



Long Term Intervention Monitoring Project Murrumbidgee System Selected Area Project Progress Report #6 Report period: 1 October – 31 December 2015



Mercedes Swamp, South Redbank, November 2015

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Ecological responses to Commonwealth environmental water in the Murrumbidgee system as of 31 December 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 October and 31 December 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 as well as parts of the Nimmie-Caria and Redbank systems (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 31 December 2015

Routine wetland monitoring activities targeting water quality, microinvertebrates, fish, frogs and tadpoles, and waterbirds were completed at nine of the 12 Murrumbidgee LTIM wetland sites (refer Appendix 1 and 2) that contained water during November 2015. Vegetation communities were surveyed at all 12 LTIM wetlands during the same period. Additional monitoring was carried out at Molley's Lagoon and Yellow Clay Creek in the Yanco Creek system. Sample processing for microinvertebrates, carbon and nutrients and vegetation surveys are underway. Preliminary observations made during November 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 commenced in late October 2015. The larval fish component was completed in late December while metabolism sampling will continue until March.

Water Quality

Overall, physicochemical variables were within expected ranges for sites sampled. Mercedes, Piggery and Two Bridges recorded low nighttime dissolved oxygen concentration, although this is expected for these sites, particularly at their respective stages in the hydrological cycle. Yellow Clay Creek appears to have high concentrations of dissolved organic carbon which we attribute to a thick layer of terrestrial leaf litter along this forested creek system, although this does not appear to be associated with particularly low dissolved oxygen.

Frogs and tadpoles

Large numbers of marsh frogs (*Limnodynastes* spp.), Peron's tree frog (*Litoria peronii*) and plains froglet (*Crinia parainsignifera*) were heard calling at recently inundated parts of Two Bridges. Banjo frog (*Limnodynastes interioris*) tadpoles were observed in relatively high abundances at Molley's Lagoon (141) and Yellow Clay Creek (72). However, adult banjo frogs were not heard calling, nor were any adults observed. Adult Southern Bell Frogs (*Litoria raniformis*) (Vulnerable Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)) were heard calling at Eulimbah and Yarradda. Several bell frog tadpoles, one juvenile adult and one metamorph were captured in fyke nets at Yarradda. This is the first time Southern Bell Frogs have been recorded at Yarradda since the 1970s.



A juvenile Southern Bell Frog (*Litoria raniformis*) at Yarradda Lagoon, November 2015.

Waterbird diversity

Cormorants (mostly *Phalacrocorax sulcirostris* but also *Microcarbo melanoleucos* and *Phalacrocorax carbo*) and darters (*Anhinga novaehollandiae*) were seen nesting at Yarradda. Two Australasian Bitterns (*Botaurus poiciloptilus*) (endangered EPBC Act) were heard calling at Eulimbah Swamp.

Fish (wetlands)

As expected, native carp gudgeon (*Hypseleotris* spp.) were numerically dominant. Oriental weatherloach (*Misgurnus anguillicaudatus*) were found in relatively high abundances at Two Bridges despite few individuals recorded during September 2015. Weatherloach were also seen in low numbers across other sites across the catchment, including Molley's Lagoon, and while they appear to be slowly spreading numbers are low at most sites. Large numbers (12,814) of juvenile carp (*Cyprinus carpio*) as well as three juvenile large-bodied native fish (possibly Murray cod - TBC) were also captured at Eulimbah. Unspecked hardyheads (*Craterocephalus stercusmuscarum fulvus*) and good numbers of Murray rainbowfish (*Melanotaenia fluviatilis*, 100) were observed at Molley's lagoon. No fish were captured at Yellow Clay Creek.



Murray rainbowfish (*Melanotaenia fluviatilis*) at Molley's lagoon, November 2015.

Appendix 1 Summary of monitoring activities undertaken during November 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						✓	✓	✓	✓	N/A	N/A	
	Sunshower	Low/Dry						✓	✓	✓	✓	✓	✓	✓
	Yarradda	Full	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓
	Molley's	Moderate	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓
	Yellow Clay Creek	Low	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓
South Redbank	Mercedes	Low	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓
	Two Bridges	Full	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓
	Piggery Lake	Low	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓
	Waugorah Lagoon	Low	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓
Nimmie-Caira	Nap Nap	Dry						✓	✓	✓	✓	✓	✓	✓
	Avalon	Low	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓
	Telephone	Moderate	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓
	Eulimbah	Full	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓
River sites	McKennas (Carrathool zone)		Commenced October 2015			✓	Completed in December 2015							
	Bringagee (Carrathool zone)					✓								
	Yarradda (Carrathool zone)					✓								
	Narrandera (Narrandera zone)					✓								
	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>

