



Australian Academy of
Technology & Engineering



Submission to the Productivity Commission

National water reform 2020

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NATIONAL WATER REFORM 2020: ISSUES PAPER

The Australian Academy of Technology and Engineering (ATSE)¹ and the Australian Academy of Science (AAS)² recognise that water is essential to Australia's national prosperity. Both Academies have previously provided expert advice on water, including assessments of Australia's National Water Initiative (NWI) 2004.³

The message has been consistent: a long term, strategic, national approach to water management and a regular, transparent process of measuring compliance and progress of reforms are essential to success. Water will always be scarce in Australia, and the challenges of managing it efficiently are only increasing along with the risks.

This submission builds on previous positions, focusing on the principles to guide a renewed NWI, underpin investment, and encourage water reform in Australia. Particularly, it addresses the question of which principles should be included in the framework to encourage governments to provide the means and solutions to address identified issues.

This submission focuses on the following key areas of water reform:

1. Governance of water reform in Australia
2. An Indigenous voice on water
3. Integrated urban water management
4. Environmental water management and resilience
5. Water research and development

Key recommendations

- The Australian Government develop and commit to a 10-year strategy for national water reform.
- The Australian and state governments to commit to a national water initiative and legislated structures and processes for the effective implementation of the NWI.
- Address responsibility and governance arrangements for the NWI in the context of the transition from the Council of Australian Governments (COAG) to the National Federation Reform Council (NFRC). Ideally, responsibility should sit with an independent statutory authority.
- Establish mechanisms to ensure strong participation by Aboriginal and Torres Strait Islander Peoples that values Indigenous Knowledges in sustainable water reform.
- Provide resources to assist Aboriginal and Torres Strait Islanders Peoples in preparing responses to and participating fully in the process of NWI review.
- Develop an integrated urban water planning and management framework that addresses contemporary challenges through optimum management and investment in the water sector.

¹ The Australian Academy of Technology and Engineering 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.

² The Australian Academy of Science is a not-for-profit organisation of individuals elected for their outstanding contributions to science and research. It provides independent, authoritative and influential scientific advice, promotes international scientific engagement, builds public awareness and understanding of science, and champions, celebrates and supports excellence in Australian science.

³ <https://www.atse.org.au/research-and-policy/publications/publication/productivity-commissions-national-water-reform-inquiry-issues-paper/>; <https://www.atse.org.au/research-and-policy/publications/publication/implementing-the-national-water-initiative-2014-triennial-assessment-of-water-reform-progress-in-australia/>; <https://www.atse.org.au/research-and-policy/publications/publication/first-biennial-review-of-the-national-water-initiative/>; <https://www.science.org.au/supporting-science/science-policy-and-sector-analysis/reports-and-publications/fish-kills-report>

- Ensure that reforms enable adequate environmental protection of water catchments, a holistic approach to water security and adaptive management of human water use.
- Establish a national water research funding agency to professionally direct, administer and evaluate research funding in a strategic manner, on a stable ongoing basis.

1. Governance of water reform in Australia

At the turn of the 20th century, Australia led the world in water reform. The 1994 COAG Water Reform Framework and the 2004 NWI drove valuable reform for two decades. However, from 2013 the COAG Standing Council on Environment and Water was disbanded, the National Water Commission was abolished, and the Productivity Commission was instead tasked with monitoring progress of the NWI.

The Productivity Commission's first review report in 2018 found that the increasing pressures of population growth and climate change, coupled with increasing community expectations, posed significant challenges for Australia's national water reform agenda. It also identified that reform implementation had slowed, and noted that the extent to which NWI-consistent entitlements had been implemented varied across jurisdictions, regions and types of water source. The report urged the Government to act, recommending further reform particularly in the priority areas of urban, rural and regional, and environmental water.⁴

Despite this warning, Australia still lacks a clear framework to drive the next generation of reform. We are concerned that with the cessation of COAG and the creation of the NFRC there is now even more uncertainty as to where responsibility for the NWI reforms will rest.⁵

It is important that Australian governments work proactively and collaboratively to develop and implement water policy that drives investment, innovation, equity, sustainability and water resilience for the benefit of Australian communities. Australia needs proactive, strategic leadership of the NWI reforms in water policy and implementation in order to make progress and address the significant challenges facing our nation.

To avoid a future water crisis, we renew the call to all the governments of Australia to develop and commit to a 10-year strategy for national water reform that will ensure secure, sustainable, and equitable water supplies for Australian communities, industries and the environment. The Australian and state governments should commit, in the national interest, to a national water initiative and legislated structures and processes for the effective implementation of the NWI.

