

Edward/Kolety-Wakool system Environmental Flows Newsletter

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Edward/Kolety-Wakool Monitoring, Evaluation and Research Program



Juvenile river blackfish (*Gadopsis marmoratus*) caught during juvenile fish recruitment surveys in February 2023 (Photo: John Trethewie).

What's in issue 15

End of the 2022 flood event in the mid-Murray River

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Camera network capturing time series of inundation patterns in Werai Forest

Welcome to issue 15 of the Edward/Kolety-Wakool Environmental Flows Newsletter - a quarterly newsletter that provides an update on our progress as we monitor and undertake research on the ecosystem outcomes of Commonwealth environmental watering actions in the Edward/Kolety-Wakool system.

The Edward/Kolety-Wakool Flow-MER Program is a collaboration between universities, state government agencies, consultants, and local community organisations.

More information on the program can be found at: <https://flow-mer.org.au/selected-area-edward-kolety-wakool/>



End of the 2022 flood event in the mid-Murray River

Throughout the second half of 2022 there were unregulated flows and extensive flooding in the rivers and creeks in the Edward/Koety system (see [newsletter #14](#)). The discharge downstream of Stevens Weir on the Edward/Koety River remained above 2700 ML/d (the discharge at which water commences to flow into Werai Forest via the Tumudgery Creek regulator) for approximately six months from 1 June 2022 through to 1 January 2023 (Figure 1).

A fresh in June/July 2022 was followed by another event commencing in mid-August. The discharge and water levels continued to gradually rise over several months, peaking at the gauge downstream of Stevens in late November followed by a relatively rapid recession during December (Figure 1). This pattern of flows contrasts with the hydrology at this gauge between July 2021 and June 2022, when there was a sequence of flow peaks all less than 9500 ML/d. From mid-January through to 30 March 2023 the discharge downstream of Stevens Weir was less than 2700 ML/d.

