



## Long Term Intervention Monitoring Project Murrumbidgee System Selected Area Project Progress Report #5 Report period: 1 July – 30 September 2015



Gooragool lagoon mid-Murrumbidgee September 2015

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## **Ecological responses to Commonwealth environmental water in the Murrumbidgee system as of 30 September 2015**

This quarterly report outlines key activities undertaken and preliminary outcomes identified during monitoring of ecosystem responses to the use of Commonwealth environmental water in the Murrumbidgee Catchment undertaken as part of the Murrumbidgee Long Term Intervention Monitoring (LTIM) Project between 1 July and 30 September 2015. Monitoring includes assessment of ecological outcomes in the Murrumbidgee River and connected wetlands through the mid-Murrumbidgee and Lowbidgee floodplain wetlands as outlined in [the Murrumbidgee Monitoring and Evaluation Plan](#).

To date in 2015-16 Commonwealth environmental water has been delivered to Yarradda Lagoon and the Yanco Creek system in the mid-Murrumbidgee wetlands (Appendix 2). The key objectives of these Commonwealth environmental watering actions were to support:

- native riparian, wetland and floodplain vegetation diversity and condition;
- maintain condition and provide reproduction opportunities for fish, waterbirds and other aquatic vertebrate species, and
- hydrological connectivity and water quality

### **Preliminary outcomes to October 2015**

Routine wetland monitoring activities targeting water quality, microinvertebrates, fish, frogs and tadpoles, and waterbirds were completed at nine of the twelve Murrumbidgee LTIM wetland sites (refer Appendix 1 and 2) that contained water during September 2015. Aside from Yarradda Lagoon (watered during 2015-16) and Sunshower Lagoon (watered using NSW EWA during 2015-16) wet sites contained residual environmental water from actions during 2014-15. Vegetation communities were surveyed at all 12 LTIM wetlands during the same period. Sample processing for microinvertebrates, carbon and nutrients and vegetation surveys are underway. Preliminary observations made during September 2015 surveys of wetland water quality, fish, frogs and tadpoles and waterbirds are presented here.

Monitoring of riverine fish communities, along with larval fish and ecosystem metabolism are scheduled to commence in late October 2015.

### **Water Quality**

Physicochemical variables were within expected ranges for the time of year and sites sampled. Several sites contained residual water from environmental flows during 2014-15 and some of these are approaching the latter stages of the hydrological cycle where water quality might be expected to decline. Conductivity at Sunshower Lagoon was high relative to most other sites while dissolved oxygen was low, although these conditions might be expected for a recently wetted and partially-filled site. Conductivity at Waugorah Lagoon was high relative to past results. Neither of these conductivity readings are within the range where we expect impacts to sensitive species. No adverse water quality issues were observed.

### **Frogs and tadpoles**

As described in previous quarterly reports, southern bell frogs (*Litoria raniformis*, vulnerable under EPBC Act) have been active through the LTIM monitoring sites in the Nimmie-Caira zone. Adult southern bell frogs were recorded calling at Telephone Creek and one individual was observed at Avalon Swamp in September 2015. Larger numbers of adult barking marsh frogs (*Limnodynastes fletcheri*) were observed at Two Bridges Swamp and Piggery Lake, both of which contain environmental water from 2014-15. Small numbers of other common species, spotted marsh frogs (*Limnodynastes tasmaniensis*), Peron's tree frog (*Litoria peronii*) and plains froglet (*Crinia parinsignifera*) were recorded at sites that retained water through the Lowbidgee floodplain. Frogs were also heard calling at sites that recently received environmental water in the mid-Murrumbidgee (Sunshower and Yarradda Lagoons). Adult banjo frogs (*Limnodynastes interioris*) were heard calling at Yarradda Lagoon.

### **Waterbird diversity**

Waterbird activity was generally low during the early spring surveys which was expected given the time of year and that half of the sites were dry or water levels were low. No colonial waterbird breeding activity was detected at the survey sites but around 15 pairs of black swans (*Cygnus atratus*) were observed nesting and/or with advanced young at Piggery Lake. Both Piggery and Two Bridges Swamp supported the high diversity and abundance of waterbirds where a diversity of foraging habitats were available for more than 20 waterbird species.



Black swans (*Cygnus atratus*) on Piggery Lake, Redbank September 2015.