The critical first step must be to address responsibility and governance arrangements in the COAG to NFRC transition. Ideally, responsibility should sit with an independent statutory authority.

2. An Indigenous voice on water

Recognising the water rights and water entitlements of Aboriginal and Torres Strait Islander Peoples is an essential part of Australia's reconciliation journey. Aboriginal and Torres Strait Islander Peoples are the custodians of Australia's original water industry, one that has existed for millennia. Indigenous knowledge, practices and beliefs offer valuable and essential insights to current water policy.⁶ Despite this deep knowledge and millennia-long experience in environmental water

⁴ <https://www.pc.gov.au/inquiries/completed/water-reform/report>

⁵ <https://www.pm.gov.au/media/press-conference-australian-parliament-house-act-29may20>

⁶ <https://watersource.awa.asn.au/business/diversity/original-water-industry/>

management, cultural heritage and climate change, the Indigenous voice has had limited influence in policy, planning and decision-making to date.⁷⁸

Many of the world's Indigenous peoples are oppressed, marginalised and dispossessed of land, water, knowledge and a cultural life.⁹ The legacy of dispossession continues in economic, social and political disadvantage. The Productivity Commission's report *Overcoming Indigenous Disadvantage: Key Indicators 2009*¹⁰ exposed the continuing high levels of disadvantage faced by Indigenous communities in Australia.¹¹

The omission of Indigenous water rights and entitlements is a significant weakness of the NWI agreement. It was encouraging that Indigenous water rights were recognised in principle by the Productivity Commission's 2018 report (recommendation 3.2 and 3.3), but the situation has not improved. A recent assessment of Indigenous water entitlements in New South Wales showed that almost 20% of Indigenous water holdings by volume were lost between 2009 and 2018, and that current holdings represent only 0.2% of available surface water.¹² Recognition and planning mechanisms that deliver water rights and entitlements are essential if reforms are to be achieved.

The Australian legal system has provided legislative schemes to claim back land and waters for Aboriginal and Torres Strait Islander Peoples, but this system remains challenging and uncertain. These schemes invariably relegate Country to a shared status with other stakeholders including government, pastoralists, rural communities and resource companies rather than allowing exclusive ownership. Critical assessment and reform of legal, administrative and governance arrangements for water entitlements, rights and water markets is needed to address these structural inequalities.

It is crucial that mechanisms are established to ensure strong participation by Aboriginal and Torres Strait Islander Peoples that values Indigenous knowledges in the development and implementation of policy to guide sustainable water reform. This should include contributing to Closing the Gap targets relating to inland waters and in renegotiating the NWI, and involve the re-establishment of the First Peoples Water Engagement Council.

Resources should be made available to assist Aboriginal and Torres Strait Islanders Peoples to prepare policy positions, options for law reform, and contribute fully developed ideas to the process of NWI review. The Indigenous Water Policy Group of the North Australia Land and Sea Management Alliance represents a case^{13,14} of collaborative water policy-making that could serve as a model, as does the National Cultural Flows Research Project. Water policy and Indigenous policy should be consistent and integrated with mutually reinforcing linkages between water legislation, environmental and heritage protection legislation and native title law. The National Cultural Flows Research Project law and policy paper provides detailed explanations of the relationships and outlines options for reform.¹⁵

⁷ Australian Human Rights Commission Special Rapporteur on Indigenous Peoples' Australian Mission. Above n73, 206.

⁸ <https://watersource.awa.asn.au/business/diversity/original-water-industry/>

⁹ Pamela Jacquelin-Andersen(ed). The Indigenous World IWIGA 2018.

¹⁰ <https://www.pc.gov.au/research/ongoing/overcoming-indigenous-disadvantage/2009>

¹¹ Australian Human Rights Commission Special Rapporteur on Indigenous Peoples' Australian Mission. 17-28 August 2009.

¹² <https://doi.org/10.1016/j.landusepol.2020.104869>

¹³ Jackson, S. and J. Altman (2009). Indigenous rights and water policy: perspectives from tropical northern Australia, *Australian Indigenous Law Review* 13(1): 27-48.

¹⁴ Jackson, S. and L. Crabtree (2014). Politically engaged geographical research with the community sector: is it encouraged by Australia's higher education and research institutions? *Geographical Research*, 52(2):146-156.

¹⁵ <http://culturalflows.com.au/images/documents/Law%20and%20policy.pdf>

3. Integrated urban water management

Australia's population is expected to nearly double by 2066, and 80% of new arrivals will choose to live in cities and towns.¹⁶ The servicing model in Australia remains largely that water sources are considered collectively as an undifferentiated commodity, which constrains innovation in new business models.