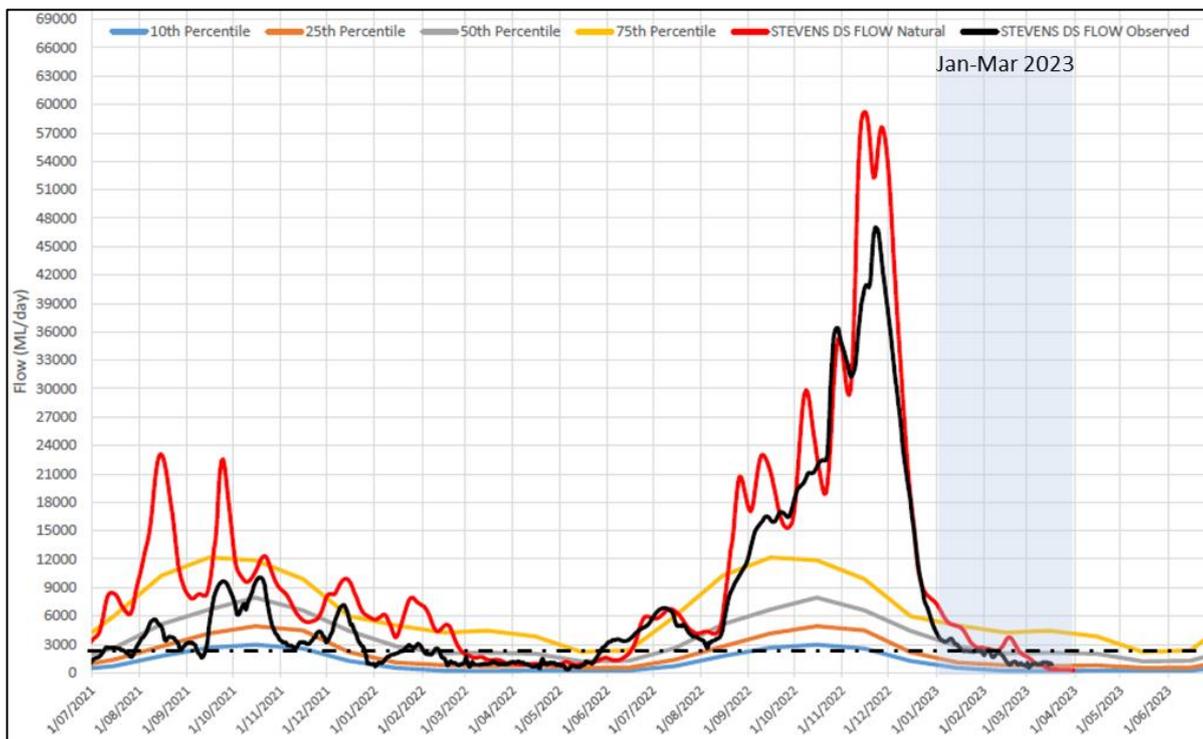


Figure 1 Hydrograph showing observed and modelled natural daily discharge in the Edward/Koety River from 1/7/2021 to 23/3/2023 at the Downstream Stevens Weir gauge. Black line shows the recorded flow downstream of Stevens Weir. The red line is the modelled natural discharge. (Source: MDBA). The dotted black line indicates the discharge of 2700 ML/d at which water commences to flow into Werai Forest via the Tumudgery Creek regulator.

Photos from the 2022-23 flood and beyond

Here is a small collection of photos taken by field staff during the flood in spring and summer 2022 and into the early months of 2023.

During the flood water spread out everywhere in ephemeral creeks and flood runners such as Shaw Creek (Figure). After some time the floodwater triggered a boom in wetland plants on the floodplain, in some places there were large fields of nardoo (*Marsilea drummondii*) (Figure) and swamps full of water ribbons (*Triglochin sp.*) (Figure). In addition to this floodplain habitat there were booms in the populations of other animals, such as various frogs (Figure a) and reptiles, and an explosion in the numbers of dragonflies with the casings of their larvae seeming to cover every hard surface emerging from the water (Figure). The water also caused serious damage to both public and private infrastructure forcing road closures (Figure).



Figure 2 Shaw Creek flowing through paddocks near Wakool Reserve during spring 2022 (Photo: John Trethewie).



Figure 3 Fields of nardoo on the floodplain adjacent to the upper Wakool River (Photo: John Trethewie).



Figure 4 Off stream wetland and floodplain dominated by water ribbons (*Triglochin* sp.) adjacent to the upper Wakool River (Photo: John Trethewie).



Figure 5 Left: Spotted marsh frogs on a track near the Niemur River. Right: Larval dragonfly (mudeye) casing dried on tree trunk (Photos: John Trethewie).



Figure 6 Cooley Hoo Creek cutting through Brassi Road (Photo: John Trethewie).

Juvenile Fish Recruitment Survey

Throughout February 2022 we conducted the annual juvenile fish recruitment surveys. Sites throughout the Wakool River and Yallakool Creek were first surveyed using boat electrofishing in conjunction with NSW Fisheries staff to target juvenile Murray cod and golden perch. Once the electrofishing was completed, CSU staff returned to the sites to use baited setlines and angling to target juvenile silver perch, as that species can be evasive to electrofishing methods.

This is the second time since the monitoring of recruitment commenced in 2014 that the fish recruitment survey has taken place after a large flood (2016 & 2022). The results of the monitoring in February 2023 were similar to those after the 2016 flood; juvenile Murray cod almost absent from the system following the major disturbance.

For the second year in a row juvenile golden perch (Figure 7) were captured during electrofishing operations, having not been detected during surveys undertaken from 2014 to 2021. Golden perch are likely to be migrants into the system having been spawned elsewhere in the Murray-Darling Basin and moved into the Wakool to use it as a nursery to feed and grow. Maintaining connectivity in the system and with other parts of the mid-Murray will create conditions that will enable golden perch to continue to move into the Wakool system in the coming years and boost the local population.

