

# Edward/Kolety-Wakool system Environmental Flows Newsletter

Issue Number 13 | 1 July – 30 Sept 2022

Edward/Kolety-Wakool Monitoring, Evaluation and Research Program



High water levels in the Wakool downstream of the Barham-Moulamein Road Bridge (Photo: John Trethewie).

## What's in issue 13

**Water, water everywhere**

**Scientists continuing to monitor rivers during the floods**

**Environmental water providing refuge against declines in water quality in the Edward/Kolety–Wakool rivers**

**Ephemeral Creek Monitoring**

**Commencement of Larval Fish Monitoring**

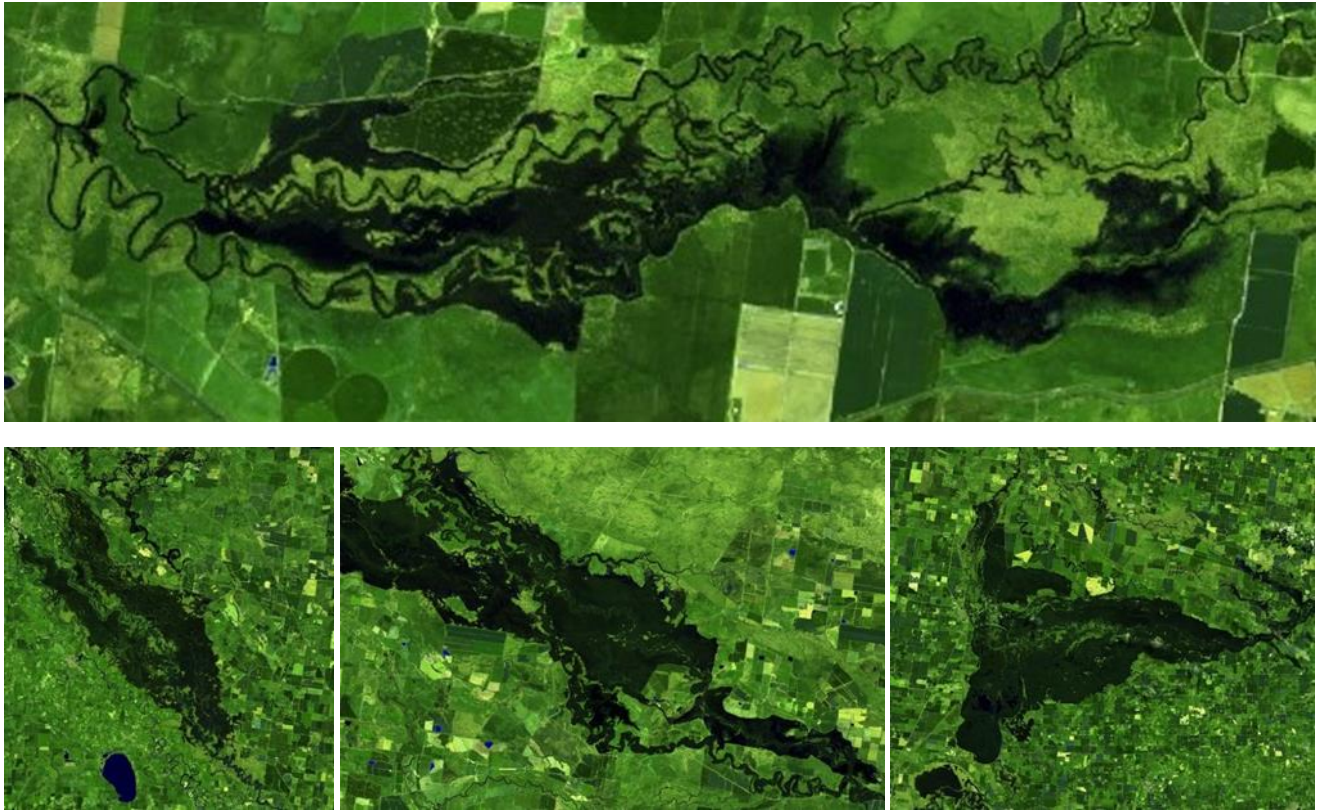
Welcome to the issue 13 of the Edward/Kolety-Wakool Environmental Flows Newsletter - a quarterly newsletter that provides an update on our progress as we monitor and undertake research on the ecosystem outcomes of Commonwealth environmental watering actions in the Edward/Kolety-Wakool system.

