

# ARI Aquatic Quarterly Update

WINTER 2024



Brolgas

## About us

The Arthur Rylah Institute for Environmental Research aims to generate and share knowledge, through world-class, applied, ecological research. This research 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.

## Leading the way to better understand our iconic endangered Brolga

An expert team brought together by ARI has had huge success in the Goulburn Broken catchment, with five adult Brolgas captured, tagged with solar-powered GPS/GSM tracking devices and safely released. The species is incredibly hard to capture, requiring days of reconnaissance, plenty of patience and some help from taxidermic decoy Brolgas! The transmitters being used have real time technology which can be shared instantly through the mobile data network straight to devices.

Information gathered includes weights, photographs of wings to assess moult stage, blood (for genetic assessment) and feather samples. In addition to the lightweight transmitters, colour bands were placed on each Brolga for field identification purposes.

Research on the iconic, culturally significant and endangered Brolga is funded by the Wetland Monitoring and Assessment Program for environmental water ([WetMAP](#)). It is the first time birds from this potentially isolated population in northern Victoria have been captured and tagged.

A knowledge gap has been identified regarding how environmental water can be delivered to enhance populations of this species. This waterbird [tracking study](#) will provide valuable insights to support the species' conservation by identifying landscape-scale movements, finding breeding locations and gaining an understanding of the environmental characteristics that determine a successful breeding location. This information can inform seasonal and annual watering decisions to benefit the species.

Tracking of the five Brolga will continue over the next few years. So far, data has shown multiple flight paths within local areas and two up to 50km from the original tagging location. This work has been a collaboration between ARI, Biosis and the Goulburn Broken Catchment Management Authority.





### Have you ever heard of the Kooyang?

The Budj Bim Cultural Landscape ([BBCL](#)) is an area with significant cultural and biodiversity values located in south-western Victoria. In 2019, it became only the second site in Victoria to be included on the World Heritage List. The reason: Kooyang (Short-finned Eel).

Surveys in February 2024 were undertaken at the BBCL to record a range of migratory native fish species (eels, galaxiids and Tupong) and non-migratory native fish species (Southern Pygmy Perch and Flat-headed Gudgeon). These data will be used to assess and benchmark fish populations and will be vital to inform conservation management of ecological values in the future.

The surveys were the result of a monumental collaboration between Gunditj Mirring Traditional Owner Aboriginal Corporation, Winda-Mara Aboriginal Corporation and ARI.

ARI scientists had the opportunity to learn more about the significance and value of Kooyang and the BBCL from Traditional Owners. The collaboration included field-based training of Traditional Owners and Budj Bim ranger staff to enhance skills and knowledge in ongoing ecological management, using field survey techniques such as netting and electrofishing. This work contributes to the department's [Self-Determination Reform Strategy](#) by transferring decision-making powers to Traditional Owners on environmental monitoring planning at the BBCL.

Monitoring of both juvenile and adult Kooyang will also be conducted over the coming months to determine population density of Kooyang in Tae Rak (Lake Condah).

ARI has a long history of studying the ecology and movement patterns of eels in Victoria. You can find further information on our eel research [here](#).



*Budj Bim rangers measuring eels*



*A Traditional Owner checking a fyke net*

"...it contains one of the world's oldest and most extensive aquacultural systems designed to trap, store and harvest Kooyang."

– UNESCO World Heritage Listing

*Setting fyke nets in Tae Rak (Lake Condah)*



## Victoria's newest Conservation Hatchery is open for business

Construction is complete on the new \$2.7m conservation facility at the Snobs Creek Hatchery which will support the [10 in Ten](#) captive breeding program to restock and recover 10 threatened freshwater species in ten years.

An official opening of the new facilities at the Snobs Creek Hatchery was held in early May featuring a welcome to country and smoking ceremony led by Taungurung Land and Waters Council's (TLaWC) Shane Monk as part of the proceedings. The Minister for Environment and Outdoor Recreation (the Hon. Steve Dimopoulos), State Labor Member for Northern Victoria (the Hon. Jaclyn Symes) and a range of project partners toured the new facilities to learn how populations of threatened fish, crayfish and mussel species will benefit from this initiative.

Captive breeding and ex-situ management of these threatened species will complement research and interventions such as habitat improvement, water for the environment and translocations.

This will ensure maximum ecological benefit is achieved from these important investments, an important step in helping to secure the future of Victoria's native freshwater species for generations to come.