River blackfish are not a specific target of the fish recruitment surveys but have been showing up at more and more sites each year. This year, river blackfish were found in both the Wakool River and Yallakool Creek, with both juveniles (Figure 7) and adults being captured. This suggests that they were able to spawn and recruit successfully despite the flood. Although they are not a well-known species or important as an angling target, the presence of a healthy self-sustaining population is a positive sign for the overall health of the ecosystem.



Figure 7 Left: A juvenile golden perch captured while electrofishing in the Wakool River. Right: A juvenile river blackfish captured while electrofishing in the upper Wakool River (Photos: John Trethewie).

Unfortunately, the flood triggered a huge spawning event of European carp, and incredibly high numbers of juveniles were observed while electrofishing (Figure 8). Even when not electrofishing, schools of small carp could be seen swimming just below the surface, and their behaviour suggested there is high competition for food as they were attempting to eat anything floating on the surface including gum leaves and sticks.



Figure 8 Huge numbers of juvenile carp were observed during electrofishing operations (Photo: John Trethewie).

These huge numbers of carp meant the monitoring using bait fishing with setlines and angling was very challenging this year, as the baits would be taken by carp as soon as they hit the water. Despite this, both juvenile and adult silver perch (Figure 9) were captured at several sites, although in lower numbers than last year. However, the numbers of these species are most likely higher than the survey indicates, as extreme competition for food amongst carp would have affected the results. All the silver perch encountered were in great condition and the wide spread of sizes suggest there is a strong, healthy population in the Wakool system. Adult Murray cod, including some large ones (Figure), were present at many of the survey sites which is a promising indication that breeding stocks were not as heavily impacted by the flood in 2022 as they were in 2016.



Figure 9 Left: John Trethewie releasing a juvenile silver perch in the Wakool River (Photo: Margrit Beemster). Right: A large adult silver perch taken as by-catch angling in Yallakool Creek (Photo: John Trethewie).



Figure 10 John Trethewie with a large adult cod captured electrofishing in the Wakool River (Photo: Duncan McLay).

Camera network capturing time series of inundation patterns in Werai Forest

Cameras installed in the field can provide a valuable source of monitoring information. Field cameras are often used to study wildlife, enabling animals to be photographed in their environment in the absence of humans. The Edward/Kolety-Wakool Flow-MER team are using a network of field cameras around the Edward/Kolety-Wakool system to monitor changes in water levels at field sites. They are usually installed on tree trunks or fence posts, aimed at a particular spot of interest, and are then programmed to take photos several times each day.

In 2021, just prior to when the unregulated flows commenced in July, a network of field cameras was established in Werai Forest to monitor changes in water levels in the forest and in flood runners. These cameras have taken photos every day between July 2021 and March 2023, over the period when Werai Forest was inundated many times and it was not possible to access the forest for much of this time. The sequence of photos taken by the cameras provides a record of the wetting/drying regimes at field sites and information about when flood runners commence or cease to flow. These photos are a valuable source of information and will be used by the Commonwealth Environmental Water Holder to inform environmental watering of Werai Forest, assist Traditional Owners to manage and conserve the area's cultural resources, and assist management of the Werai Ramsar wetland site.

In March 2023 after the flood had receded and floodplain had mostly dried, it was possible for Traditional Owners and researchers to visit field sites in Werai Forest. Kolety Werkul River Rangers Leticia Ross and Tyron Ross-Garden, along with John Trethewie (Charles Sturt University), downloaded photos from the cameras (Figure 11). In addition to providing valuable information about inundation of the forest, the photos have captured a time series of the amazing response of aquatic plants to the inundation (Figure 12).



Figure 10 Kolety Werkul River Rangers Leticia Ross and Tyron Ross-Garden download field cameras in Werai Forest.