Most state governments have taken steps to diversify water sources in major metropolitan and regional cities, in order to strengthen the resilience of water supply for these cities. The majority of the initiatives are investments in large, centralised infrastructure such as seawater desalination plants^{17,18} (almost all coastal capital cities) and managed aquifer recharge with stormwater (Adelaide) and recycled wastewater (Perth).¹⁹ These are important investments, but alone they lack the agility, robustness and cost-effectiveness needed to support the anticipated growth in urban populations.

This will require a portfolio of water sources, including seawater desalination and water recycling, water conservation and stormwater reuse or economic instruments for ensuring a strong level of resilience in Australia's water security.²⁰ Recognising this challenge many governments, government and non-government agencies, and water utilities have also developed Integrated Urban Water Management strategies, an approach also advocated by the Productivity Commission.^{21,22,23,24}

Drawing on research by the CRC for Water Sensitive Cities we recommend that an integrated urban water planning and management framework should aim to:

- consider all possible sources of water (centralised and decentralised) including surface water, groundwater, treated wastewater, desalinated seawater, stormwater, rainwater and demand management;
- leverage analysis of a wide range of future climate, population, hazard and technology scenarios;
- integrate land use, energy, urban design and transportation planning;
- consider a set of objectives identified by representative community groups including traditional custodians and include community input to select the best policies;
- use multi-objective optimisation to ensure that the most efficient solutions are identified;
- be dynamic and adaptive in response to unexpected changes in climate, technology and societal values.

New infrastructure investment must ensure that contemporary infrastructure is adaptive to:

- complement and extend the operational life of existing (centralised) infrastructure,
- continually harness technological breakthroughs to optimise operations,
- identify and establish means to evolve business models of water utilities, and
- deliver outcomes that enhance liveability and reflect community expectation while ensuring sustainability and resilience to future climate uncertainties.

¹⁶ <https://www.abs.gov.au/AUSSTATS/abs@.nsf/mf/3222.0>

¹⁷ <https://iwa-network.org/news/desalination-australian-experience/>

¹⁸ Water Services Association of Australia (2013). Seawater Desalination: Information Pack Two.

¹⁹ <https://research.csiro.au/mar/using-managed-aquifer-recharge/>

²⁰ Prime Minister Science Engineering and Innovation Council Working Group (2007). Water for Our Cities: building resilience in a climate of uncertainty. A report of the PMSEIC Working Group, June 2007.

²¹ <https://www.water.vic.gov.au/liveable/integrated-water-management-program/iwm-framework>

²² <https://www.industry.nsw.gov.au/water/water-utilities/best-practice-mgmt/iwcm>

²³ <https://www.pc.gov.au/research/completed/water-cycle#panel>

²⁴ <https://www.futureearth.org.au/publications/sustainable-cities-strategy>

4. Environmental water management and resilience

In 2016 the State of the Environment report found that the resources allocated to water quality monitoring, analysis and reporting had reduced, and that this had increased the risk of poor water resource management.²⁵ Hydroclimatic conditions have deteriorated far more quickly than envisaged in the NWI and this is now an acute problem requiring a strong policy response. The balance between water supply and demand is now more volatile and this requires a stronger adaptive management approach, with shorter cycles between major policy reviews.

Australia has made a good start to redressing the imbalance of water allocation to the consumptive and environmental pools, through the creation of government water holdings and specialist agencies. Environmental benefits have resulted from these measures, although more time is needed to evaluate progress. It is evident that major ecologic shocks such as mass fish kills are an on-going risk that must be mitigated.

Specific areas where improvement can be made include:

- the management of constraints that restrict the delivery of flood flows into ecosystems, and
- the management of very low flow sequences and rapid transitions between drought and flooding, which create water quality problems.

The continuous assessment and monitoring of major catchments, as well as current and imminent threats, are essential to the improved management, governance and resilience of natural water systems. The environmental health of many of Australia's natural water systems is already seriously degraded and is continuing to degrade due to factors such as excessive extraction for human use, climate change, successive droughts, bushfires, contamination and reflooding.

One severely impacted location is in the Lower Lakes of South Australia, where soil and water acidification has occurred over large areas and has required costly adaptive management interventions (e.g. regulators, limestone dosing).²⁶ The recent impacts of climate change are further reducing the amount and quality of water that can sustainably be extracted for human use, such as across Norfolk Island.²⁷ The sustainability of Australia's natural water systems in the face of these mounting challenges must be considered in the short and long term, ideally over successive generations in a coordinated national water strategy.

