

Long Term Intervention Monitoring Project Murrumbidgee System

Selected Area Project Progress Report #14

Report period: 1 October 2017 – 31 December 2017



Nap Nap Swamp, Nimmie-Caira, November 2017

Wassens, S., Wolfenden, B., Spencer, J., Thiem, J., Jenkins, K., Hall, A., (2017). Long Term Intervention Monitoring Project, Murrumbidgee System Selected Area, Progress Report number 14, December 2017. Charles Sturt University, Institute for Land, Water and Society. Prepared for the Commonwealth Environmental Water Office.

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Ecological responses to Commonwealth environmental water in the Murrumbidgee system as of 31 December 2017

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 2017. 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](#).

All 4 wetland sites monitored in the mid-Murrumbidgee, and Mercedes and Waugorah Lagoons in South Redbank, were watered or partially watered by environmental flows, delivered as a high-flow fresh during August 2017. The remaining 6 sites were either dry (Piggery Lake) or remained partially wet following widespread flooding and subsequent environmental water deliveries to support waterbird breeding during 2016-17.

Preliminary outcomes to 31 December 2017

Routine wetland monitoring activities targeting water quality, microinvertebrates, fish, frogs and tadpoles, and waterbirds were completed at the 12 Murrumbidgee LTIM wetland sites (refer Appendix 1 and 2) during November 2017. The lack of water at Piggery Lake meant that not all indicators could be monitored at this site during this time.

Vegetation communities

The majority of LTIM wetland monitoring sites are drying out, with some wetlands already dry or containing small amounts of residual water. As expected given the dry conditions there is a lower diversity of aquatic plant species and higher percentage of bare ground and leaf litter with annual terrestrial species colonising dry sections of the wetland.



Two Bridges Swamp transect 1 March 2017 (top) and November 2017 (bottom). Note the drying of green vegetation that has occurred as a result of low rainfall and absence of inundation during the intervening period.

Water Quality

Water quality remained within nominal ranges at sites with the most water (Waugorah, Yarradda Lagoons) though most other sites showed some signs of declining water quality associated with the latter stages of drying (increasing conductivity, turbidity and very high daytime dissolved oxygen). This is expected for drying ephemeral wetlands. Turbidity was particularly high at Telephone Creek (exceeding the reportable range on our handheld WQ meter – 1000 NTU).

Frogs and tadpoles

Larger numbers of frogs were seen and heard in November than September. This included southern bell frogs (*Litoria raniformis*) seen at Avalon dam, Eulimbah Swamp and at Nap Nap but only heard at Yarradda Lagoon. Bell frog tadpoles were caught at Yarradda. Numerous Perron's tree frog (*Litoria peronii*) and *Limnodynastes* spp. tadpoles were seen at Sunshower Lagoon. Several hundred inland banjo frog tadpoles (*Limnodynastes interioris*) were captured at Mercedes Lagoon. Note that Nap Nap Swamp was seined for bell frog tadpoles and none were recorded. No bell frog tadpoles were recorded at Eulimbah Swamp.



A southern bell frog (*Litoria raniformis*) at Avalon Swamp, November 2017.

Waterbird diversity

We recorded a total of 23 waterbird species during the November LTIM surveys. As many wetlands are drying down the survey sites continue to support flocks of dabbling ducks and a diverse range of shoreline foragers (e.g. waterhens), large waders (e.g. spoonbills) and Australian resident shorebirds (e.g. dotterels). OEH staff completed additional surveys of known colony sites (25 sites in total) during the November surveys but did not detect significant colonial waterbird breeding activity. Only small numbers of active waterbird nests (5-15 nests/site) were observed at Narwie Swamp (North Redbank), House Creek (upstream of Telephone Creek), Loorica Lake (both Nimmie-Caira), Gooragool Lagoon, Yarradda Lagoon (Mid-Murrumbidgee) and Waldaira Lake (Junction Wetlands). This included breeding yellow-billed spoonbill, Australasian darter and little pied cormorant nests.