### **Fish (wetlands)**

Overall there were relatively low numbers of fish in the Murrumbidgee wetlands. As expected, carp gudgeon (*Hypseleotris* spp.) were numerically dominant (10,846 individuals). Native rainbowfish (*Melanotaenia fluviatilis*) and bony bream (*Nematalosa erebi*) were observed at Avalon Swamp while smelt (*Retropinna semoni*) were seen in Telephone Creek and Waugorah Lagoon. Numbers of exotic carp (*Cyprinus carpio*), goldfish (*Carassius auratus*) and weatherloach (*Misgurnus anguillicaudatus*) were low compared with surveys during 2014-15, even at sites where they were previously abundant (e.g. Two Bridges swamp).

**Appendix 1 Summary of monitoring activities undertaken during September 2015 as part of the Monitoring and evaluating ecological responses to Commonwealth environmental water use in the Murrumbidgee River Valley**

Zone	Site name	Status	Water Quality	Microinvertebrates Chlorophyll A	Carbon Nutrients	Ecosystem metabolism	Larval fish	Tadpoles, fish and turtles	Frogs	Waterbirds	Vegetation	Depth logger	Temperature logger		
mid-Murrumbidgee	Gooragool	Full	✓	✓	✓			✓	✓	✓	✓	✓	✓		
	Mckennas	Dry						✓							
	Sunshower	Low	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓
	Yarradda	Full	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓
South Redbank	Mercedes	Low	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓
	Two Bridges	Moderate	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓
	Piggery Lake	Moderate	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓
	Waugorah Lagoon	Low	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓
Nimmi-Caira	Nap Nap	Dry						✓	✓	✓	✓	✓	✓	✓	✓
	Avalon	Low	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓
	Telephone	Moderate	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓
	Eulimbah	Dry						✓	✓	✓	✓	✓	✓	✓	✓
River sites	Mckennas (Carrathool zone)							✓	Due to commence in October 2015						
	Bringagee (Carrathool zone)														
	Yarradda (Carrathool zone)														
	Narrandera ( Narrandera zone)					Oct 2015									
	Euroley ( Narrandera zone)														
	Dairy ( Narrandera zone)														

## **Appendix 2**

### **About the Murrumbidgee Long-Term Intervention Monitoring Project (LTIM Project)**

The Long Term Intervention Monitoring (LTIM) Project for the Murrumbidgee River system is funded by the Commonwealth Environmental Water Holder (\$3.7M 2014-2019) and is being delivered as a collaborative partnership led by Charles Sturt University (Institute for Land, Water and Society) with NSW Department of Primary Industries (Fisheries), University of NSW, NSW Office of Environment and Heritage, and Riverina Local Land Services.

The Murrumbidgee LTIM Project is designed to provide a robust framework to evaluate the ecological outcomes of Commonwealth environmental water within wetland and river systems downstream of Narrandera, NSW. Monitoring activities target multiple taxonomic groups and ecological processes with a focus on indicators of high ecological and community significance, such as large bodied native fish, waterbirds, and endangered species.

Monitoring activities within wetlands are focused on the responses of fish, frogs, tadpoles, turtles, microcrustacea (a component of the zooplankton), waterbirds, vegetation, along with the changes in water quality, carbon and nutrients associated with black water and algal bloom risks, and hydrology measured before, during and after environmental watering. The riverine component includes intensive monitoring of native fish breeding and fish community responses to environmental watering actions, along with microcrustacea, stream metabolism (stream productivity) and water quality associated with black water and algal bloom risks, and hydrology.

The Murrumbidgee LTIM Project is being undertaken across three key ecological regions within the Murrumbidgee, the mid and lower Murrumbidgee River channel and adjacent mid-Murrumbidgee wetlands between Narrandera and Hay, and the Lowbidgee floodplain downstream of Maude, that is further divided into separate monitoring “zones” representing areas with common ecological and hydrological attributes.

The framework includes 12 fixed monitoring sites across three key wetland types, oxbow lagoons of the Mid-Murrumbidgee, lignum-black box wetlands through the Nimmie-Caira system and river red Gum-spike rush wetlands through the Redbank systems and six fixed sites across the mid and lower the Murrumbidgee River channel. Copies of the Murrumbidgee Monitoring and Evaluation plan are available at:

<http://www.environment.gov.au/system/files/resources/bc51ee00-ac5f-4e65-910d38f23416823e/files/murrumbidgee-me-plan.pdf>