Scientists at ARI will continue working alongside the Victorian Fisheries Authority's (VFA) conservation hatchery team to 'crack the code' on breeding the 10 key threatened species. Recent success has included raising juvenile Murray Spiny Crayfish that were then released to the wild.

This project has been funded by contributions from multiple Victorian and Commonwealth governments, including DEECA, VFA, the Victorian Environmental Water Holder (VEWH), the Department of Climate Change, Energy, the Environment and Water (DCCEEW) and the Victorian Government's flood recovery program.

## News



A crayling raised at the hatchery



Shane Monk (TLaWC) and Tim Fernando (ARI)



Sam Fawke (VFA) and Jarod Lyon (ARI) holding craylings

Inside the conservation hatchery



## Influencing Change

### Let's talk Maccas!

Macquarie Perch are a nationally endangered species that have declined across their range in the Murray-Darling Basin. In Victoria there are fragmented populations in the Mitta Mitta, Ovens, Goulburn and Broken river catchments, and a translocated population in the Yarra River. Most remaining populations have a low genetic diversity and small population size, putting them at risk of inbreeding depression and an inability to adapt to threats posed by climate change.

Funding provided by the Victorian Government's flood recovery program has enabled researchers to implement some of the key actions listed in the species' [Victorian Action Statement](#) and [National Recovery Plan](#) in response to the impacts of the 2022/23 flood event that degraded habitat and impacted recruitment.

In early 2024, ARI scientists translocated 22 Macquarie Perch between known wild populations with the aim of bolstering genetic diversity and avoiding inbreeding.

More recently, ARI scientists translocated 96 juvenile Macquarie Perch from Lake Dartmouth, a self-sustaining strong population, to the Kiewa River, where the species hasn't been recorded for 85 years! A community field day was held for the release, with 30 people in attendance. The next steps include supplementing the new Kiewa River population with captively bred juveniles (stocking), through the [10 in Ten](#) program at the new conservation facilities at the Snobs Creek Hatchery. This will create a mixed age structure, and hopefully replicate the actions taken in the nearby Ovens River, which has previously been successful in establishing a new self-sustaining population of Macquarie Perch.

This work forms part of a long-term recovery strategy for the species, to improve the genetic diversity of populations and enhance their resilience when facing extreme events into the future. It also complements the various research, habitat improvement programs and breeding efforts underway to [support the species' recovery](#). This work is in partnership with the North East Catchment Management Authority, Goulburn Broken Catchment Management Authority, Victorian Fisheries Authority and Monash University, with support provided by a number of community groups.



Macquarie Perch release



Community members involved in the release



Adult Macquarie Perch



## Influencing Change

### Gaining consistency across projects

Many monitoring programs use different survey methods, which makes it difficult to conduct large scale studies. It is much easier and more effective to evaluate management outcomes when monitoring data are equivalent.

A considerable amount of effort has been made within ARI to use consistent monitoring methods across different wetland monitoring projects. This is highlighted by the application of standard approaches for understorey vegetation and lignum surveys.

ARI is currently working on a project to align survey methods of on-ground vegetation surveys across sites within The Living Murray program ([TLM](#)) and the Victorian Murray Floodplain Restoration Project ([VMFRP](#)). The standardised methods would also be applied to the Wetland Monitoring and Assessment Program for environmental water ([WetMAP](#)). A standardised approach would simplify data collection and analysis, and allow data-sharing across projects to enable large-scale evaluation of management outcomes. This will greatly improve the useability of the data and increase value for multiple programs.

Additionally, a new survey method devised by the University of Canberra for lignum vegetation communities in the TLM program has been adopted by ARI for VMFRP and WetMAP surveys to ensure consistency of methods and the ability to compare outcomes across programs. The method uses drones to collect spatial imagery of lignum plant communities which is run through a built for purpose model that can quantify lignum extent and condition in broad classes.

This important work is providing valuable insights into the response of wetland and floodplain vegetation communities to water for the environment. Preliminary results from the surveys suggest a positive difference to lignum communities in wetlands that receive environmental water compared to others that don't.

Further monitoring and analysis are continuing for each project.



