultation draft of the Water Science and Research Review. For further information, please contact academypolicyteam@atse.org.au.

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