Gooragool Lagoon, mid-Murrumbidgee, November 2017.

Fish and turtles (wetlands)

Similar to September 2017, relatively few fish were captured compared to previous years. In particular there were fewer carp gudgeon and fewer European carp, both of which are typically numerically dominant. The largest catch, in terms of species diversity (8 species) and numbers (1795 individuals), was at Yarradda Lagoon. Two smelt were seen at Sunshower Lagoon (where 232 were observed two months earlier). No smelt were captured at McKennas Lagoon, though many dead smelt were seen floating on the surface of the water (possibly due to declining water quality).

A total of 31 turtles were captured in fyke nets during November, with individuals recorded across all 3 zones. Young turtles, all around 6cm long, were seen at Mercedes Swamp (3) and Yarradda Lagoon (1).



A young 6cm long broad-shelled turtle (*Chelodonia expansa*) observed at Yarradda Lagoon, mid-Murrumbidgee wetlands, November 2017.

Appendix 1 Summary of monitoring activities undertaken during November 2017 as part of the Monitoring and evaluating ecological responses to Commonwealth environmental water use in the Murrumbidgee River Valley

Zone	Site name	Estimated Status	Water Quality	Microinvertebrates Chlorophyll A	Carbon Nutrients	Ecosystem metabolism	Larval fish	Riverine fish	Tadpoles, fish and turtles	Frogs	Waterbirds	Vegetation	
mid-Murrumbidgee	Gooragool	½ full	✓	✓	✓				✓	✓	✓	✓	
	Mckennas	¼ full	✓	✓	✓				✓	✓	✓	✓	
	Sunshower	¼ full	✓	✓	✓				✓	✓	✓	✓	
	Yarradda	Full	✓	✓	✓				✓	✓	✓	✓	
	South Redbank	Mercedes	½ full	✓	✓				✓	✓	✓	✓	✓
		Two Bridges	v. low	dry	dry				dry	dry	dry	✓	✓
		Piggery Lake	Dry	dry	dry				dry	dry	dry	✓	✓
		Waugorah Lagoon	Channel only (¼ full)	✓	✓				✓	✓	✓	✓	✓
	Nimmie-Caira	Nap Nap	very low	dry	dry				dry	dry	dry	✓	✓
		Avalon	Dam-only	✓	✓				✓	✓	✓	✓	✓
		Telephone	¼ full	✓	✓				✓	✓	✓	✓	✓
		Eulimbah	¼ full	✓	✓				✓	✓	✓	✓	✓
River sites	McKennis (Carrathool zone)		Complete: October-December 2017			Oct 17	Complete: October-December 2017	Mar/Apr 2018					
	Bringagee (Carrathool zone)												
	Yarradda (Carrathool zone)												
	Narrandera (Narrandera zone)					Oct 17							
	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>