Hird Swamp drone survey



University of Canberra drone testing



Hird Swamp



## Publications

- [Amtstaetter et al. \(2023\)](#) Fishways provide catchment-scale improvements to common galaxias (*Galaxias maculatus*) upstream of a barrier in south-eastern Australia. New Zealand Journal of Marine and Freshwater Research.
- [Fanson et al. \(2023\)](#) Assessing impacts of notorious invader (common carp *Cyprinus carpio*) on Australia's aquatic ecosystems: Coupling abundance-impact relationships with a spatial biomass model. Biological Conservation.
- [Stuart et al. \(2023\)](#) Escaping the dry: Native and non-native fish outmigration from a receding floodplain following managed inundation. Freshwater Biology.
- [Todd et al. \(2023\)](#) Modelling the response of common carp (*Cyprinus carpio*) to natural and managed flows using a stochastic population model. Biological Invasions.
- [Klunzinger et al. \(2024\)](#) Freshwater mussels of Australia and captive breeding trials for *Hyridella glenelgensis* Australia's rarest freshwater mussel, Tentacle.
- [Deng et al. \(2024\)](#) Soil moisture influences the root characteristics of a herbaceous riparian plant along a regulated river. Plant Ecology.
- [Koster et al. \(2024\)](#) Diel patterns of habitat use and movement by juvenile and subadult trout cod (*Maccullochella macquariensis*) in a regulated lowland river. Marine and Freshwater Research.
- [Koster et al. \(2024\)](#) Factors influencing migration of short-finned eels (*Anguilla australis*) over 3 years from a wetland system, Lake Condah, south-east Australia, downstream to the sea. Journal of Fish Biology.
- [Raymond et al. \(2024\)](#) Understanding the effects of egg loss from fisher handling to improve conservation of a threatened freshwater crayfish (*Euastacus armatus*). Marine and Freshwater Research.
- [Shanafield et al. \(2024\)](#) Australian non-perennial rivers: Global lessons and research opportunities. Journal of Hydrology.

## Knowledge transfer

### Presentations:

- [ARI seminar](#): Managing riverine vegetation with flows: what we know and what's next (Jones);
- [Society for Ecological Restoration](#) conference: A multi-site evaluation of riparian vegetation responses to common management interventions (Mole), Managing livestock grazing regimes to optimise wetland biodiversity in agricultural landscapes (Morris);
- [Australian Society for Fish Biology](#) conference: Towards adaptive management for the reintroduction of a wetland specialist fish (Wootton), Using empirical data to validate and update population models: a case study using a model for Golden Perch (Wootton), The ripple effect of predator removal: results from a five-year trout removal trial in a mountain stream (Lieschke);
- [Wise Waterways](#): What fish want (Lyon);
- Aboriginal Cultural Capability Awareness Program: On the tail of the eel – creatures of mystery (Koster);
- International Freshwater Sciences conference: Evaluating the effects of environmental water on fish populations in the Murray-Darling Basin (Hladyz);
- Ecoacoustics conference: Detecting cryptic bird species via call data along the Murray River floodplains (Kulich);
- [Native Fish Forum 2024](#): Carp control with and without the virus – what are the options? (Lyon).

**Community events:** [Upper Barwon River community event](#) and electrofishing demonstration; [Mullinmur Wetland stakeholder event](#) and fish netting demonstration; [Kiewa River Macquarie Perch translocation](#) community field day; [Snobs Creek Hatchery open day](#).

### A selection of work that ARI has been involved in that has also been shared by our collaborators and via news channels:

[Kneel before the eel](#) (ABC radio interview with Wayne Koster); [Pygs are Flying! Southern Pygmy Perch Recovery in the Mid-Murray](#) and [Gaining some mussels – New developments in Glenelg Freshwater Mussel breeding](#) (Finterest); [Saving Australia's native fish](#) (Podcast – Australian River Restoration Centre); [NFRS surveys](#) (WGCMA); [VEFMAP surveys](#) and [VEFMAP fish surveys](#) (CCMA); [Look! It's a M-Uber \(a Mussel Uber\)](#) and [Carp removal](#) (GHCMA); [Growing mussels, Conservation Hatchery, Conservation Hatchery craylings, Southern Purple Spotted Gudgeon, Broodstock collection and Macquarie Perch recovery](#) (VFA); [WetMAP waterbirds, Purple Spotted gudgeon stocking, Flow-MER surveys, King Parrot Creek survey](#) and [WetMAP Brolga tagging](#) (GBCMA); [Gunditj Mirring fish monitoring training](#) (Gunditj Mirring); [Ovens River NFRS, Upper Ovens flagship monitoring, Bushfire recovery](#) and [Bringing back the Maccas](#) (NECMA); [Upper Barwon fish surveys](#) (Barwon Water).

We acknowledge Victorian Traditional Owners and their Elders past and present as the original custodians of Victoria's land and waters and commit to genuinely partnering with them and Victoria's Aboriginal community to progress their aspirations.



The State of Victoria Department of Energy, Environment and Climate Action 2024.  
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