In this context water reforms should focus on:

- Adequate environmental protection of water catchments including natural reservoirs and storage systems and drainage and discharge systems.
- The perspectives of Aboriginal and Torres Strait islander Peoples on sustainable custodianship of water resources.
- A holistic approach to water security, encompassing both water quality and water quantity assessments.
- Adaptive management of human water use, based on weather and changing climate, and the best available economic alternatives.

²⁵ Argent, R.M. (2017). Australia state of the environment 2016: inland water, independent report to the Australian Government Minister for the Environment and Energy. Australian Government Department of the Environment and Energy. Canberra.

²⁶ Fitzpatrick, R.W., Shand, P. and Mosley, L. M. (2018). Soils in the Coorong, Lower Lakes and Murray Mouth Region. In: Natural History of the Coorong, Lower Lakes and Murray Mouth Region. (Eds. Luke Mosely, Qifeng Ye, Scoresby Shepherd, Steve Hemming and Rob Fitzpatrick). Chapter 2.9 pp. 227-251. Royal Society of South Australia (Inc.) Adelaide, South Australia. DOI: <https://doi.org/10.20851/natural-history-clmm-2.9>

²⁷ Fitzpatrick, RW, S. Philip, P, Wilson, MD Raven and P Self (2020). Peaty acid sulfate soils on Norfolk Island: Soil-landscape evolution models of wetlands during severe drought. Geoderma (Submitted)

5. Water research and development

Investment in water research and development is a critical part of water reform. In 2017-18 ATSE and AAS identified a series of strategic research and development needs where investment would lead to better water management and policy in Australia.^{28,29} ATSE, AAS and the Australian Academy of Social Sciences (ASSA) are developing a joint project on a national water R&D report and strategic plan, to address Australia's water research and development needs, and would be pleased to discuss this project with the Commission.

Australia's agility in addressing our water challenges and our evidence-based approach has relied on our strong water research community in the past. This community functions as an early warning system for emerging problems and a training ground for advanced technical capability in the water industry. The research community has also been an important bridge between the myriad of stakeholders pursuing specific interests and policy makers who need to balance them fairly.

Most water research in Australia is underpinned by core funding assigned by the Australian Government to universities and the CSIRO. Much of that core funding is co-invested into contestable and programmatic funding research programs operated by the Australian and state governments. Research institutions have relied heavily on contestable and programmatic funding programs to increase the scale of their research activity and to enhance their impact. As such, fluctuations in contestable and programmatic funding levels have had a significant bearing on the size, effectiveness and impact of the water research community.

The contestable and programmatic funding pools for water research in Australia have varied greatly over the last three decades in Australia, in terms of number, focus, duration and funding quanta. Our research has found that funding levels peaked in the latter stages of the millennium drought and plummeted after the global financial crisis, when many of the main sources of funding were terminated. Current investment levels are close to historic lows, running counter to need. Even at the peak funding levels of the mid-late 2000s, the quanta allocated to research was surprisingly modest given the economic and social importance of the water sector.

Less than half of the water R&D funding programs that operated over the last 30 years have endured for more than 5 years. Only AWRAC (1987-91) and NWC (2006-11) defined and issued national priorities for water R&D, and neither listing was ever updated. Less than a third of the water R&D funding programs that operated over the last 30 years involved end-users in the governance of the research, and undertook rigorous performance and cost/benefit assessments of the research. This is in stark contrast to the situation in agriculture, where numerous Research and Development Corporations (RDCs) professionally direct, administer and evaluate research funding in a strategic manner.

Instability in funding levels and the absence of effective funding mechanisms has degraded the potential efficiency and effectiveness of the water research community. That in turn has harmed the interests of water sector participants who rely on the research community for innovation, capacity development and support in managing contentious public policy issues.

We therefore recommend a national water research funding agency to professionally and strategically direct, administer and evaluate the investment of research funding, on a stable ongoing basis that nurtures long-term dividends for the nation. Such an agency would ensure the water research and development community is supported to provide contemporary evidence-based advice on approaches to water policy.

²⁸ <https://www.science.org.au/supporting-science/science-policy/submissions-government/management-and-use-commonwealth-water>

²⁹ <https://www.atse.org.au/research-and-policy/publications/publication/house-of-representatives-standing-committee-on-the-environment-and-energy-inquiry-into-the-management-and-use-of-commonwealth-environmental-water>

If you would like to discuss any aspect of this submission or to arrange an appearance before the Commission, please contact Dr Harry Rolf (ATSE) at harry.rolf@atse.org.au or 03 9864 0900 or Dr Stuart Barrow (AAS) at stuart.barrow@science.org.au or 02 6201 9464.