

Water Issues in Australia

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Water in Australia is a contentious topic; mentioning it in any social or professional context invariably uncovers a rich array of opinions, usually expressed with plenty of emotion.

Water flowing through Australian history

Water has been at the centre of nation-building projects such as the massive Snowy Mountains Hydroelectric Scheme (construction dates from 1949 and 1974), the Ord River Irrigation Scheme (constructed from 1963 to 1972) and C.Y. O’Conner’s Coolgardie Goldfields Water Scheme (constructed from 1989 to 1903) with its famous pipeline carrying water from the hills near Perth to Kalgoorlie.

An attempt to dam Tasmania’s Franklin River (Gordon-below-Franklin Dam project, proposed in 1978) sparked one of the most passionate and high-profile environmental movements yet seen in this country and contributed to the change of government in the 1983 Federal election. A proposed canal to transport water from the Fitzroy River in the Kimberly to Perth played a prominent role in the 2005 Western Australian State election.

Australian rivers in pre-European times were very different from the rivers we are now familiar with. For example, in south-eastern Australia, rivers had wider, shallower bed forms (rather than steep-sided channels), and were more likely to exist as chains of disconnected ponds during dry times. The flow through these rivers was highly episodic, characterised by long dry periods punctuated with bursts of higher flow. Floodplain vegetation was adapted to thrive in these conditions, experiencing occasional inundation during infrequent flood events.

Land clearing can alter rivers irreversibly

Expansion of European settlement in Australia marked the beginning of widespread land clearing, construction of dams and weirs, and the diversion of water for agricultural, domestic and industrial purposes. These have triggered changes to the quantity of water available in different locations and the speed with which water moves through the landscape.

Land clearing has been extensive in Australia. For example, the Western Australian wheatbelt has had approximately 85% of its native vegetation cleared for agriculture¹. Land clearing affects water in several ways. Rainfall landing on cleared land is more likely to move rapidly across the land surface, eroding valuable topsoil in its path and eventually creating erosion gullies. These processes have also seen the formation of steep-sided channels in river beds where once there were wide, shallow valley-bottoms that were able to retain more water in the landscape. The long-term ecological consequences of these changes are profound, and have greatly affected the diversity of plants and animals in these areas (e.g. floodplain plants, fish species, frogs, birds). Furthermore, good plant cover is vital for the delivery of high-quality drinking water (see box inset).

Box inset: Why do we need healthy ecosystems for our water supply?

Before the Canberra bushfires, Canberra’s water was primarily sourced from the Cotter Catchment, located in Namadgi National Park. Water from this catchment was high quality drinking water that required very little treatment. By contrast, water from the ACT’s source in NSW, the Googong catchment, required far more treatment before drinking. Unlike the storages in the Cotter catchment, Googong reservoir occupies a working agricultural

catchment. Water drains agricultural and cleared land, and is more susceptible to pollution from nutrient and sediment runoff. In 2002, Googong water was ten times more expensive to treat than Cotter water². The bushfires in 2003 stripped the Cotter catchment of vegetation, and triggered an urgent need for new water treatment facilities to handle the increased runoff of topsoil into the dams. This higher level of water treatment will be required to treat Cotter water until the vegetation recovers.

The episodic and unpredictable nature of natural flows were not conducive to the water needs of European agriculture, domestic and industrial uses. Consequently many Australian rivers have been dammed or regulated in the name of water security, ensuring greater predictability of supply. In regulating rivers we have altered the ecology of both aquatic and terrestrial species in a myriad of ways. An extensive river assessment from the National Land and Water Resources Audit found that over 85% of river length is significantly modified from its original condition, and approximately one third of river length is impaired (substantial loss of river species when compared to undisturbed river reaches)³.

Water quality has also been affected by clearing, irrigation and agricultural practices; water running off agricultural land carries fertilisers and pesticides, and where vegetation has been cleared, water runoff carries away valuable topsoil. Fertilisers and soil contain nutrients needed for plant growth, but in waterways the nutrients fuel algal problems in inland waters. If rivers deliver these nutrients to coastal regions they pose a threat to sensitive and highly valuable coastal ecosystems such as the Great Barrier Reef. Where land clearing has exacerbated salinity problems, the rivers draining these areas have experienced increased salt levels.

Ecosystems that have evolved over millennia have been transformed utterly within the space of two centuries, in many cases irreversibly. Recognition of this fact has driven the call for more ‘environmental flows’, that is, for the flow patterns in our rivers to be managed to bring them closer to pre-European patterns.

Interlinked water stories: cities and agriculture

What was the motivation for these profound human-induced changes to our landscapes and rivers? Overwhelmingly, the changes occurred to support agricultural production. Food and fibre production has driven the vast majority of land clearing decisions, and the regulation and diversion of rivers. Rivers have also been dammed for domestic and industrial supply, but this component comprises a very small part of the big picture. By far the largest demand on Australia’s water resources – 75% of all surface water use – comes from irrigated agriculture.

