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Image: Cover of Fishes of the Murray-Darling Basin (second edition) "Lintermans, M. 2023,

Fish in the Future of the Murray Darling Basin Plan

Murky waters running clearer?

Monitoring, reporting and evaluation of the state of the Murray–Darling Basin after more than three decades of policy reform

In late November the Wentworth Group of Scientists released a 'highly concerned' assessment of the success of the Water Act and expenditure of $13 billion of reforms and the Basin Plan to restore environmental water to the Murray Darling Basin in Marine and Freshwater Research 75 (2024) MF24193.

One of the 27 indicators in the report related to fish and aquatic life. They used data from the New South Wales Department of Primary Industries fish kill database to estimate frequency and magnitude of fish kills (>1000 individuals killed). The report showed, 'there is no evidence that the Basin Plan settings are associated with a reduction in the number of fish kills. The number of very large events appears to be increasing'. The data show between calendar years 1980 and 2023, the mean annual number of fish kills in the New South Wales Basin increased from 1.5 to 3.6. (During the period after the Basin Plan was implemented (2012–23), the annual number of events rose from 1.3 to 3.9, compared with an increase from 3 to 4.6 for the 12 years prior (2000–21). There have been six very large fish kills (>100,000 individuals) during the 2012–23 period, including the 2019–20 and 2023 kills at Menindee 15. (M. J. Collof et al. Lakes in New South Wales (Australian Academy of Science 2019; Sheldon et al. 2022; NSW Chief Scientist 2023), compared with only 2 in the 12 years prior. (Matthew J. Colloff, Kate Lanyon, Jamie Pittock, Milo Costanza-van den Belt, Sarah Wheeler, Quentin Grafton, John Williams, Fran Sheldon, Richard T. Kingsford, Gilad Binof, Luigi Renzullo and Bradley J. Moggridge)

Link for Fishes of the Murray-Darling Basin **(second edition) "Lintermans, M. 2023,** ***Fishes of the Murray–Darling Basin"*** **Australian River Restoration Centre, Canberra**

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Murray Cod (Maccullocella Peelii)

Stuart Rowland's *The Murray Cod* is an in-depth exploration of one of Australia's most iconic freshwater fish species. The book examines the Murray cod's biology, ecology, and cultural significance while offering a detailed account of the challenges it faces. The book serves as both a scientific resource and a passionate plea for the conservation of the Murray cod and its habitat. It balances technical information with accessible storytelling, making it an informative and engaging read for scientists, environmentalists, and nature enthusiasts alike.

The native fish fauna of the Barka-Darling River are in serious trouble, says Stuart Rowland. Since the 1980s, river regulation, expansion of large-scale irrigation and over-extraction of water, proliferation of the introduced fish Common Carp (Cyprinus carpio) and pollution have severely degraded the aquatic environment in the Barka-Darling. Symptoms of this degradation are reduced frequency and extent of flooding, loss of “pulses” of water from different tributaries, increasing periods of low/no flows, loss of macrophytes, extensive algal blooms, poor water quality, regular fish kills (often involving Murray Cod), declining numbers of native fish, increasing incidence of infectious diseases, and the functional loss of wetlands and floodplains.

The Murray cod is a national treasure and a barometer for the health of Australia's freshwater ecosystems. It plays the vital role of both a predator and a keystone species in maintaining balance within Australia's freshwater environments. The fish has deep roots in Australian history, particularly for Indigenous Australians, for whom it holds spiritual and practical value. It was also prized by early European settlers and remains a beloved species among recreational anglers. Rowland outlines the significant threats facing the Murray cod, including habitat destruction, river regulation, overfishing, pollution, and climate change.

The icon of the Murray-Darling River System (MDRS) the Murray Cod (Maccullocella Peelii), Australia’s most famous fish has declined dramatically and is now rare or absent from stretches of the Darling-Barka River.

These factors have contributed to population declines over the years. The book highlights the extensive research and conservation programs aimed at protecting and rehabilitating the species. This includes captive breeding initiatives, habitat restoration, and regulatory measures to reduce human impact on its environment. By focusing on the interconnectedness of the Murray cod and the health of Australia's river systems, Rowland emphasizes the broader need for sustainable environmental practices and ecological awareness.

