ARI Aquatic Quarterly Update

Autumn 2021

Translocating Macquarie Perch helps their recovery in the upper Buffalo River

A population of the endangered Macquarie Perch in the upper Buffalo River was significantly affected by the 2019/20 bushfires in north east Victoria. Months after the fires, rain flushed ash and debris into the river, causing sedimentation and damaging the instream habitat for fish.

To help support this population's recovery, 400 fish were translocated from Dartmouth Dam to this river near Dandongadale in May 2021. Most of the fish collected were small, which will reduce any impact their removal may have on the important Dartmouth population. Translocated wild fish can be more resilient to the risk of predation, which therefore can increase their likely survival compared to releasing hatchery bred fish. Fin clips samples from these fish will be analysed to help improve our understanding of the genetic diversity of this population and also guide management options.

These efforts are part of an ongoing program to improve the long-term survival of Macquarie Perch in the Buffalo River. This has included emergency fish salvage operations immediately after the fires, breeding programs, Willow eradication, riparian plantings, and fingerling stockings.

Fish release - PRIME7 ; DELWP media release

Many organisations and individuals work together to help Macquarie Perch in north east Victoria, including in the nearby Ovens River. This includes DELWP Hume region, ARI, the North East Catchment Management Authority, the Victorian Fisheries Authority, the Wangaratta Sustainability Network, Taungurung Land and Waters Council, Native Fish Australia and local landholders. Some of the recent efforts are part of the Vic Government's Bushfire Biodiversity Response and Recovery Program.

See the ARI website for more on recovering Macquarie Perch.

About us

The Applied Aquatic Ecology section aims to generate and share knowledge, through world-class, applied, ecological research, which supports and guides sustainable ecosystem policy and management to ensure healthy, resilient ecosystems. We work collaboratively with national, state and local agencies, research institutes, universities, interest groups and the community.

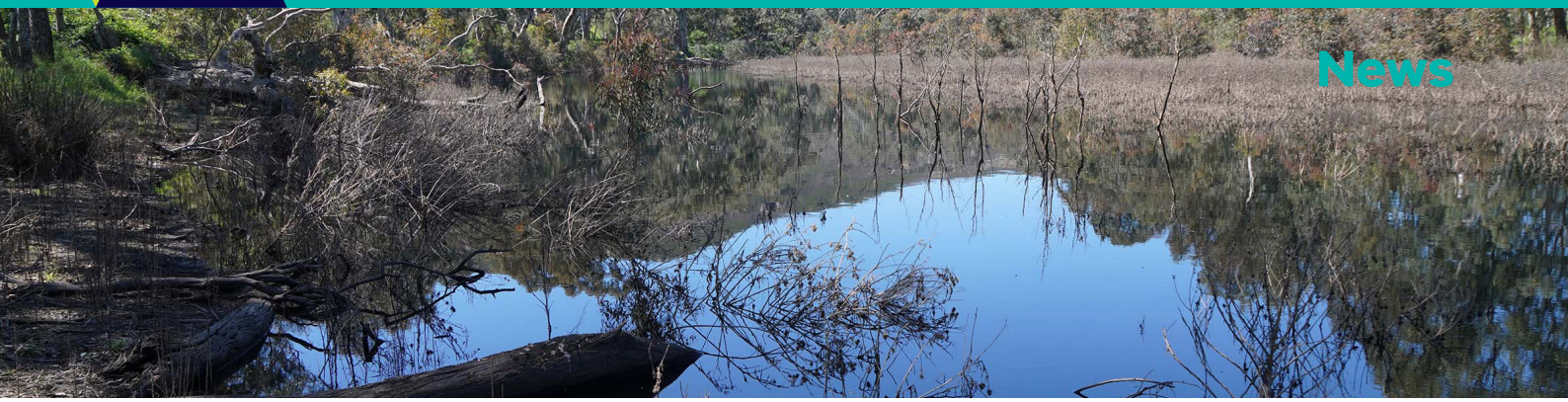
Juvenile Macquarie Perch

Fyke netting in Dartmouth Dam

ari.vic.gov.au

Arthur Rylah Institute for environmental research

VICTORIA State Government | Environment, Land, Water and Planning



News

ARI plays its part in the Victorian Murray Floodplain Restoration Project

The Victorian Murray Floodplain Restoration Project (VMFRP) is part of the Sustainable Diversion Limit program of the Murray-Darling Basin Plan. The VMFRP aims to restore high value wetlands and floodplains at nine Victorian sites along the Murray River floodplain in the Mallee and North Central CMA regions. This project will involve engineering works including levees, regulators, pipes and pumps to efficiently and effectively deliver water to focal wetlands and floodplains.

