Corin Dam was completed in 1968 as the highest dam up the Cotter River.
Photos: Matthew Higgins

COTTER COMFORT

Water seems to be on everyone's mind at the moment – or at least it should be here in the driest inhabited continent. Amidst terrible drought (only time will tell whether the recent rains have truly broken it) and the growing signs of climate-change-induced drying of south-eastern Australia, the National Museum's exhibition *Water: H2O = Life* was well timed. It has also given Canberra residents pause to consider their own water supply.

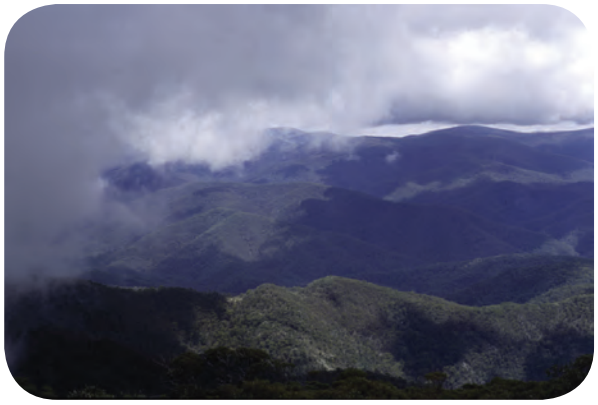
As one of the international partners in the Water exhibition project, the National Museum was able to include in the travelling section of the New York-designed show a segment on its own city's water supply. This segment is in a computer interactive which has similar supply information for the other host cities of the exhibition. Naturally the data given in the interactive is very brief, so here is a bit more background on the national capital's water resources.

Water lies at the very heart of not just Canberra but the Australian Capital Territory. Have you ever wondered why the ACT is such a strange shape? It is due to water. When the territory boundary was being determined in 1908–09, Commonwealth government authorities did not want to have battles with surrounding New South Wales about catchment protection and possible pollution of the new city's water. So the decision was made to have the territorial border contain the prime catchments. This explains why the border, for the most part, follows a series of watersheds.

Why does the territory extend so far to the south-west of the city? Because that is the head of the primary catchment, the Cotter River.

It is the Cotter that has delivered most of Canberra and Queanbeyan's water since the capital was founded and the first dam built. Although since the 1970s we have also drawn water from Googong Dam on the Queanbeyan River in neighbouring NSW, it is the Cotter with its clean, mountain-sourced water that has been at the centre of supply. Right around the world, mountains are important as a source of fresh water, and that is very true in flat Australia. The Brindabellas and other mountain chains to our west and south are places of relatively high precipitation in rain and snow, and it is they that make Canberra's existence as Australia's biggest inland city possible. As early engineer Ernest Macartney De Burgh said in 1921, 'it is impossible to imagine a catchment from which a purer supply could be obtained'.

There are three dams on the Cotter, with a fourth just begun. The first, Cotter Dam, was commenced in 1912. It was built as a concrete 'gravity' dam, the mass of its thick concrete wall being the key element holding back the force of the water. Building it was tough and labour-intensive work. Steam-driven machines broke rock for aggregate and drove winches, horses pulled loads and men worked long hours. A tent camp – complete with a canvas school for worker's children – stood at today's Cotter Reserve. Because the dam was lower in



A wild mountain catchment: view across the middle Cotter valley.

elevation than the planned city, water had to be pumped uphill, courtesy of the Cotter Pumping Station, designed by J. S. Murdoch who was also architect of Old Parliament House and other landmarks like the Hotel Canberra.

The wall of Cotter Dam was increased in height for extra storage during Canberra's growth spurt a few years after the Second World War. In a parallel with the Snowy Mountains Hydro-Electric Scheme then beginning to the south, numbers of European migrants (including refugees from war-torn Europe) worked on the project.

