Edward/Kolety-Wakool system Environmental Flows Newsletter

Issue Number 17 | 1 July – 30 September 2023

Edward/Kolety-Wakool Monitoring, Evaluation and Research Program

Connor McGinn setting a larval light trap in the Wakool River September 2023 (Photo: John Trethewie, CSU)

What's in issue #17

Welcome to issue 17 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/

FLOW Monitoring Evaluation Research

Australian Government Commonwealth Environmental Water Holder | Charles Sturt University | NSW Department of Primary Industries | Murray Darling Wetlands Working Group | streamology | La Trobe University | YARKUWA Indigenous Knowledge Centre | EWAA

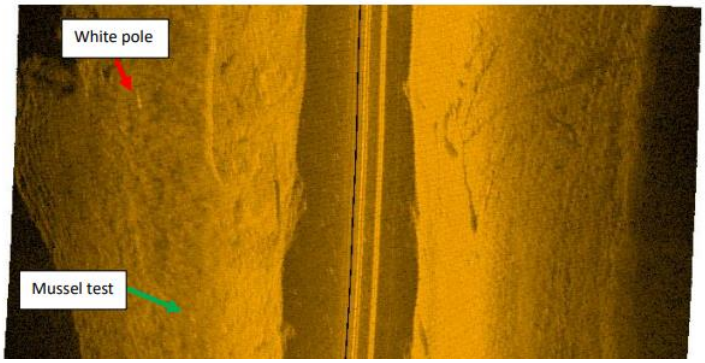
Mussel Surveys Using Side-Scan Sonar

As reported in Issue #16 of this newsletter, in winter 2023 researchers from Charles Sturt University, Austral Research and Consulting and the Kolety Werkul River Rangers were busy preparing to conduct surveys of freshwater mussels in Yallakool Creek and the Upper Wakool River.

Unfortunately, these planned on-ground visual surveys to map exposed mussel beds during the winter draw-down period could not take place as unregulated flows moved through Edward/Kolety-Wakool River System from mid-June until late August. While these flows prevented the visual surveys, we have been successful in carrying out our first trial of side-scan sonar surveys to detect freshwater mussels.

Paul Davies and Jackson Lamin from Austral Research and Consulting conducting side-scan-sonar surveys of the river bottom in Wakool River and Yallakool Creek in search of freshwater mussels, September 2023. (Photo: John Trethewie,CSU)

Side-scan sonar is a technology many recreational fishers might be familiar with, as it is the same technology used in fish finders. Side-scan sonar works by emitting an acoustic pulse towards the bottom of the riverbed. As the acoustic pulse hits and reflects different objects of different shapes and densities, the intensity of the reflection of the acoustic pulse back to the survey boat changes. These differences in acoustic reflections, are then used to create 'images' of a section of river bed. While side-scan sonar is used commonly by commercial and recreational fishers to find fish, its application for finding freshwater mussels is still developing.



Side-scan sonar image showing the river bottom of for a 20 m section of the Wakool River. Reference objects were placed in the river to help verify what can be seen in the images. On the left-hand side of the image is a reference pvc pole ('White pole') and in the lower left-hand side of the image are reference mussel shells ('Mussel test'), which appear as bright spots. (Image: Paul Davies, Austral Consulting and Research).

In early September 2023 Austral Research and Consulting undertook side-scan sonar surveys, mapping five 2 km reaches of river in both the Yallakool Creek and the Upper Wakool River. Over the next couple of weeks researchers will be searching these images closely, looking for signs of freshwater mussels in these images, and identifying locations that will be revisited in October, to confirm the presence of freshwater mussels in the areas first identified in the sonar images.

The results of this study will provide valuable insight into the effectiveness of side-scan sonar for detecting freshwater mussels across different freshwater habitats throughout the Edward/Kolety River System.