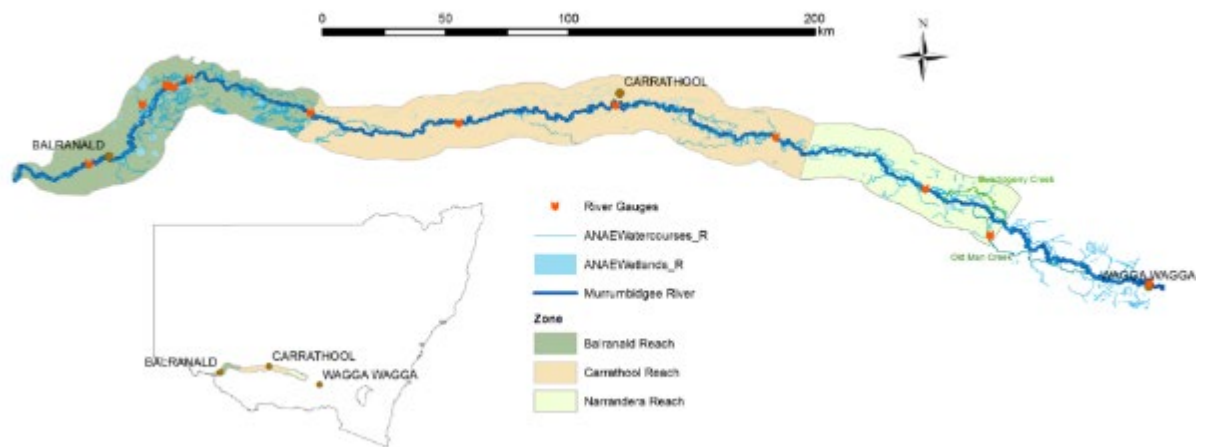


Figure 2 Distribution of riverine zones in the Murrumbidgee Selected Area.

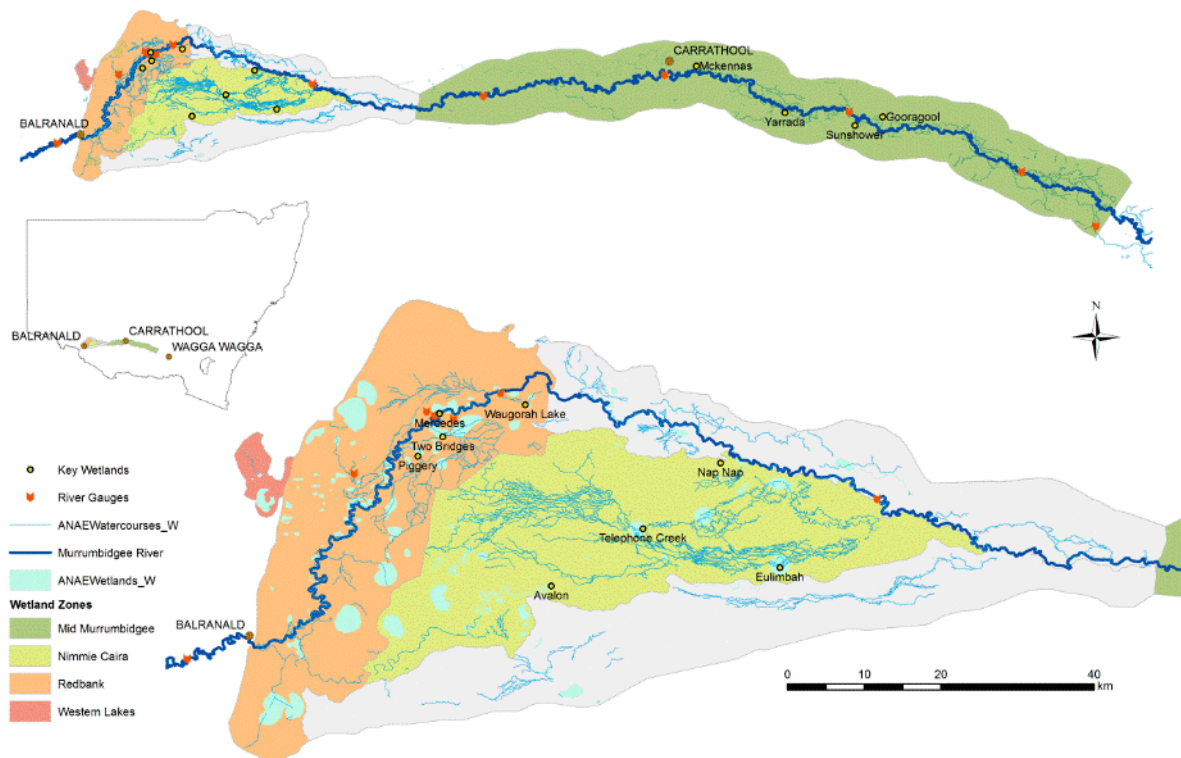


Figure 3 Distribution of wetland zones in the Murrumbidgee Selected Area and locations of key wetlands.