



Lower Murray Newsletter

Issue 11 – January to March 2022

Welcome to Issue 11 of the Lower Murray newsletter where we provide updates on our work monitoring ecological responses to Commonwealth environmental water delivery in the Lower Murray

In this issue, you will find:

- Project updates
- Wrapping up 2021/22 field work
- Silver perch spawning and recruitment
- Engagement and Communication
- What's next?



Fyke net



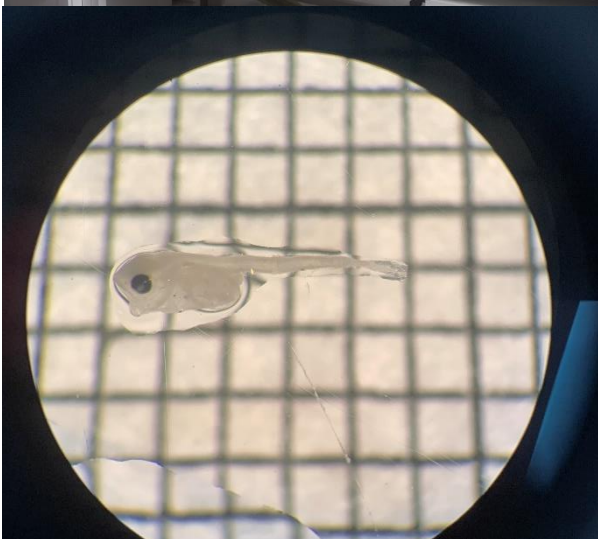
Friendly visitor



Frightening visitor

Project Updates

- The Lower Murray research team has been wrapping up reporting for the 2020/21 sampling season. Both the summary and technical reports will be published in June.
- Our field teams have now mostly completed field work for the 2021/22 season. Over spring–summer, flow in the Lower Murray River was elevated, but below flood level, for the entire period. Focus will now shift to laboratory activities for several indicators including *microinvertebrates* and *flow-cued spawning fish recruitment*. Fish samples have been sorted and identification has commenced. Excitingly, golden perch eggs and larvae have been observed during sorting and larvae appear to be in their highest abundance since this project commenced in 2014.



Samples being sorted under magnifying lens and stored for identification (top). Early-stage golden perch larvae under the microscope (bottom). Photo credit: SARDI.

- Fyke net and electrofishing sampling for the *Fish Assemblage* indicator occurred from March–May 2022. Young-of-the-year (YOY, less than 100 mm) golden perch were detected in good numbers, demonstrating strong recruitment of this native species for the first time in years (we will have more information on this outcome in the next issue!). Some YOY silver perch were also found. Small-bodied species, including carp gudgeon and Murray rainbowfish, were sampled in low abundance relative to previous years, potentially as a consequence of elevated flows. Native bony herring were by far the most abundant species in the Lower Murray, while common carp, specifically juveniles less than 200 mm in length, were also recorded in their thousands, indicating strong recruitment for this non-native species.



Carp gudgeon (top) collected by fyke net and juvenile golden perch (bottom) sampled by electrofishing in the Lower Murray River. Photo credit: SARDI.



- Targeted electrofishing for Murray cod conducted in January, February and May 2022, detected only low numbers (less than 5) of YOY Murray cod, suspected to have been spawned in spring 2021. Nonetheless, the broader Murray cod population was sampled in moderate–high numbers relative to past years, with fish likely to be 2+ years old (300–400 mm) and spawned in spring 2019, dominating the population.

Silver perch spawning and recruitment

Similar to golden perch, silver perch are considered to be a flow-cued spawning species. In the Lower Murray River (LMR), spawning is commonly associated with elevated flow either in-channel (e.g. >20,000 ML/day) or overbank (>45,000 ML/day) that coincides with increases in water temperature >17°C. Despite associations between elevated flow and spawning in the LMR, silver perch appears to reproduce each year in some of the lotic (flowing) reaches of mid-Murray River.

The year 2020-21 was a hydrologically dry year in the LMR. The total annual discharge volume at the South Australian border was 3,084 GL, about two-thirds of the twenty-year average (4,730 GL/year), with daily discharge peaking at 17,900 ML/day.

Despite relatively low flow, substantial numbers of silver perch larvae (142), which were rarely present in samples from previous years, were collected in the LMR during spring–summer of 2020-21. The silver perch larvae sampled had a range of sizes and were most abundant in samples below Lock 6. All silver perch larvae sampled had their ear-stone (otolith) removed for assessment of age and time and place of spawning. To determine the place of spawning, the strontium isotope ratios ($^{87}\text{Sr}/^{86}\text{Sr}$) of otoliths were compared with those from water samples collected throughout the southern Murray-Darling Basin.



Late-stage silver perch larvae collected at lock 6, Lower Murray River. Photo credit: SARDI.



Silver perch otolith mounted on slide ready for daily ageing. Photo credit: SARDI.