For copies of The Murray Cod please contact stuthecodfather@gmail.com

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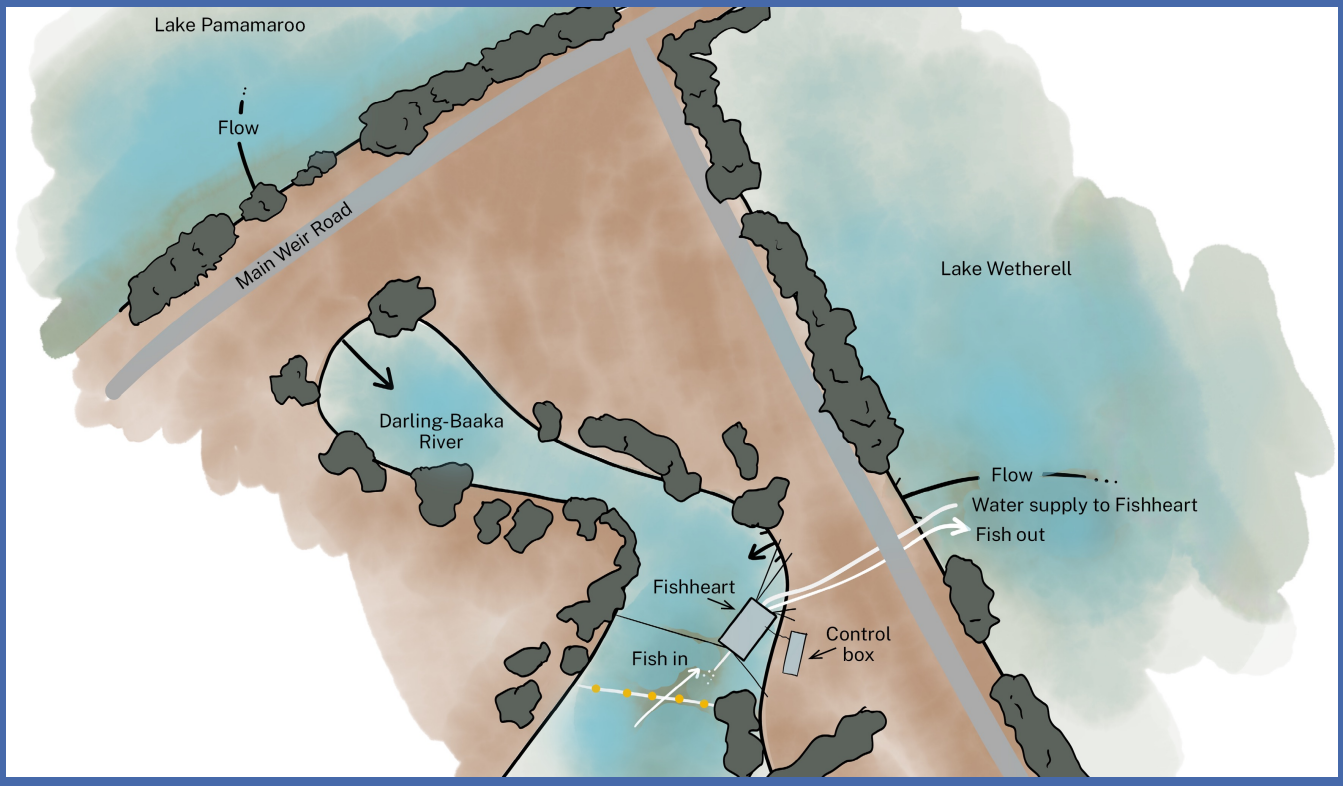

Tube Fishway Trial

In response to the Office of Chief Scientists and Engineer's Independent Review into the 2023 Mass Fish Deaths in the Darling-Baaka River at Menindee (Menindee Fish Deaths | Chief Scientist), the NSW Government committed $25 million to establish the Restoring the Darling-Baaka River Program. The NSW Government response committed to applying short-term technical fish passage solutions to create temporary opportunities for fish to migrate upstream as an immediate action in the first 12 months.

DPIRD Fisheries aims to trial tube fishway technology that can be easily and cost-effectively retrofitted to existing structures to enhance fish passage at the Lake Wetherell outlet within the Menindee town weir pool on the Lower Darling-Baaka River.