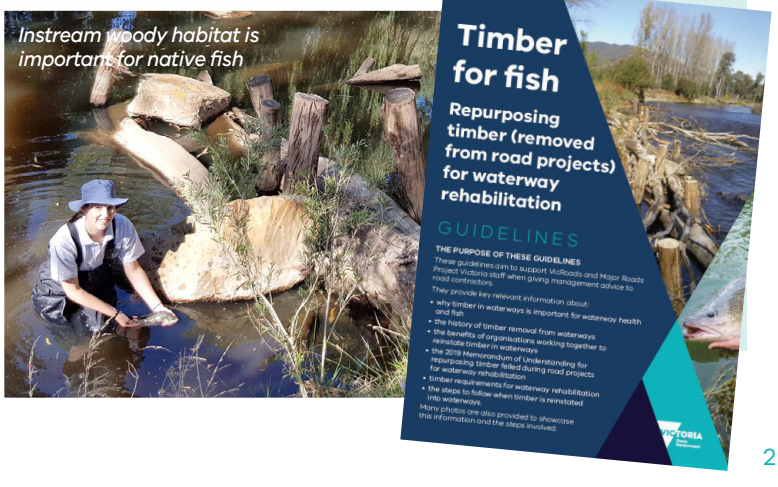
Monitoring, evaluation and reporting (MER) are central to the project. ARI recently led development of an Ecological MER Plan, through a combination of stakeholder workshops, a review of existing MER programs in the Basin, analysis of the project's objectives and targets, and input from experts on each targeted taxonomic group and ecosystem process. The Ecological MER Plan includes hydrology, vegetation, birds, fish, frogs, reptiles, bats, sugar gliders and planigales, carbon and other physico-chemical attributes. It also includes a prioritisation of prospective monitoring methods for objectives and targets, to assist decision-makers. VMFRP is also developing cultural and economic MER plans.

A floodplain habitat in the Mallee

The release of Timber for Fish Guidelines

Instream woody habitat (IWH) is important for waterway condition, ecosystem function and many fish species. Historically, IWH was commonly removed from waterways in south-eastern Australia as part of the old river management practices. In more recent times, its reinstatement is an integral part of rehabilitating waterways. Sourcing and transporting timber are a barrier to reinstating IWH. Fortunately, state authorities involved in managing roads, waterways, biodiversity and fisheries came together to enable repurposing timber felled during road projects for waterway rehabilitation.

In 2019, a Memorandum of Understand (MOU) was signed by VicRoads, Major Road Projects Victoria, DELWP, VFA, all CMAs and Melbourne Water. Guidelines have now been developed to support VicRoads and Major Roads Project Victoria staff when giving management advice to road contractors. They provide key background information, including the timber requirements for waterway rehabilitation, and steps to follow when reinstating timber into waterways.



Influencing Change

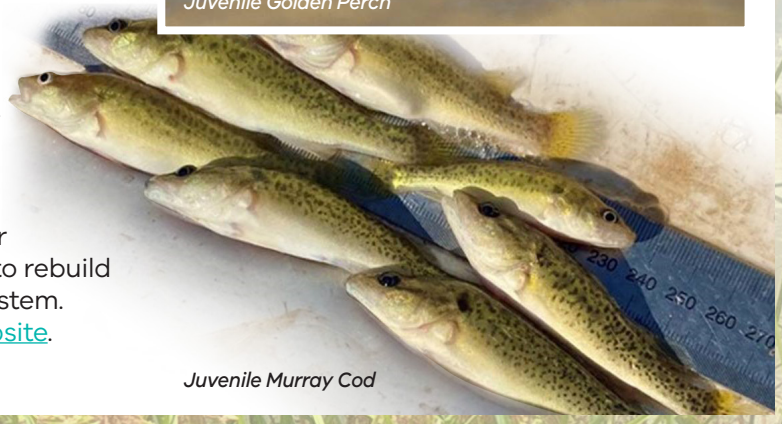
Influencing water management across State boundaries to benefit fish

The lower Darling River experienced two long cease-to-flow events in recent years (2015-16, 2018-20). The latter event led to catastrophic declines in water quality and major fish death events. From early 2020, rainfall in the northern basin made water available for an environmental flow to support recovery of native fish. In spring/summer 2020-21, a collaborative team, from NSW Environment Department, NSW DPI Fisheries, Commonwealth Environmental Water Office (CEWO) and the Arthur Rylah Institute planned an environmental flow using the latest understanding of fish ecology.