The results demonstrated that silver perch larvae collected in the LMR in 2020-21 were spawned from 18 November 2020 – 2 January 2021 and originated predominantly from spawning in the lower part of the mid-Murray. Flows in the mid-Murray are likely to have supported the spawning of silver perch and downstream larval drift into the LMR.

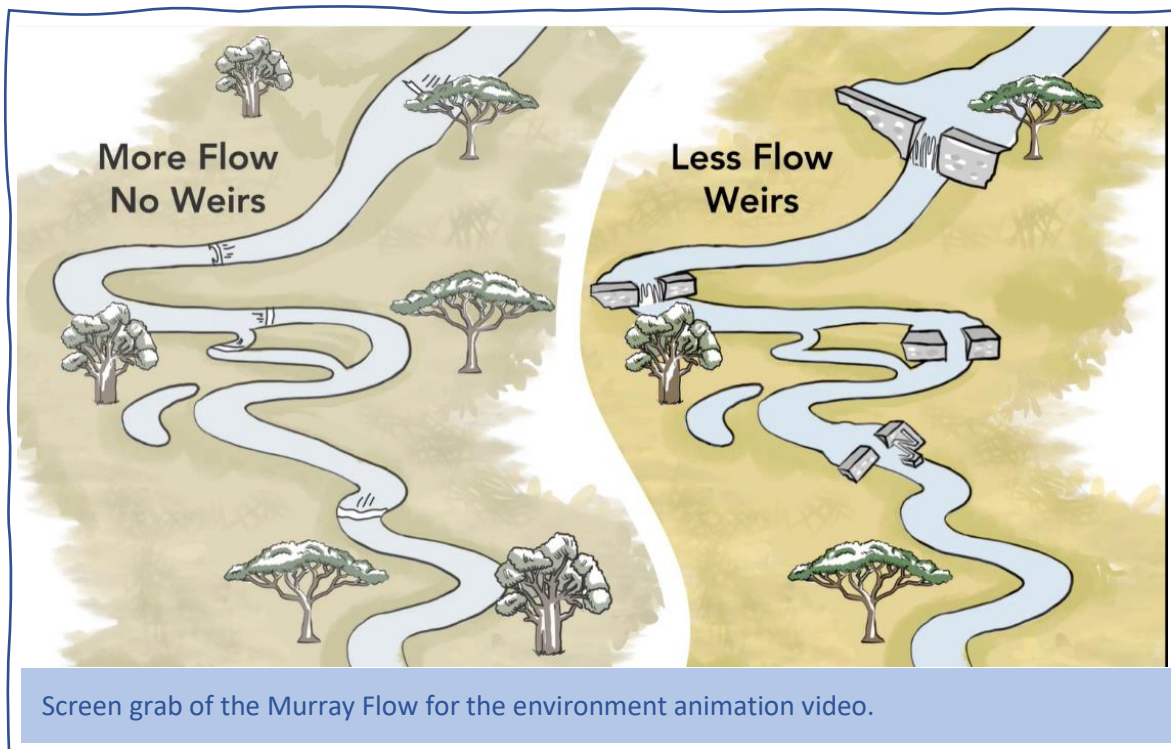
Despite high numbers of larvae, YOY silver perch were not detected in autumn 2021. Nonetheless, during 2022 electrofishing, our team found juvenile silver perch likely to be 1+ years of age and derived from the spawning event detected in 2020-21. While finding silver perch larvae in the LMR is encouraging, signs of these young fish surviving and growing into older age classes (i.e. 'recruitment') are the true indication of ecological outcome in response to flow regimes and promote longer-term resilience in the population.



Juvenile silver perch larvae collected by electrofishing in the Lower Murray River. Photo credit: SARDI.

Engagement & Communications updates

- The “Murray Flow for the environment” animation video is now publicly available on the Flow-MER website, following on from the success of the “Flow and fishes of the Lower River Murray” animation video. This latest animation explains how our monitoring is building the understanding of why flow is important for restoring the health of the Lower Murray Selected Area.
- Another video, “Restoring flows to the Lower Murray”, will soon be released. It builds on our earlier “Sharing our science” video, showcasing the field sampling methods, laboratory techniques and computer-based modelling used by the Lower Murray team to monitor the effects of Water for the Environment on plants and animals of the Lower Murray.



What's next

During the April–June quarter, the Lower Murray field teams will be wrapping the last sampling trips for the 2021-22 season. Following this, the team will tackle the large number of samples brought back to our laboratories. This includes identification of microinvertebrate and larval fish samples, dissecting and removing ear stones (otoliths) from juvenile and adult fish samples and preparing otoliths for assessment of age and natal origin (particularly the native perch species). The next Selected Area Working Group meeting is planned to occur in late June.

We are also excited about our next Indigenous Ecology in Action workshop with years 7/8 students from Renmark High School, which is planned to be held on the 21–22 June, at Calperum Station.

For more information about the work we do, visit our webpage <https://flow-mer.org.au/selected-area-lower-murray/> and follow us on social media and <https://twitter.com/FlowMERprogram>



Lunch time and break from electrofishing at the margins of the Lower Murray River. Photo credit: SARDI.