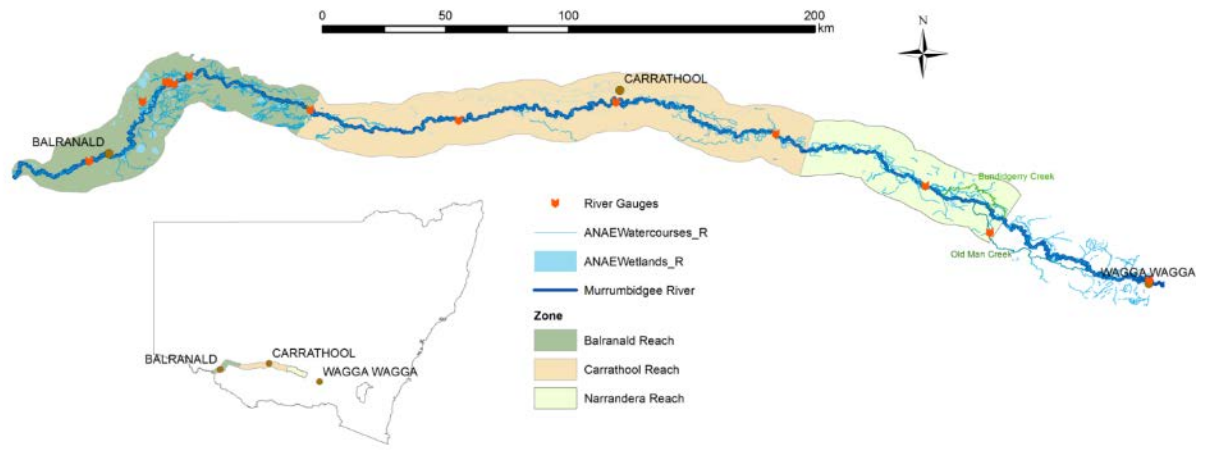


Figure 2 Distribution of riverine zones in the Murrumbidgee Selected Area.

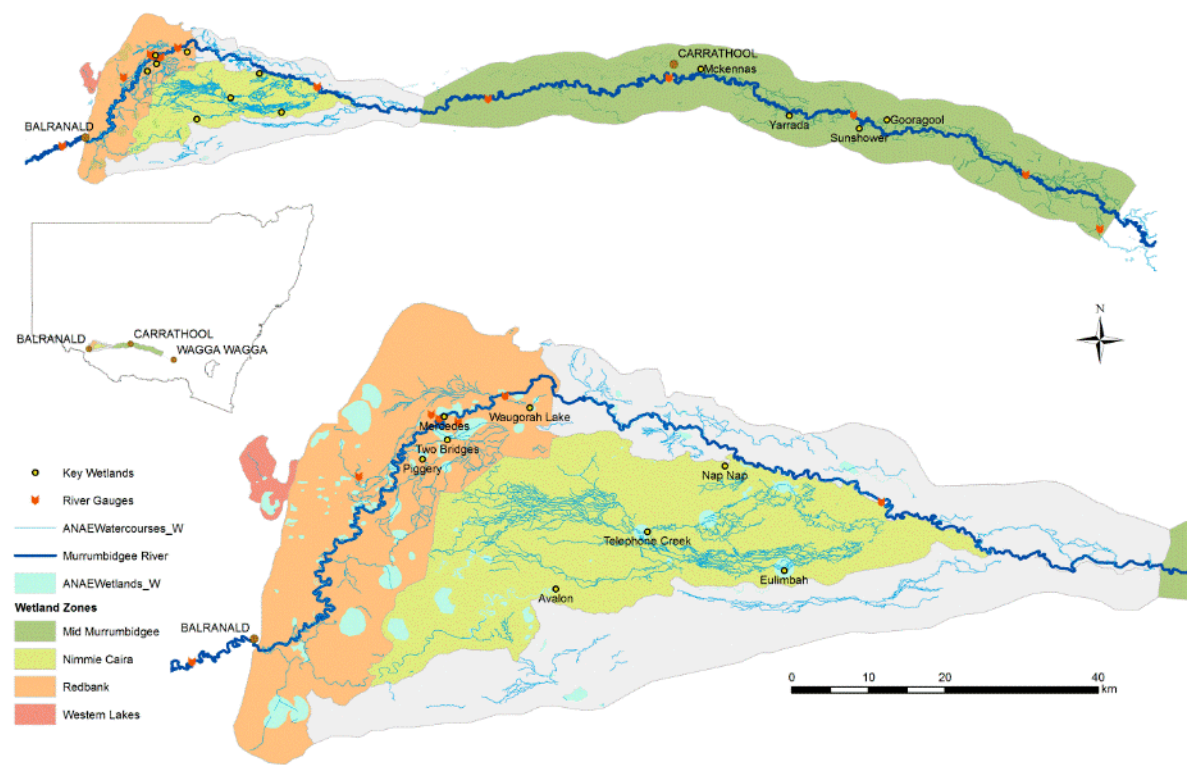


Figure 3 Distribution of wetland zones in the Murrumbidgee Selected Area and locations of key wetlands.