Canberra's continuing growth soon saw plans for another dam further up the Cotter River. In 1959, construction began on the Upper Cotter Dam, eventually re-named Bendora. Bendora was a very different structure to the old Cotter Dam, being a thin-walled, double-curvature-arch concrete dam, which used concrete's compressive strength to hold back the water. One of the first dams of this type in Australia, Bendora was designed by the Department of Works and built by a Sydney-based contractor, E. S. Clementson. There was considerable influence from the Snowy Scheme, with engineering advice being given by Snowy experts, and Snowy contractors filling various roles. Works engineers also utilised, perhaps for the first time, a digital computer – Utecom – at the University of NSW in Sydney. Bendora, holding 2.5 times the capacity of Cotter Dam, was completed in 1961.

Bendora was higher in elevation than Canberra, which meant that the water could be conveyed by gravity, fulfilling an idea that had been around for 60 years. The Bendora Gravity Main was again designed by Works, and constructed in the mid-1960s by an American firm, Nat Harrison. The project saw a massive pipeline built – mostly underground – for 20 kilometres through some of Australia's most rugged mountain country. Using gravity meant that the expensive Cotter pumps could be sidelined; the decision was made for economic reasons but, perhaps better appreciated in hindsight, it made good environmental sense as well.

Canberra's continued growth in the 1960s saw another dam get underway. Corin Dam was built furthest up the Cotter River during 1966–68. Again contrasting with the two previous Cotter valley dams, Corin was an earth and rockfill structure, with a dramatically sweeping concrete spillway, and a concrete valve tower to let the water run downriver to top-up Bendora for onward gravity conveyance to Canberra. The Queensland firm Thiess Brothers built a big part of the Snowy Scheme and they were the successful tenderers for Corin, which once again had been designed by the Department of Works for the National Capital Development Commission. So once more there was crossover between the Cotter projects and the Snowy. It was still a time when 'dams could only do good', as one observer noted, still more than a decade prior to the Franklin Dam campaign which so fundamentally affected Australians' views on development of water resources.

The sweeping view down Corin's spillway.
Photos: Matthew Higgins

Having a good water supply depends on more than just building dams. The catchment had to be kept clean. As early as 1913 the Commonwealth government banned grazing in the Cotter catchment, and from the late 1920s a ranger was stationed in the isolated, upper part of the rugged valley at Cotter Hut, a former grazier's residence. The ranger position lasted until Namadgi National Park was established in 1984, and was one of the most remote government jobs in the whole country. It is because the catchment was so closely guarded that the upper valley has remained relatively undisturbed, making possible today's Bimberi Wilderness area within Namadgi, a key element within the Australian Alps National Parks. Garrett Cotter, the 1820s Irish convict after whom the river is named, might even still recognise it.

When the terrible bushfires attacked Canberra in 2003, they also caused widespread damage in the Cotter catchment. New treatment facilities had to be installed at Mt Stromlo to deal with the ash and sediment that washed down the burnt valley. A major reason the fires were so bad was the prevailing drought. One of the worst on record,

The beautiful Cotter River, just upstream of Bendora Dam, photographed prior to the 2003 bushfires which caused so much damage in the catchment.

Cotter Dam in the 1990s. This dam, Canberra's oldest, will soon be drowned by the Enlarged Cotter Dam, being built to protect Canberra's water supply against drought induced by climate change.

the continuing drought has forced water restrictions on the national capital and much of the rest of Australia's population. CSIRO's research indicates drying out of south-eastern Australia as part of climate change. Actew, Canberra's water provider, has modelled its planning on CSIRO findings. Numbers of new water infrastructure projects are now underway as a result. The Enlarged Cotter Dam, at 78 gigalitres (78,000,000,000 litres), is the first of Canberra's dams to be built not in response to rising population but to declining rainfall and inflows. The Murrumbidgee River also is now to be tapped for additional supply to the capital, with a new pumping station just below the old Cotter one (which itself has been re-commissioned), and a pipeline from Angle Crossing to Googong Dam.

More about the history of the Cotter supply system, and the people who built it, can be found in my *Rugged beyond imagination: stories from an Australian mountain region*, published by NMA Press last year and available at the NMA Shop and good bookshops everywhere.

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