DPIRD Fisheries engaged Public Works to manage the procurement process for the Project's construction services and have worked with partner agencies including WaterNSW to progress, with community consultation commencing in August 2024 and continuing throughout the Project.

Fishheart Ltd were the successful supplier via an open tender process and the Fishheart unit will be fitted to the Lake Wetherell outlet regulator during the 2024/25 summer to help connect the northern and southern Basin.

The project will help move some fish out of the Menindee town weir pool to reduce biomass and help mitigate risks of further mass fish kills in the region, noting that this is novel technology currently untested at this scale in Australia and on native inland freshwater fish.

Image: NSW DPIRD-Temp tube fishway site birds-eye map

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FISH PASSAGE / RIVER RESTORATION SUCCESS STORY – FOUR MAJOR DAMS REMOVED IN USA.

The Klamath River Renewal Project in August 2024 completed final work to remove four major dams from the Klamath River, which flows from Oregon and through California. The Klamath River now flows freely from Lake Ewauna to the Pacific Ocean.

The largest such river restoration project in USA history has come in ahead of schedule and on budget. The massive project removed three hydroelectric dams and one non-generating dam.

The Klamath River, once the third-largest salmon-producing river on the USA West Coast, has faced drastic declines in fish populations since the construction of hydroelectric dams began in 1918. The river's blocked flow reduced water quality, increased temperatures, and made it nearly impossible for salmon and steelhead to complete their life cycles. Now, for the first time since 1918, an astonishing 676 kilometers (420 miles) of salmon habitat in the Klamath River watershed in California and Oregon will be fully connected.

Work will continue for several years restoring the 890 hectares (2,200 acres) of formerly submerged lands.

Already, the first salmon returning to the river has been sighted. In October, fish biologists at Oregon Department of Fish and Wildlife identified an autumn-run Chinook salmon in a tributary to the Klamath River, upstream from where the J C Boyle Dam once stood. It is the first anadromous fish (species that migrate from the sea upstream to spawn) to be seen in the state's Klamath Basin since 1912 – when the first of four hydroelectric dams were constructed.

You can find more information about the Klamath River Renewal Project on the website of the American Rivers Association (which has similar aims to the IRN) at https://www.americanrivers.org/dam-removal-on-the-klamath-river/

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ORIGINS OF THE DAM REMOVAL PROJECT

During a 2002 fish kill in the Klamath River, an estimated 30,000 to 70,000 salmon died when the U.S. Bureau of Reclamation diverted water to farms instead of letting it flow downstream. This catastrophic event catalyzed a movement to remove four dams which had choked the river for nearly a century.

This represents a major victory for the Klamath Basin tribes, the States of California and Oregon, and numerous environmental and fishing groups. The dams removal is the result of a historic decades-long Tribally-led campaign to free the Klamath River and restore salmon and steelhead populations, which are core to Native traditions and foodways.

California Governor Gavin Newsom helped convene leaders in 2020 to advance the restoration plan, pushed for the needed federal approvals, and returned land to the Shasta Indian Nation.

The Governor said “By taking down these outdated dams, we are giving salmon and other species a chance to thrive once again, while also restoring an essential lifeline for tribal communities who have long depended on the health of the river. This is proof of what’s possible when we come together to prioritize our environment, our people, and future generations.”

Yurok Tribal Chairman Joseph L. James said *“The tribally-led effort to dismantle the dams is an expression of our sacred duty to maintain balance in the world. That is why we fought so hard for so long to tear down the dams and bring the salmon.*

Iimage from Guardians of the River n this film by American Rivers and Swiftwater Films, Indigenous leaders share why removing four dams to restore a healthy Klamath River is critical for clean water, food sovereignty, and justice.

Piscis Podcasts

Undamned the Klamath River Story - Podcast

The largest dam removal in history is on the verge of completion on the Klamath River. This moment is the result of a historic decades-long Tribally-led campaign to free the Klamath River and restore salmon and steelhead populations, which are core to Native traditions and foodways.

Rheophilia – and BioScience Talks Podcast - about people, research, conservation and management of rivers. Associate Professor Paul Humphries interviews biologists, managers, conservationists about their careers, interests and love of rivers, and in doing so, hope to excite and educate the wider community.

The Golden Ticket: Understanding the role of flow on golden perch movement and population dynamics at a basin scale from the Commonwealth Environmental Water Holder