The Edward/Kolety-Wakool 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/>



## Water, water everywhere

Widespread heavy rainfall across south-eastern Australia during winter and early spring 2022 confirmed the arrival of a third La Nina in a row, and as a result there is water everywhere throughout the entire Murray system. The Edward/Kooley downstream of Steven's Weir is at levels not seen since 2016, and water flowed into redgum forests and ephemeral watercourses (Figures 1, 2).



**Figure 1** Sentinel Playground screen grabs with False Colour Urban filter, showing water spreading into the redgum forests  
Top: Upper Wakool and Yallakool Creek. Bottom left Koondrook-Perricoota Forest, bottom centre Werai Forest and bottom right Barmah Forest



**Figure 2** Flooded road near the Wakool River, September 2022

## Scientists continuing to monitor rivers during the floods

Despite the many challenges posed by the current flooding throughout the Murray-Darling Basin, the Edward/Kolety-Wakool Flow-MER team have been persisting with their fieldwork under very difficult conditions - dealing with mozzies, road closures, wet roads and flooded riverbanks.

Large floods don't occur very often, so we are keen to get out there to see what is happening. It is crucial to continue to collect field data so we can inform water managers and the community and better understand what happens to river ecosystems during floods.

Water quality monitoring led by Dr Sha sha Liu, focusses on dissolved oxygen concentrations, water temperature, turbidity, and conductivity. Data is recorded by handheld meters and by a network of loggers that continuously monitor water quality. Sha sha and her team also collect water samples (Figure 3) to analyse for concentrations of carbon, nutrients and chlorophyll (algae). During the flooding it has been difficult to access some of the water quality loggers. A lot of our water loggers have been under water and could not be retrieved to be maintained, so we will have to retrieve them later when the floodwaters recede.



**Figure 3.** Dr Sha sha Liu (CSU) wading through flood water to collect samples from the flooded Wakool Rd. (Photo: Chris Davey)

One of the major environmental concerns about the floods is that it has resulted in hypoxic blackwater conditions (low oxygen, carbon rich water) that cause stress or death of fish and other aquatic animals. Monitoring of fish spawning is led by Dr Nicole McCasker and the fieldwork is undertaken fortnightly by John Trethewie (CSU) and staff from NSW DPI Fisheries. The team is continuing to do the fortnightly fish monitoring, albeit at a reduced number and/or slightly changed sites because access to sites has been impacted by flooded roads.

The results we collect from the fieldwork during this flood are being used to guide real time management of Commonwealth environmental watering. The monitoring information is shared with managers from multiple agencies who have been meeting weekly during the flood to discuss and plan their response to the flood and have been releasing [fact sheets](#) to inform the community. The outcomes of the monitoring will also contribute to future adaptive management of environmental watering.

## Environmental water providing refuge against declines in water quality in the Edward/Kolety–Wakool rivers

The unregulated flows inundating floodplains and low-lying agricultural land in spring 2022 have created a food bonanza for native fish, yabbies, shrimp, and many other aquatic animals. However, with the warmer spring weather, the high levels of organic material in the Edward Kolety-Wakool rivers are at risk of driving oxygen down to critical levels, creating low oxygen hypoxic blackwater that can kill fish and other wildlife.

To mitigate the risk of hypoxic blackwater, the Commonwealth Environmental Water Holder (CEWH) is releasing oxygenated water through several Murray Irrigation Limited irrigation escapes into local creeks. Their aim is to create small areas of better quality water so that native fish and crays can move to these areas to improve their chances of survival, should low oxygen hypoxic blackwater arise.

The approach has been designed and planned in collaboration with the [Edward Kolety-Wakool Environmental Water Reference Group](#) (Figure 4) and draws on lessons learned from previous low-oxygen events in 2016, 2012 and 2010. Delivery of water for the environment will be responsive to changes in conditions and advice from the SES and local communities.

Scientists from Charles Sturt University and local citizen scientists from Deniliquin will be monitoring water quality as water for the environment is delivered. Water managers will continue talking with local communities, including First Nations about the progress of deliveries during the watering action.

This work is possible thanks to the collaboration and support of the local community alongside Commonwealth Environmental Water Office, NSW DPE – Environment and Heritage Group, NSW DPI Fisheries, Charles Sturt University, WaterNSW, Murray Irrigation Ltd, Murray Local Land Service and the Murray-Darling Basin Authority.