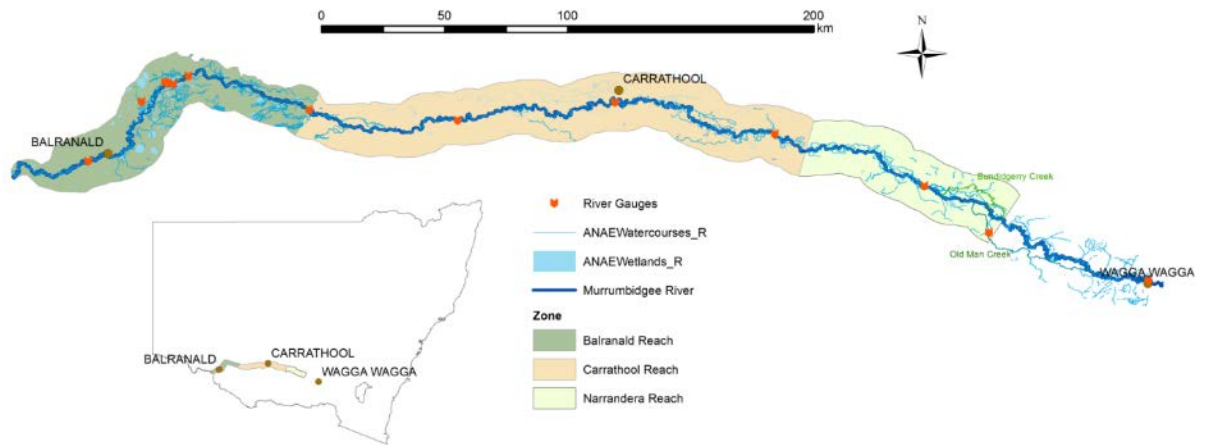


Figure 2 Distribution of riverine zones in the Murrumbidgee Selected Area.

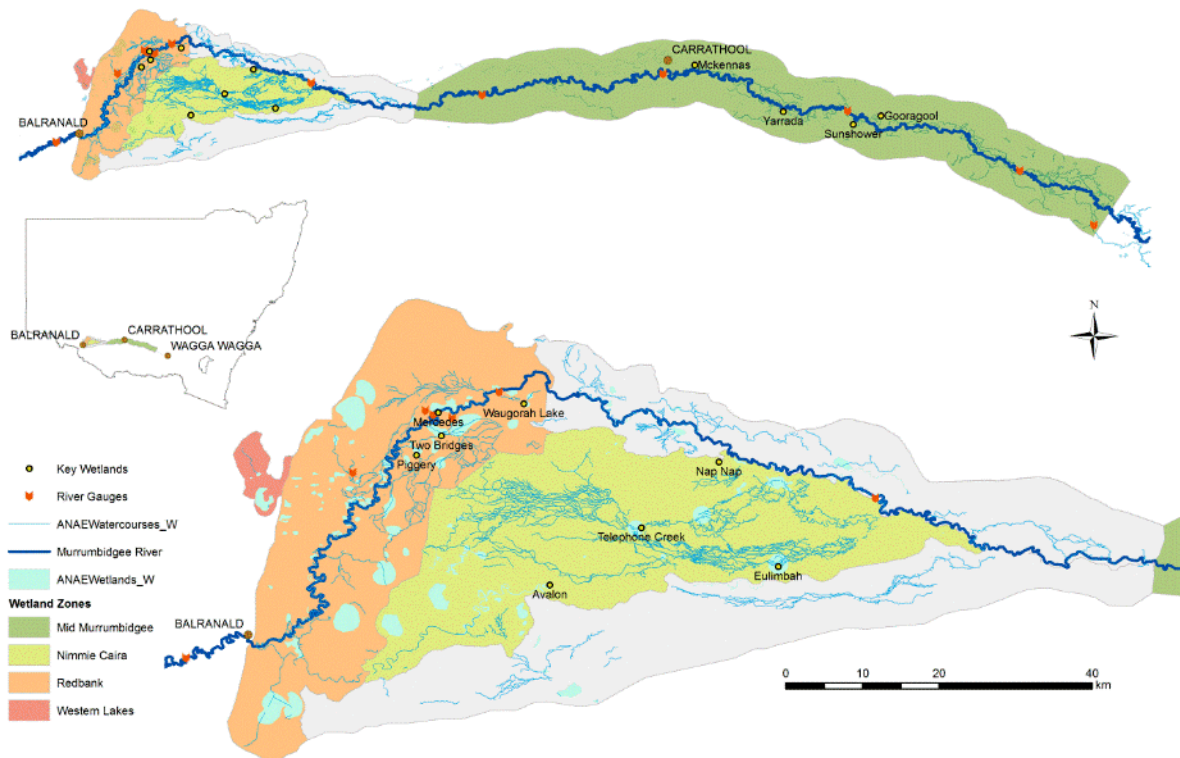


Figure 3 Distribution of wetland zones in the Murrumbidgee Selected Area and locations of key wetlands.