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Institute for Land, Water and Society
Charles Sturt University

Long Term Intervention Monitoring Project Murrumbidgee System
Selected Area Project Progress Report #13
Report period: 1 July 2017 – 30 September 2017

Waugorah Lagoon, Lower Murrumbidgee, September 2017

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Ecological responses to Commonwealth environmental water in the Murrumbidgee system as of 30 September 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 July and 30 September 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 September 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 30 September 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 September 2017. The lack of water at Piggery Lake meant that not all indicators could be monitored at this site during this time.

Water Quality

Overall water quality remains good in most wetlands. The recently-inundated mid-Murrumbidgee wetland sites were slightly more turbid than expected, however, we expect natural biological processes that regulate water quality (establishment of water plants and biofilm production) will accelerate as the seasons change with these values falling as spring progresses. Sunshower Lagoon appears to have high concentrations of algae (untested) and it is possible that water quality will decline at the site as temperatures increase and the water level declines.

Vegetation

The four wetlands monitored in the mid-Murrumbidgee sites were recently watered. As yet there has been little time for aquatic vegetation to respond, although small amounts of tall spike rush are beginning to emerge. Mercedes Swamp (Yanga National Park) was also recently watered, and the aquatic vegetation is in very good condition. Some of the smaller encroaching river red gum (*Eucalyptus camaldulensis*) seedlings at McKenna's Lagoon have continued to die, promoting thinning of river red gum in response to widespread unregulated overbank inundation in late 2016. More generally, there is no evidence of widespread germination by red gum seedlings in the wake of the recent widespread inundation.

Gooragool Lagoon showing early emergence of tall spike rush (*Eleocharis sphacelata*) in the foreground, September 2017

Frogs and tadpoles

Frog activity is typically subdued over the colder months and so few frogs were observed or heard and no tadpoles were captured during the September 2017 surveys. Several southern bell frogs (*Litoria raniformis*, EPBC Act listed as Vulnerable) were heard calling at Yarradda Lagoon, and much larger numbers (10-15) were heard calling at Eulimbah Swamp. Although several adult bell frogs were observed at Nap Nap swamp none were heard calling. Calling and observed frogs were dominated by spotted and barking marsh frogs (*Limnodynastes* sp.) and plains froglet (*Crinia parinsignifera*). Several adult banjo frogs (*Limnodynastes interioris*) were recorded (observed adults and heard calling).

A banjo frog (*Limnodynastes interioris*) at Waugorah Lagoon, September 2017.

Waterbird diversity

We recorded a total of 41 water-dependent bird species during September surveys. This included listed Eastern great egret (JAMBA) and migratory shorebird Latham's snipe (JAMBA, ROKAMBA and CAMBA listed) (a single Latham's snipe was recorded at McKenna's Lagoon in the mid-Murrumbidgee) One Australasian bittern (EPBC Act listed as Endangered) was also heard calling at Eulimbah Swamp during the nocturnal frog surveys. The recently inundated mid-Murrumbidgee wetlands supported large numbers of dabbling ducks including grey teal and pink-eared ducks. The wetlands in the Nimmie-Caria and Redbank systems which were drying down supported a diverse range of shoreline foragers (e.g. waterhens) and Australian resident shorebirds (e.g. dotterels). No colonial waterbird breeding activity was detected during the September surveys. A pair of white-bellied sea-eagles (listed as vulnerable in NSW (TSC Act)) had established a new nest at Nap Nap Swamp which we suspected was active.

Black-fronted dotterel (*Elseyornis melanops*) at Gooragool Lagoon, mid-Murrumbidgee, September 2017.

Fish (wetlands)

Relatively few fish were captured in fyke nets during September wetland surveys. One large golden perch (*Macquaria ambigua*; 43 cm) was captured at Gooragool Lagoon (see photograph below). Around 300 Australian smelt (*Retropinna semoni*) were recorded at Sunshower Lagoon (few smelt have been recorded during the Murrumbidgee LTIM wetland surveys in recent years). Fish captured at Nap Nap and Eulimbah Swamps were dominated by exotic fish (Eastern gambusia – *Gambusia holbrookii*, European carp – *Cyprinus* carpio, and goldfish – *Carassius auratus*). Oriental weatherloach (*Misgurnus angullicaudatus*) were not observed in large numbers at any of the surveyed wetlands.

a. An adult golden perch (*Macquaria ambigua*) at Gooragool Lagoon and; b. flathead gudgeon (*Philypnodon grandiceps*) at Gooragool Lagoon, September 2017.

Appendix 1 Summary of monitoring activities undertaken during late January – early February and March 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	¾ full	✓	✓	✓				✓	✓	✓	✓
	Mckennas	¼ full	✓	✓	✓				✓	✓	✓	✓
	Sunshower	¾ full	✓	✓	✓				✓	✓	✓	✓
	Yarradda	¾ full	✓	✓	✓				✓	✓	✓	✓
South Redbank	Mercedes	½ full	✓	✓	✓				✓	✓	✓	✓
	Two Bridges	Low	✓	✓	✓				✓	✓	✓	✓
	Piggery Lake	Dry	dry	dry	dry				dry	dry	✓	✓
	Waugorah Lagoon	Channel only	✓	✓	✓				✓	✓	✓	✓
Nimmie-Caira	Nap Nap	¼ full	✓	✓	✓				✓	✓	✓	✓
	Avalon	Dam-only	✓	✓	✓				✓	✓	✓	✓
	Telephone	¼ full	✓	✓	✓				✓	✓	✓	✓
	Eulimbah	½ full	✓	✓	✓				✓	✓	✓	✓
River sites	McKennas (Carrathool zone)		Commences October 2017			Oct 17	Commences October 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