Nevertheless, domestic and industrial water uses are also important. Most capital cities and many towns are now approaching the limits of their local water supplies, and are actively enforcing water restrictions. The construction of new dams is highly unpopular and impractical, given that the best dam sites have already been taken. Alternative approaches are needed to supply a growing population with water. ‘Demand management’ is the name given to programs and policies aimed at reducing domestic water consumption. This can include incentive programs to install low-flush toilets, water-saving showerheads, front-loading washing machines, native (xerophytic) gardens, domestic water tanks and grey-water recycling facilities.

The contrast between the domestic and rural experience of water lies at the heart of many of the water issues in this country. Demand management in the city is promoted as saving *money* as well as saving *water*. But the relatively low price of water means that pay-back times for the installation of domestic rainwater tanks and grey-water recycling facilities are long indeed. However, even if suburban households were to invest in all water-saving measures,

and conscientiously reduce their direct water use, they can remain blind to their indirect water use, for example, via the foods they buy.

The amount of water used in agricultural production means that our food choices can have much more impact on the water cycle than our domestic water use. It remains a surprisingly poorly researched area, but work that has been conducted in this field has demonstrated that the 'embodied' water in our daily purchases can far outweigh the direct water use in our households. For example, studies have estimated that approximately 700L of water are embodied in a typical one-litre carton of milk, attributable to the water requirements to grow pasture for dairy cattle. This is greater than the amount of water required to wash 10 loads of laundry in a front-loading washing machine!

Summarising, much damage to our landscapes and waterways has been in the name of agriculture, which is primarily driven by the purchasing choices of city-dwellers. In cities we are encouraged to use less water, and governments are spending money on imposing water restrictions and providing incentive programs for households to adopt more water-wise measures. In the meantime, the water use embodied in the food and material items we purchase, remains hidden to us. Historically the price of water in rural areas has been far below city prices, resulting in little price incentive to use less water in agricultural systems. Water has recently been brought into focus by prolonged drought which has triggered distress and lost production in agricultural regions, and the enforcement of water restrictions in most capital cities.

Water Reform in Australia

All these factors have combined to drive a suite of profound changes to water management in this country. We are in the midst of exciting times, where water is a hot political topic and real changes are being made. These changes have been a long time coming, and have important historical roots, including Council of Australian Governments (CoAG) agreements on water dating from 1994, the introduction of 'The Cap' in allocating water within the Murray-Darling in 1995, and a group of influential scientists (The Wentworth Group) who promoted a 'Blueprint for a National Water Plan' in 2003.

In 2004 an Intergovernmental Agreement was signed on a National Water Initiative, which is administered by the newly formed National Water Commission. The National Water Commission is an independent statutory body in the Prime Minister's portfolio, and it reports to the Council of Australian Governments. The National Water Initiative seeks to consolidate all former water reforms, and form a shared, national approach to water. This includes the development of robust water accounting methods, the establishment of national markets for trading water and water planning processes so that different parties can reconcile competing water uses (e.g. urban vs rural, the environment vs agricultural production). The Chairman of the National Water Commission, Ken Matthews, warns that "there are no silver bullets ... water reform is a complex, hard slog".

Further interesting challenges ahead include: the very real potential to reuse sewage and stormwater (possibilities that currently meet a lot of resistance in Australian cities); the future of Australia's northern rivers, which will be under increasing pressure to be developed due to their large, currently unregulated flows; and how to prepare for the unknown impacts that global climate change will have on the Australian water cycle.

The recent developments in water policy demonstrate that ideas on water in Australia are becoming more sophisticated, informed and less blinded by populist myths (e.g. 'turn the rivers inland and make the desert bloom'). Droughts bring out calls for simplistic 'silver bullet' solutions to 'drought-proof' the nation. In 2003 John Williams (then chief of CSIRO

Land and Water) wrote an eloquent plea to ‘myth-proof’ the nation⁴, asking us to once and for all abandon naïve faith in large infrastructure plans to divert rivers or build massive dams. The infrastructure needed to tackle these problems is more subtle and complex; we need social, economic, legal and democratic infrastructure that allows us to consider the needs of communities, agriculture, industries and the environment, and allocate water effectively in times of drought or plenty.

¹ Australian Natural Resources Atlas (<http://audit.ea.gov.au/ANRA>).

² *The Value of Water: Inquiry into Australia's Management of Urban Water*. Report of the Senate Environment, Communications, Information Technology and the Arts References Committee, December 2002, Chapter 1, Section 1.100. (http://www.aph.gov.au/Senate/committee/ecita_ctte/water/report/contents.htm)

³ Norris *et al* (2001) *The Assessment of River Condition*. Report to the National Land and Water Resources Audit, 2001. (<http://www.nlwra.gov.au>). The study investigated the condition of 193 river basins, in an area that encompassed all of Victoria, Tasmania, ACT, over 90% of New South Wales and significant parts of the remaining states and the Northern Territory.

⁴ Williams J (2003) Can we Myth-proof Australia? *Australasian Science* Vol 24 (1): 40-42