**Figure 4** Members of the Edward/Kolety-Wakool Environmental Water Reference Group met in September 2022 to discuss environmental watering actions and monitoring (Photo Benjamin Wiesner)

## Ephemeral Creek Monitoring



**Figure 5.** John Trethewie (CSU) and Dale Campbell (NSW department of Planning and Environment) backpack electrofishing in Jimaringle Creek prior to the floods. (Photo: Les Gordon)

Within the Edward/Koety-Wakool system lie a substantial network of ephemeral creeks and flood runners that are an important part of the landscape and the river ecosystem. The refuge pools in ephemeral creeks provide habitat for many native species including threatened species such as Southern Bell frogs.

Historically, before river regulation and agricultural modifications to the landscape, these ephemeral creeks would have flowed during large flow events. Then, as the water in the creeks dried up, they would become a series of waterholes/refuge pools, some small, some large. However, many of these ephemeral creeks are now disconnected for extended periods of time from the rivers and permanent creeks that would have once supplied them with water. Without environmental water, they would be dry most years except in big flood years such as in spring 2022. Over the past few years environmental water has been delivered into these ephemeral creeks using Murray Irrigation Limited's infrastructure. We need to know more about them to help deliver environmental water into the future, and to make decisions about further monitoring.

The ephemeral creeks in the Edward Koety-Wakool River system are the focus of a new research project within the [Edward Koety-Wakool Flow-MER program](#) funded by the Commonwealth Environmental Water Office (CEWO). The project is a collaboration of government agencies, local landholders and community members, the Koety Werkul River Rangers from Yarkuwa Indigenous Knowledge Centre, and researchers.

Fish, frogs and birds will be surveyed in six ephemeral creeks; Tuppal Creek, Thule Creek, Cockrans Creek, Jimaringle Creek, Murrain Yarrein Creek and Yarrein Creek. Traditional ecological survey methods such as fyke nets and backpack electrofishing (Figure 5) will be used as well as environmental DNA metabarcoding (Figure 6), that will be used to test for the presence of the DNA of fish and other vertebrates in samples of filtered creek water.

It was planned to survey the ephemeral creeks before, during and after the delivery of environmental water. However, due to the widespread flooding, no environmental water was delivered to the creeks in spring 2022 because they received unregulated floodwater. Despite this change to the study plan, the project will provide vital information about what animals were present in the waterholes of the ephemeral creeks before they flooded, and what animals moved into them during the floods.



**Figure 6** Shasha Liu collecting water samples for eDNA metabarcoding analysis (Photo: Elka Blackman)

“The environmental water is great for the bird life, and it’s great for the trees that were dying, that hadn’t had a drink for some time, and it keeps the fish in the refuge pools alive...we’ve got Murray Cod, some up to a metre long, in those pools...it keeps the creeks alive,” says landholder Dennis Gleeson (Figure 7), whose main property is Colligen Creek Station is a member of the [Edward Kolety-Wakool Environmental Water Reference Group](#).

Dennis owns a property at the top end of Cockrans Creek, one of the ephemeral creeks being monitored, and is a keen supporter of environmental water being delivered to the ephemeral creeks and of the research being done to better inform those deliveries.

Landholder Les Gordon, from ‘Inglebrae’, at Burraboi, also has an ephemeral creek, Jimaringle Creek, running through his property and likes that monitoring is occurring on his land.

“Without monitoring and without saying what are we trying to achieve, there’s a whole lot of other variables we haven’t even begun to consider other than that water equals life,” says Les. “Monitoring helps provide answers.”



**Figure 7** Left John Trethewie (CSU) with Jack Hamilton (Kolety Werkul Ranger) at Tuppal Creek. (Photo: Luke Egan). Right. Anthony Wilson (CEWO Local Engagement Officer) and Dennis Gleeson (right) with Cockrans Creek in the background. (Photo: James Dyer)

## Commencement of Larval Fish Monitoring

Despite high flows and wet conditions in the Wakool system, larval fish monitoring has commenced for the 2022-23 season in early September (Figure 8). With water spilling onto the floodplain, backwaters filling and flood runners flowing, accessing sites will be challenges at times, but all efforts will be made to continue the monitoring. The larval monitoring program will be undertaken fortnightly until the end of February 2023, and with such high flows the results for the 2022-23 season should prove interesting.



**Figure 8** John Trethewie (CSU) retrieving a light trap in the upper Wakool River (left), high flows moving through Yallakool Creek (right).

### 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](mailto: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., Watts R. J., Beemster M. (2022) Edward/Kolety-Wakool System Environmental Flows Newsletter, Issue 13. Charles Sturt University.