Ephemeral Creeks Monitoring Results

As reported in Issues 13 & 16 of this newsletter, Charles Sturt University in collaboration with NSW DPI Fisheries, Kolety Werkul River Rangers and staff from NSW Department of Planning and Environment set out to investigate the effects of environmental watering on vertebrate species in six ephemeral creeks within the Edward/Kolety-Wakool system. Initially researchers planned to conduct surveys before, during and after environmental watering events. However, this plan changed as widespread unregulated flooding moved through the entire system. The researchers changed the study design to compare surveys from before the creeks began to flow to monitoring undertaken after the flows ceased. The project was also used to compare traditional survey methods (backpack electrofishing and fyke netting) with environmental DNA (eDNA) metabarcoding.

Traditional methods detected six small-bodied native species of fish (carp gudgeon, Australian smelt, unspecked hardyhead, flathead gudgeon, dwarf flathead gudgeon and Murray-Darling rainbowfish, Figure 3) and four invasive species (carp, goldfish, gambusia and oriental weatherloach) across all sites. The eDNA metabarcoding detected four additional fish species not detected using traditional methods (silver perch, Murray cod, golden perch and bony bream).

Both traditional methods and eDNA sampling indicated that the fish community was more diverse pre-flooding and became more heavily dominated by introduced species after flooding, particularly eastern gambusia and oriental weatherloach which spread to locations they were not detected pre-flooding. Large-bodied native fish species were detected both pre-and post-flooding including Murray cod, which were detected in Cockrans Creek pre-flooding and Murrain-Yarrein and Tuppal Creeks post-flooding. Golden perch were detected in Murrain-Yarrein Creek pre-flooding and Murrain-Yarrein and Tuppal Creek post-flooding. Silver perch were only detected in Cockrans Creek pre-flooding. The large-bodied species were likely in very low abundances and therefore difficult to capture using traditional methods. This shows the potential application for eDNA to detect species in low abundances.

The eDNA sampling also identified other key vertebrate species of interest including the Rakali (native water rat), sugar glider, a range of birds, eastern sign-bearing froglet, common froglet, spotted marsh frog, Peron's tree frog, Murray River turtle and eastern long-necked turtle. The current study has shown how environmental DNA may be a valuable tool to add to our current sampling methods to assess changes in vertebrate biodiversity in the Edward/Kolety-Wakool system over time.

Two small-bodied native fish detected during the ephemeral creeks monitoring project, dwarf flathead gudgeon (left) and unspecked hardyhead (right). (Photos: John Trethewie)

Vegetation Surveys Commence for 2023-24

Vegetation monitoring for the 2023-24 season began in August, with water levels still high throughout the whole of the Edward/Kolety-Wakool system. Subsequently, very little submerged aquatic vegetation response was observed within the river channels, while river banks had a patchy but low cover of herbs. With the season warming up and on the back of higher flows, we anticipate a positive vegetation response in the coming months.

On the floodplain vegetation surveyor Sascha Healy from Murray Darling Wetlands Working Group observed ongoing Lignum response throughout winter and now entering spring. Lignum continued to flourish with ample new growth, green leaves, and consistent flowering with seeds. Lignum seedlings were also observed *en masse* around Yallakool Creek and the Wakool River for the first time since the 2016-17 flooding event.

Surrounding floodplains, although now dry, were green and supported high abundances of wetland vegetation including Eucalyptus recruitment, nardoo and flowering herbs (e.g. *Geococcus pusillus*).

Top left: Geococcus pusillus flowering. Top Right: Lignum flowering. Bottom left: Lignum seedlings. Bottom right: River redgum seedlings. (Photos: Sascha Healy, Murray Darling Wetlands Working Group)

Larval Fish Surveys Commence for 2023-24

Larval fish surveys for the 2023-24 season began in August and will continue fortnightly until the end of February 2024. Almost all of our sites are accessible again now that flood waters have retreated and the floodplain has for the most part dried out. Water temperatures are now approaching the level that our native fish require, and we anticipate seeing the first larvae of species like Murray cod appearing during October.

John Trethewie setting a larval light trap in the upper Wakool River in September 2023. (Photo: Bridget Smith, NSW Fisheries).

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 and present 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., Duncan M., Healy S., and McCasker N. (2023) Edward/Kolety-Wakool System Environmental Flows Newsletter, Issue 17. Charles Sturt University.