Juvenile Golden Perch

Monitoring of the environmental flow found spawning, recruitment, dispersal and survival of several native fish, including Murray Cod and Golden Perch. The results for Murray Cod were particularly good, with up to 30% of fish collected born during the 2020-21 environmental flow.

This work provides an adaptive management template for other areas across the MDB, to support post fish-death population recovery. It also demonstrates the value of strong collaborations among state and federal water managers, and the community stakeholders to rebuild the resilience of the lower Darling River ecosystem. The final report is available on the CEWO website.



Juvenile Murray Cod

Providing advice on the Goulburn River and inter-valley transfers (IVT)

Several years of high inter-valley transfers (IVT) of water (2017-18 and 2018-19) resulted in significant ecological effects to the lower Goulburn River. This prompted a review of the Murray-Goulburn trade rule to ensure the ecological condition of the river was protected. This review process, led by Woodwater consultants, included the formation of a scientific panel to provide advice on the ecological risks and opportunities for the lower Goulburn River. The panel considered different flow scenarios to delivery various volumes of water to the Murray River as IVTs. The scientific panel was selected to provide advice on outcomes regarding geomorphology (or channel condition), vegetation and native fish species. ARI contributed expertise on vegetation and fish.

Monitoring Water Pepper (Persicaria hydropiper) and Tall Flat Sedge (Cyperus exaltatus) along the fringes of the Goulburn River

Tall Flat Sedge (Cyperus exaltatus) setting seed along the fringes of the Goulburn River

Outputs

- Koster et al. (2020). Environmental influences on migration patterns and pathways of a threatened potamodromous fish in a regulated lowland river network. Ecohydrology.
- Yen et al. (2021). Underlying trends confound estimates of fish population response to river discharge. Freshwater Biology.
- Lutz et al. (2021). Using multiple sources during reintroduction of a locally extinct population benefits survival and reproduction of an endangered freshwater fish. Evolutionary Applications.
- Shelley et al. (2020). Revision of the genus Hannia (Teleostei, Terapontidae), with description of a new species, Hannia wintoni, from the Kimberley, Western Australia, Zootaxa.
- Ayres, R. and Vollebergh, P. (2020). Angler Riparian Partnerships Program - State-wide achievements in 2019/20 and program finale, Fact Sheet.

PLEASE NOTE that this Update incorporates activities during the COVID-19 pandemic. Any fieldwork and presentations undertaken by ARI during this time have aligned with government protocols.


eDNA sampling


Silver Perch


Monitoring vegetation in Carp exclosure plot


Riparian habitat along the Campaspe River

Knowledge transfer

Presentations and meetings: 10ASM Conference: Enhancing native fish populations using environmental flows: a synthesis of outcomes from the Victorian Environmental Flow Monitoring and Assessment Program (Tonkin); Quantifying the impacts of Carp and waterbirds on aquatic vegetation within a regulated lowland river (Jones); Influencing management and sharing our findings: communication and engagement efforts within the Victorian Environmental Flows Monitoring and Assessment Program (Clunie).

Lower Darling river environmental flows: fish outcomes (Stuart) for Commonwealth Environmental Water Office; SWIFFT seminar on crossings - Fish passage (O'Connor); Floodplain ecology course - Fish and floodplains (Tonkin) – GBCMA; Victorian native fish species - snapshot of Diamond Creek (Sharley) Melbourne Water/Nillumbik Shire Council.

River Basin Management Society (RBMS) podcast – An update on the bushfire recovery – how are our aquatic biota fairing (Lyon)

Interest in our eel research continues: On the tail of the eel (ABC news); Eel tagging; Tagging reveals migratory movements (ABC Landline); 3MDR radio interview about eel migration; River Basin Management Society (RBMS) podcast – An eel good story – Tracking eels on a journey of a lifetime (Koster).

Interest in our Carp biomass report also continues: radio interviews with ABC South West, , ABC Riverina, ABC Broken Hill, ABC Country Hour and the Sunraysia Daily (Stuart)

Work that ARI has been involved in has also been shared by our collaborators: The hunt for the Glenelg Freshwater Mussel (video); Using environmental DNA to locate the Glenelg Freshwater Mussel (video) - GHCMA

PLEASE NOTE that during COVID-19 restrictions, presentations have been given remotely via online platforms.