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Institute for Land,
Water and Society
Charles Sturt University



research for a sustainable future



Monitoring the ecosystem responses to Commonwealth environmental water delivered to the Edward-Wakool river system, 2012-13

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EXECUTIVE SUMMARY

This report provides an overview of the project “Monitoring the ecosystem responses to Commonwealth environmental water delivered to the Edward-Wakool river system, 2012-13”. It includes details of Commonwealth environmental water use, including environmental watering objectives, study design, selection of indicators and methodology used to assess ecosystem responses to environmental watering, and preliminary outcomes of the monitoring from September 2012 to January 2013. Information on community consultation and community involvement in the project is also presented. The collection of data is on-going and the results of the monitoring program will be presented in a final report that will be submitted in late 2013.

The Edward-Wakool system is a large anabranch system of the Murray River main channel. It is a complex network of interconnected streams, ephemeral creeks, flood runners and wetlands including the Wakool River, Yallakool Creek, Colligen-Niemur Creek, Coobool Creek and Merran Creek. The Edward-Wakool system is considered to be important for its high native species richness and diversity including threatened and endangered fish, frogs, mammals, and riparian plants. It has abundant areas of fish habitat and historically had diverse fish communities.

Watering objectives and flow-dependent ecological objectives for the use of Commonwealth environmental water in 2012-13 in the mid-Murray region were developed by the Commonwealth Environmental Water Office (www.environment.gov.au/ewater/southern/murray/index.html).

The flow-dependent ecological objectives for the Edward-Wakool system developed for the use of Commonwealth environmental water focussed on breeding, recruitment and habitat requirements of native fish and other aquatic organisms and in-channel ecosystem functions. Flow objectives include to:

- Support breeding and recruitment of native species (e.g. fish, frogs, turtles, invertebrates)
 - Support habitat requirements of native species (e.g. fish, frogs, turtles, invertebrates)
 - Maintain health of existing extent of riparian, floodplain and wetland native vegetation communities
 - Support ecosystem functions that relate to mobilisation, transport and dispersal of biotic and abiotic material (e.g. sediment, nutrients and organic matter)
 - Support ecosystem functions that relate to longitudinal connectivity (i.e. connectivity along a watercourse) and lateral connectivity (i.e. connectivity between the river channel, wetlands and floodplain) to maintain populations.
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Up to 60 gigalitres of Commonwealth environmental water was made available for use in the Edward-Wakool river system during 2012-13. Three in-stream watering actions occurred between October 2012 and February 2013:

1. A watering action in Yallakool Creek, which commenced on 19 October 2012 and finished on 7 December 2012. This event was aimed at maintaining inundation of habitat for Murray Cod nests and maintaining the flow until cod eggs could hatch and drift downstream
2. A watering action that occurred in Colligen Creek to promote Golden Perch and Silver Perch spawning. This watering action involved the delivery of two freshes between 2 November 2012 and 17 December 2012
3. A watering action in Yallakool Creek, which commenced on 2 February 2013 and finished on 23 February 2013. This event aimed to provide opportunities for small bodied fish (in-stream generalists) to breed. Secondary objectives of this action were to test whether or not a small water level rise result in the movement of medium / large bodied fish and / or spawning of Golden Perch.

This project builds on previous projects that have monitored fish movement, fish communities and ecosystem responses to environmental watering in this system. This project will focus on the assessment of ecosystem responses to Commonwealth environmental water delivered as in-stream freshes in the Edward-Wakool river system in 2012-13. The monitoring is focussed on the Wakool River, Yallakool Creek, Colligen Creek and Little Merran Creek. In addition, a broader scale annual assessment of fish populations will be undertaken across the whole Edward-Wakool system. Indicators assessed include: water chemistry (dissolved oxygen, light, temperature, carbon, nutrients), whole stream metabolism, phytoplankton, biofilms, aquatic and fringing vegetation, zooplankton, crustaceans, frogs and tadpoles, fish larvae, juvenile and adult fish, and fish movement. Some indicators are monitored continuously via logging equipment, and some are sampled fortnightly or monthly.

This report presents preliminary outcomes of monitoring undertaken between August 2012 and January 2013. Data collection continued until April 2013. Further assessment and statistical analysis is required before these preliminary outcomes can be attributed to Commonwealth environmental water. Detailed outcomes of the monitoring will be presented in the final report in late 2013.

Assessment of water quality showed no evidence of low dissolved oxygen events between August and December 2012. The concentration of particulate organic carbon in water samples was low (<1 mg/L) at all sites between August and December 2012 and the concentration of dissolved organic carbon was relatively low (<5mg/L) in Colligen Creek, Yallakool Creek and the Wakool River between August and December 2012. These results demonstrate that Commonwealth environmental water delivered as in-stream freshes to Yallakool Creek and Colligen Creek in 2012 did not trigger blackwater events in these systems.

There was a small response by inundated aquatic vegetation during the environmental flow fresh delivered to Yallakool Creek between October and December 2012. Inundated aquatic vegetation cover was very low in September 2012, but increased in October and November 2012 during the fresh. A decrease in inundated aquatic vegetation was detected in December 2012 as banks were exposed at the end of environmental flow in early December 2012.

Six common species of frogs were recorded between September 2012 and January 2013: *Limnodynastes tasmaniensis*, *L. fletcheri*, *L. dumerilii*, *Litoria peronii*, *Crinia signifera* and *C. parinsignifera*. Frog diversity and abundance was similar across river reaches. During the fresh in Colligen Creek in November and December 2012, water inundated some *Eleocharis* on the banks of the creek and the number of frogs calling (in particular *L. tasmaniensis*) was high. There was no increase in the response of frogs observed at Yallakool Creek during the fresh in October, November and December 2012, despite the observed increase in aquatic vegetation in that system at that time.

The fish species collected as larvae in the Edward-Wakool system between September 2012 and January 2013 were: Murray Cod, River Blackfish, Australian Smelt, Carp Gudgeon, Flathead Gudgeon, Murray River Rainbowfish and Carp. Murray Cod larvae occurred in all river reaches studied, with the exception of the Mulwala Canal. This is a good indication that Murray Cod are breeding successfully in this system. The abundance of Murray Cod larvae was slightly higher in Yallakool Creek than the other rivers in mid-November 2012. Further analysis of the data and analysis of otoliths from the larvae will determine if there is a relationship between the abundance of larvae and the delivery of Commonwealth environmental water.
