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To whom it may concern,

RE. Submission to the Australian Government's consultation on a new National Water Agreement

The 1994 water reform framework agreed by COAG and the 2004 National Water Initiative set the direction for water reform in Australia over the last three decades. It has motivated important innovations across the water sector often delivered through cooperative efforts across governments. We commend the State, Territory and Commonwealth Governments for their leadership in committing to renewal of the 2004 National Water Initiative. The need for an agreed directionality to water reform has never been stronger as we face increasing water demands and declining security of Australia's water resource.

Through the One Basin CRC, the Murray–Darling Basin's researchers, agriculture sector, water agencies and regional communities have joined forces to collaboratively solve shared water challenges in the basin. We are made up of 85 different organisations, working together to find ways to make better use of water, for agriculture, people and the environment. Consistent with the One Basin CRC's commitment to an industry-led program, our research is directed by industry, government and community partners. Together, we aim to achieve a more productive, resilient and sustainable Murray-Darling Basin.

Our submission focusses on five key areas where we think there should be additional emphasis or effort in the new National Water Agreement: i) First Nations; ii) science leadership and gaps; iii) skills shortages in the water services and sciences sectors; iv) conceptualisation of irrigation infrastructure, and; v) responsiveness to climate change.

We are grateful for the opportunity to make a submission to this consultation stage in developing a new National Water Agreement. We would be happy to contribute further as the National Water Agreement is progressed.

First Nations

Key points

- Protections and safeguards will need to be in place for First Nations Cultural Knowledge and Sovereign Intellectual Property.
- There needs to be wider acknowledgement that Culture is made up of many Nations, Clans and large family groups. The new National Water Agreement must have the outcome of bringing these many First Nations parties together in a unified way.

The comprehensive inclusion of First Nations interests in the new National Water Agreement reflects the changing views and commitment for positive change in the livelihoods of First Nations peoples. However, there are several areas for improvement.

The draft objectives and outcomes for the new National Water Agreement touch briefly on data sovereignty and Cultural Knowledge. There needs to be recognition and reinforcement of the protection of Cultural Knowledge and Sovereign Intellectual Property (IP). To achieve all the objectives and outcomes, First Nations will share Cultural Knowledge and Sovereign IP where they feel comfortable in doing so. Protections and safeguards will need to be in place for First Nations to be comfortable in doing this. Additionally, if there is no duty of care it could expose the new National Water Agreement to unintended consequences and poor outcomes for First Nations.

Acknowledgement is given to the longest living continuous Culture in the world which is longer than 65,000 years. This Culture is complex and diverse. However, the proposed objectives and outcomes don't acknowledge that it is made up of many Nations, Clans and large family groups representing themselves or part of organisations or other groups. Parts of the community, both Indigenous and non-Indigenous, will feel excluded and isolated if the new National Water Agreement has a narrow focus on who to engage. This will result in hearing only half of the story and missing key knowledges and understanding.

The waterways within the Murray Darling Basin have many interested First Nations where decisions in one location will impact others. The new National Water Agreement needs to have the objective and outcome of bringing many First Nations parties together in a unified way.

Science leadership and gaps

Key points

- The new National Water Agreement should support a national land and water R&D program.
- A national water R&D program should take an innovation ecosystem approach linking research providers to those who will use the products of their research, including government and industry organizations.
- Cross-government leadership is needed to establish national water missions to activate public-private sector partnerships across the water innovation system.

The new National Water Agreement should support a national land and water R&D program to underpin a sustainable future for Australia. Such a program will sustain innovation in the land and water sectors with changing climate, technology, economy and societal expectation of natural resource management. This is important for rural areas where the economy is highly dependent on the use of land and water, in remote parts of Australia where there can be a critical shortage of high-quality water supplies, and in urban areas where water and catchment management are critical determinants of liveability and wellbeing.

Australia's water research capabilities are outstanding after historic investment through government programs like Land and Water Australia, CSIRO, Murray-Darling Basin Commission, Raising National Water Standards, and the CRC program. The ability to attract, develop and retain outstanding water

researchers, regardless of the discipline, is dependent on the scale of investment in high quality research. In recent years, such investment is increasingly restricted to the Australian Research Council National Competitive Grants program which supports a small number of relatively small water research projects through grant rounds that have a very low success rate. Significant investments in national scale research efforts have been largely absent since Land and Water Australia was decommissioned. As a result, there is limited scale in water research efforts, significant duplication, and a disconnection of water research from government and industry. There is an increasingly urgent need to address the decline of Australia's national water research capability and install a more systematic funding model.

Whilst research provides a critical input to the innovation system, attention is also needed to the whole value chain from the generation of new ideas, technologies and business models to their application at scale across Australia. A national water R&D program should take an ecosystem approach linking research providers to those who will use the products of their research, including government and industry players. This includes other important actors in the innovation process including technology companies, finance sector and advisers for water and other end user industries. It is a great concern that the water innovation system is largely undefined and uncoordinated by government and industry bodies. The challenge of driving innovation is amplified because the water sector is inherently conservative with large capital investment in water infrastructure and often extreme downside risk of failure with adopting innovative approaches. Investment in research will only bear fruit when organizations intended to benefit from this research are engaged with researchers in an innovation system.