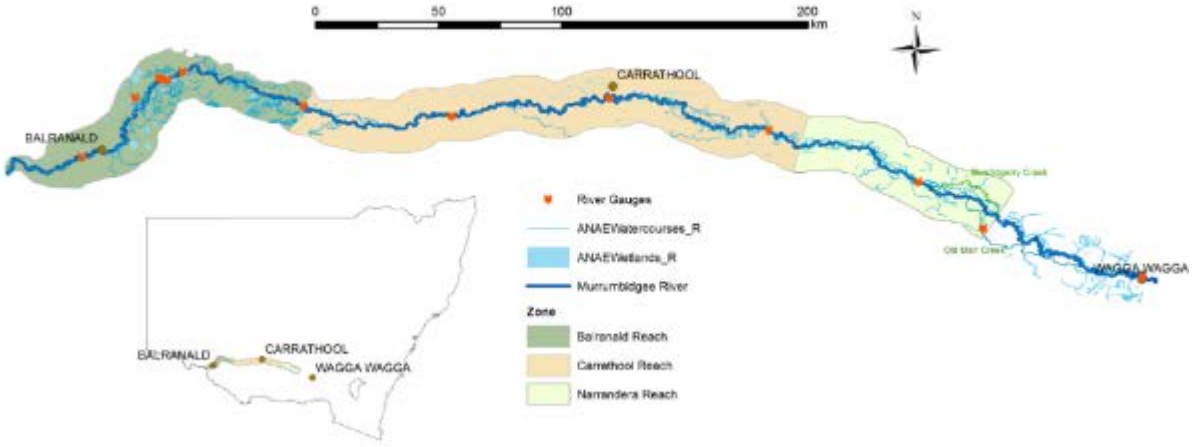

Figure 2 Distribution of riverine zones in the Murrumbidgee Selected Area.

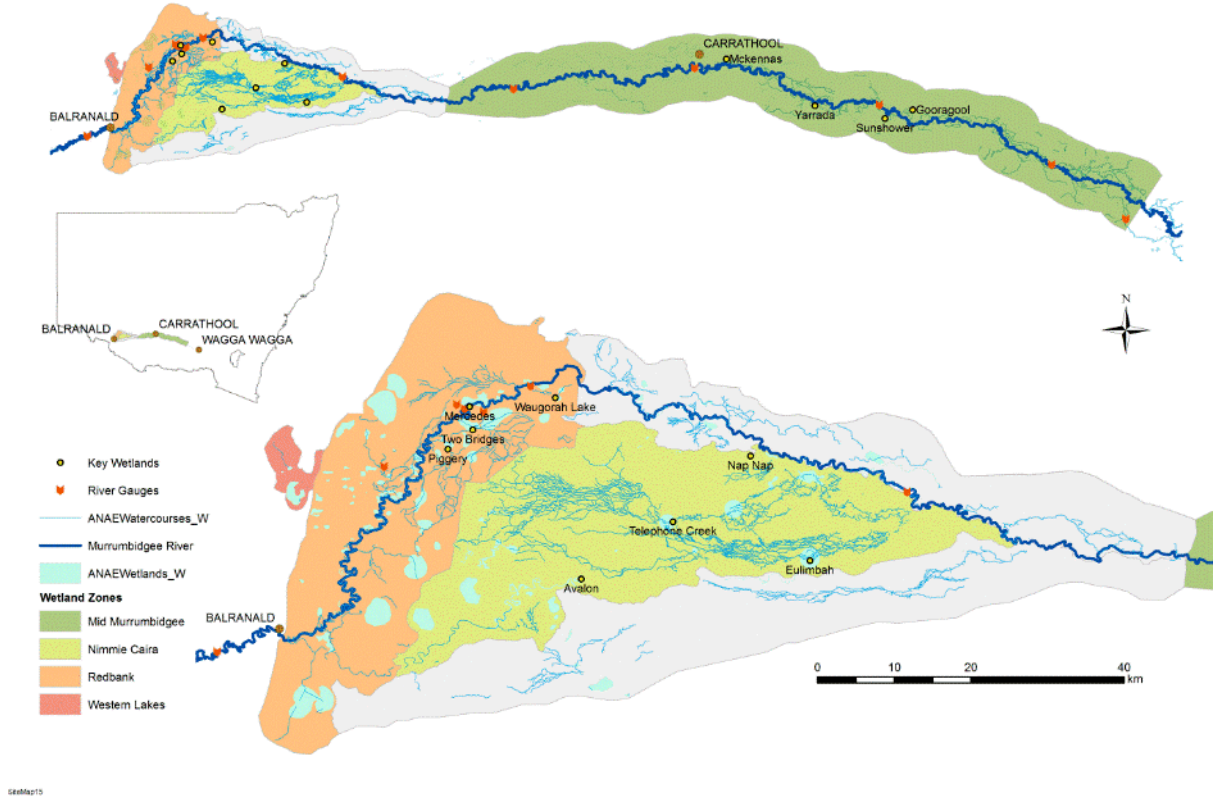

Figure 3 Distribution of wetland zones in the Murrumbidgee Selected Area and locations of key wetlands.