

The Barwon-Darling River River Structures



Structures affecting the river and floodplains, such as dams, weirs, navigation locks, canals, floodgates, levee banks, culverts and causeways have been erected over time for a number of reasons.



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Weirs create pools of water for diverting into irrigation channels, for pump intakes, town water supply, and recreational boating and swimming.

Floodgates and **levee banks** control floodwaters on urban and agricultural land and prevent upstream saltwater intrusion.

Culverts and **causeways** allow traffic to pass over waterways.

Dams store water for stock, domestic and irrigation supply and for flood mitigation.

The impacts of structures on water flow and water quality include:

- Reducing the natural flushing of the river
- Accumulating pollution and sediment
- Creating ideal conditions for blue-green algal blooms

- Creating barriers to native fish migration and breeding
- Creating environments more suited to introduced fish species such as carp and red fin perch.

The Barwon-Darling River flows slowly due to the very low slope of the landscape. Structures such as dams and weirs slow the flow even further. It is estimated that 40% of the river length is in weir pools, each of which can extend up to 100 km.

The health of the river and its floodplain depends on floods allowing the river to break its banks and fill or reconnect billabongs and other wetlands.

Poorly placed levees, channels, banks, raised roads and other structures on the floodplain can prevent flood waters reaching ecologically important wetlands. This affects fish spawning, waterbird breeding and vegetation regeneration.



Wetlands require periodic flooding.

Floodplain country used for grazing stock can also be deprived of the irrigation and fertilising benefits of floods because in-stream structures redirect water flow.

Ideally, weirs need to be actively managed to reduce conditions such as cold and warm water temperature layers supporting blue-green algae blooms.



Many native species such as the silver perch (pictured) are now restricted or endangered. Photo: Industries and Investment NSW.

Actions to reduce or overcome the impact of in-stream structures on natural water flow and water quality in the river include removing redundant structures, redeveloping infrastructure that limits flows, constructing fishways to allow migration, allocating flows to benefit the environment and opening floodgates at certain times of the year.

Fishways

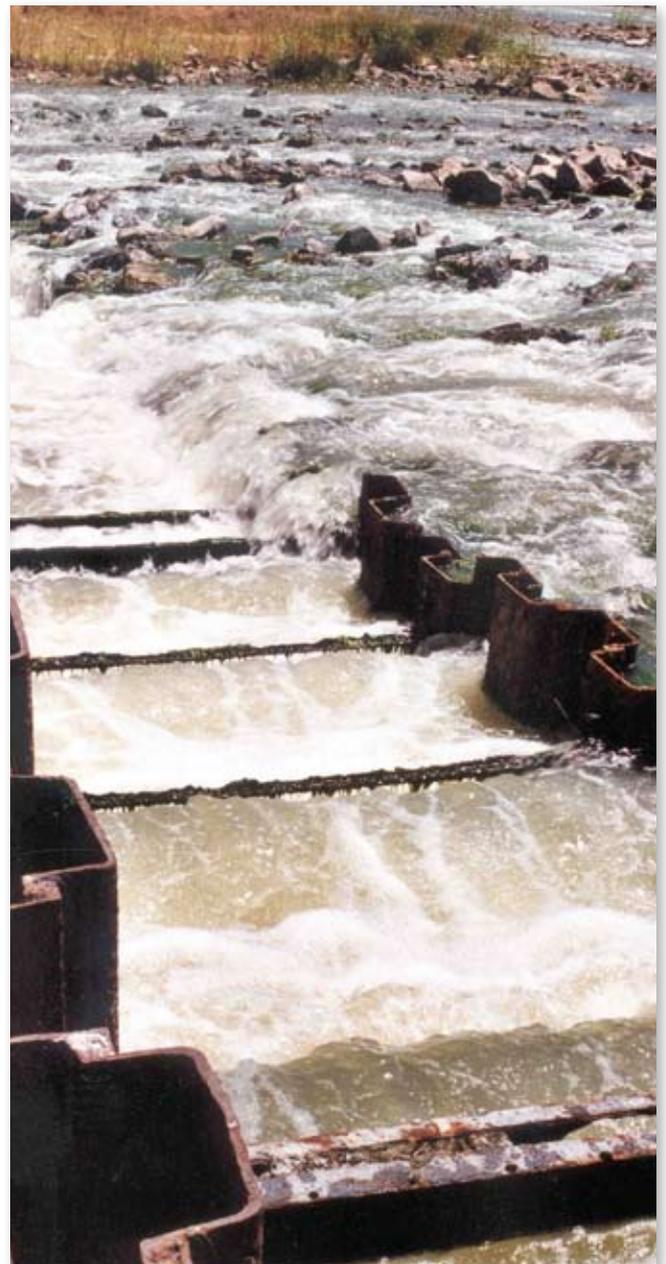
Fishways offer an alternative route up a stream for fish normally stranded at the base of a weir or dam. These structures are often made of rock, steel or concrete, and sometimes mimic the shape of a natural channel. A fishway reduces the slope of the channel and the speed of the flowing water so the fish can slowly negotiate their way over the barrier and into the pool upstream.

In the past, some fishways installed in Australian rivers were designed to suit northern hemisphere fish, such as salmon and trout, which swim strongly against the current and are able to jump. These are being replaced with fishways that are better suited to our slower moving native fish and feature a more gentle gradient.

Each site for a fishway has to be carefully assessed before a custom design is formulated. For example, the proposed reverse rockramp fishway at Brewarrina was

designed to extend back into the weir pool so as not to impact on the Ngunnhu or stone fisheries below the weir that are of great cultural significance.

The origin, colour and size of the rock to be used was selected to complement the Aboriginal fisheries while allowing fish to negotiate the weir. The rocks are arranged in a flattened 'stairwell' configuration to create a series of shallow steps and resting pools.



Earlier fishways were not well suited to Australian native fish behaviour. Photo: Phillipa Blythman



Modern fishways are custom designed to incorporate resting pools into areas where water has a high velocity, allowing the fish to use a burst of speed to progress upstream. Photo: Industry and Investment NSW.

References and further information

Breckwoldt, R., Boden, R. and Andrew, J. (eds). 2004. The Darling. Murray-Darling Basin Commission, Canberra.

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Disclaimer: The information contained in this publication is based on knowledge and understanding at the time of writing (November 2009). However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up-to-date and to check currency of the information with the appropriate officer of the Western Catchment Management Authority or the user's independent advisor.

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