A mission perspective will activate partnerships across the water innovation value chain at the national level. CSIRO is developing a missions approach which includes the AquaWatch and Drought Resilience Missions¹. Similarly, the One Basin CRC² is taking a mission approach to significant water challenges in irrigation regions. There is opportunity to build on these foundations to create national missions that activate investment, partnerships and research towards a common purpose. Government investment and leadership is needed to establish this national scale effort. The CRC program, CSIRO missions program and the former Land and Water Australia, provide models to guide the design of national-scale water innovation missions.

Skills shortages in water services and sciences sectors

Key points

- An additional objective on education and training is needed in the new National Water Agreement.
- There needs to be sustained effort in education and training to fill the skills shortage in key areas relevant to the new National Water Agreement (i.e. hydrogeology, civil, environmental and agricultural engineering, irrigation technology and design, inter-disciplinary sciences).

¹ <https://wp.csiro.au/summit23/missions/>

² <https://onebasin.com.au/>

A key element of the 2004 National Water Initiative is 'Knowledge and Capacity Building'. While the discussion paper on a new National Water Agreement says that we *need to work together* on strategies to address climate change, increasing water demand, and Aboriginal and Torres Strait Islander Peoples' water interests, there is no mention of 'education' or 'training' as a key element of how to achieve these outcomes. 'Working together' implies that human capital is the key to success in achieving the outcomes. Fundamental to human capital is that everyone involved in the NWA, and by extension, everybody affected, is adequately educated and trained to effectively work together, develop solutions for the complex-wicked problems and execute the increasingly challenging and complex tasks ahead.

Over the past three years the Australian government has identified national skill shortages in hydrogeology, civil, environmental and agricultural engineering, and irrigation technology and design. These are some of the key professions that will make the National Water Agreement a success. There are also skills shortages in inter-disciplinary sciences (e.g. social-ecological systems) that are critical for addressing the complex and wicked problems posed by water management.

An additional objective on education and training is needed in the new National Water Agreement. The objective's goal would be to achieve a workforce and a broader population that is innovative, knowledgeable and resilient to be able to address the problems of the future. This objective goes much further than the proposed Objective 4's goal about the use of science, data and cultural knowledge in water management.

Conceptualisation of water infrastructure

Key points

- Investment in new water infrastructure is needed to ensure Australia is resilient to the impacts of climate change.
- The new National Water Agreement must take a broader conceptualisation of water infrastructure that recognises and values the full range of benefits provided.
- Different types of infrastructure, such as nature-based solutions (e.g. floodplains, urban gardens, permeable pavements) and soft infrastructure (e.g. human capital, regional capacity building, decision-making trust and transparency) must also be recognised.

New water infrastructure is essential to help Australians to adapt to climate change and a likely drier future. But investment in infrastructure should not be based solely on economic benefit or financial return on investment. Decisions on whether to invest should be based on a wider set of benefits, particularly the environmental sustainability, social and cultural benefits or impacts of infrastructure. The benefits assessed should include public good benefits (e.g. ecosystem services), First Nations benefits, flood and drought risk mitigation and broader climate change adaptation outcomes.

Historically, water demand and supply was relatively stable, and past large water infrastructure was constructed under this premise. Future decisions on whether to invest in water infrastructure need to consider the increased variability in water demand and supply caused by climate change. Infrastructure will be needed that can increase resilience to extended and more extreme periods of drought and more intense floods. This will need different types of infrastructure, such as nature-based solutions (e.g.

floodplains, urban gardens, permeable pavements) and soft infrastructure (e.g. human capital, regional capacity building, decision-making trust and transparency).

On the trust and transparency 'soft infrastructure', there is the need for more transparency in modelling and data that supports decision-making and behaviour. A good start is the biophysical data now freely available by the Bureau of Meteorology. The next major step should be to have more open river system models that are well documented (e.g. assumptions are explicit) and tested and credible. High spatial and temporal resolution data on water use, farm dams, water trading etc should be made freely available so that human decisions and interactions with water are transparent.

Responsiveness to climate change

Key points

- To retain relevance, the new National Water Agreement should be responsive to rapidly changing conditions, particularly as more science and knowledge is available about impacts from climate change.

The significant focus on climate change in the new National Water Agreement is to be commended. There needs to be recognition in the new National Water Agreement that ongoing improvements in understanding of the nature and trajectory of climate change may trigger revisions to the National Water Agreement so that it retains relevance in a rapidly changing climate. Whilst temperature is confidently assumed to increase and rainfall will become increasingly more variable, the resultant changes to hydrological, ecological, and socio-economic conditions and systems remain highly uncertain.

We are happy to discuss any of these areas.

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CEO

OneBasin CRC