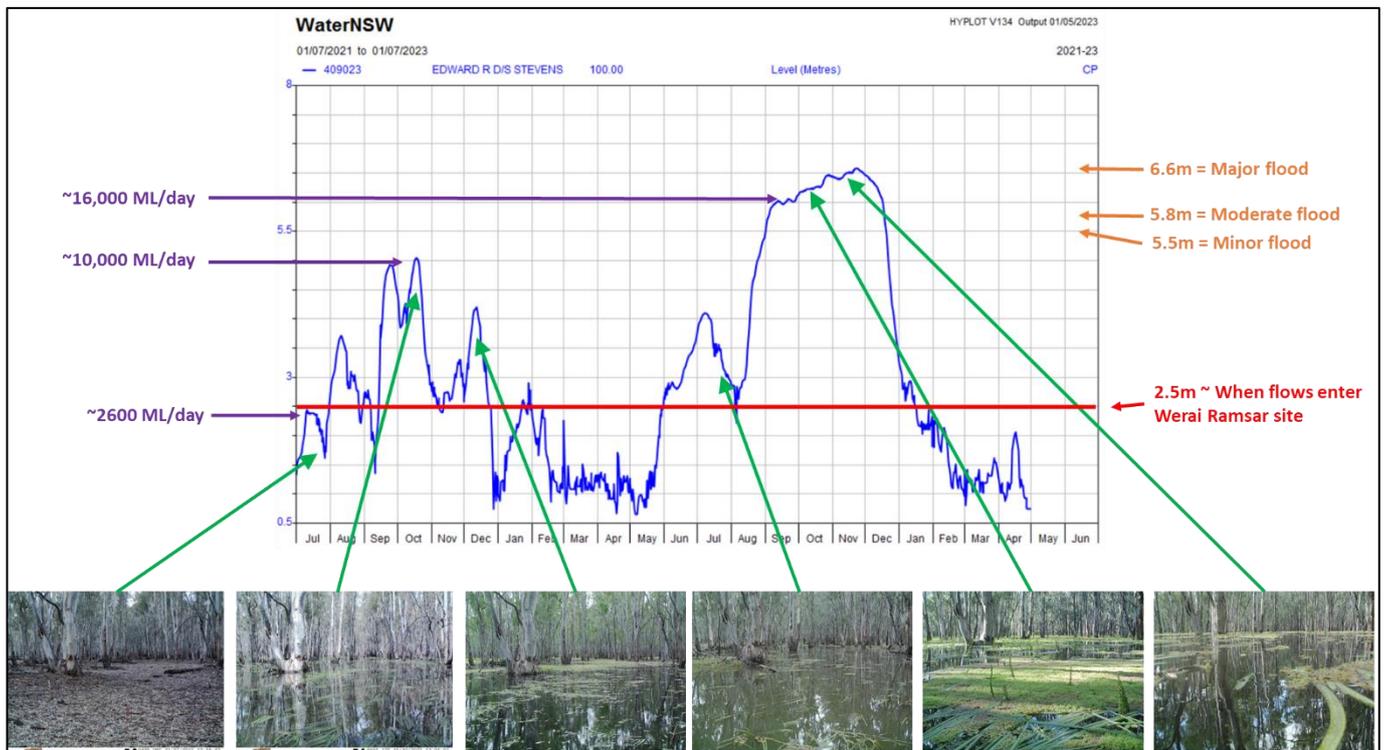


Figure 10 Small selection of photos taken by field cameras linked with timeseries of discharge data from the hydrological the gauge downstream of Stevens Weir.

More information

To join the newsletter mailing list please subscribe [here](#) or contact Professor Robyn Watts, Charles Sturt University, Albury NSW. rwatts@csu.edu.au

We respectfully acknowledge the Wamba Wamba or Wemba Wemba, and Perrepa Perrepa or Barapa Barapa peoples, traditional owners of the land on which the Edward/Kolety-Wakool program is focussed. We recognise their unique ability to care for Country and their deep spiritual connection to it. We honour Elders past, present and emerging whose knowledge and wisdom has ensured the continuation of culture and traditional practices. The Edward/Kolety-Wakool team would also like to acknowledge the local landholders with whom we work and thank them for their contribution to the monitoring and research.

Trethewie J.A. and Watts R.J. (2023) Edward/Kolety-Wakool System Environmental Flows Newsletter, Issue 15. Charles Sturt University.