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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 #18
Report period: 1 October 2018 – 31 December 2018

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Bringing nets in at Piggery Lake, November 2018

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Ecological responses to Commonwealth environmental water in the Murrumbidgee system as of 31 December 2018

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 2018. 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 Nimmie-Caria, and three of the South Redbank sites held water at the time of the November surveys. Three of the mid-Murrumbidgee sites were dry, and Yarradda Lagoon was refilling after drying down.

Preliminary outcomes to 31 December 2018

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 2018. Four sites were either dry or contained insufficient water to monitor the full set of indicators at this time.

Vegetation communities

By November there had been significant vegetation responses at Two Bridges swamp and Piggery lake which received water as part of the Tala and Yanga lakes watering action. In the Nimmie-Caria, Nap Nap swamp started receiving water in early September 2018 as part of the Nap Nap to Waugorah watering action, and like the wetlands in the Redbank systems showed a strong aquatic vegetation response with water milfoils well established by November. The remaining three wetlands (Telephone Creek, Eulimbah Swamp and Avalon Swamp) were largely dry, although Telephone Creek retained water in the main creek, and Eulimbah swamp retained a small amount of water in against the block bank, these sites had limited vegetation cover and a low diversity of water dependent plant species.

	March 2018
	September 2018
	November 2018

Plate 1: Two Bridges Swamp time series March 2018 (dry), September 2018 (approximately 3 weeks after watering commenced), November 2018 (13 weeks after watering with aquatic vegetation community starting to develop)

	March 2018
	September 2018
	November 2018
Plate 2: Nap Nap Swamp time series March 2018 (dry), September 2018 (approximately 3 weeks after watering commenced), November 2018 (13 weeks after watering with aquatic vegetation community starting to develop).	

Frogs and tadpoles

Larger numbers of frogs were seen and heard in November than September. This included numerous southern bell frogs (*Litoria raniformis*) seen and heard at Nap Nap Swamp. Southern bell frogs were also heard calling adjacent to the survey site at Eulimbah Swamp and ten tadpoles were captured in nets in the main channel. Tadpoles were most abundant at Nap Nap Swamp where 461 individuals (four species) were captured. Spotted and barking marsh frogs *(Limnodynastes fletcherii* and *L. tasmaniensis*), Peron's tree frogs (*Litoria peroni*), and plains froglet *(Crinia signifera)*were heard and observed at multiple sites.

Plate 3: A southern bell frog (*Litoria raniformis*) at Nap Nap swamp, November 2018.

Waterbird diversity

Waterbird surveys were completed across all 12 wetland survey sites from late November to early December 2018. Inundated sites supported a diverse assemblage of waterbirds despite the dry conditions across much of the Murrumbidgee Selected Area. In total 28 waterbird species were detected during the surveys, which included nationally endangered Australasian Bitterns (Commonwealth EPBC Act) at Nap Nap swamp (Nimmie-Caria zone) and Two Bridges Swamp (Redbank zone). Nap Nap Swamp and Piggery Lake (Redbank zone) had been inundated by environmental water and supported the most diverse and abundant waterbird communities across the Murrumbidgee Selected Area. Yarradda Lagoon was the only site in the mid-Murrumbidgee zone which supported waterbirds with the three other mid-Murrumbidgee sites being dry during the spring and summer 2018 surveys. Waterbird breeding activity was limited across the survey sites with only small numbers of cormorants detected nesting at Piggery Lake and Nap Nap swamp.

Plate 4: Inundated spike rush in Two Bridges swamp provided breeding habitat for Australasian bitterns over summer 2018-19.

Fish and turtles (wetlands)

Total fish captures were generally higher than the September surveys. Exotic carp were numerically dominant, with large numbers of juveniles in the 30 – 80 mm size range captured at Waugorah Lagoon (10,465 individuals) and Nap Nap Swamp (7916 individuals). Native fish were also abundant at some sites, notably, 127 bony bream of a mixed size range were caught at Telephone Creek (Nimmie-Caria). Also present in small numbers were native rainbowfish, smelt, flathead gudgeon, and exotic gambusia, weatherloach and goldfish. With fresh inflows entering Yarradda Lagoon at the time of the surveys, the nets were dominated by small-bodied carp gudgeon and one small smelt.

A total of 12 turtles were captured in fyke nets during November, with individuals recorded from all three species. Turtles were most abundant at Waugorah Lagoon, where seven individuals were captured (four broad-shelled turtles, two Maquarie River turtles and one easten long-necked turtle).

Plate 5: A long-necked turtle (*Cheldonia longilcolis*) captured at Waugorah Lagoon, south-Redbank wetlands, November 2018.

Appendix 1 Summary of monitoring activities undertaken during November 2018 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	Dry	dry	dry	dry				dry	dry	✓	✓
	Mckennas	Dry	dry	dry	dry				dry	dry	✓	✓
	Sunshower	Dry	dry	dry	dry				dry	dry	✓	✓
	Yarradda	Filling	✓	✓	✓				✓	✓	✓	✓
South Redbank	Mercedes	Dry	dry	dry	dry				dry	✓	✓	✓
	Two Bridges	Full	✓	✓	✓				✓	✓	✓	✓
	Piggery Lake	Full	✓	✓	✓				✓	✓	✓	✓
	Waugorah Lagoon	Low	✓	✓	✓				✓	✓	✓	✓
Nimmie-Caira	Nap Nap	3/4 full	✓	✓	✓				✓	✓	✓	✓
	Avalon	Dam + overflow	✓	✓	✓				✓	✓	✓	✓
	Telephone	1/2 full	✓	✓	✓				✓	✓	✓	✓
	Eulimbah	Borrow pit only	✓	✓	✓				✓	✓	✓	✓
River sites	McKennas (Carrathool zone)		Complete: October-December 2018			Oct 18	Complete: October-December 2018	Mar/Apr 2019				
	Bringagee (Carrathool zone)											
	Yarradda (Carrathool zone)											
	Narrandera (Narrandera zone)					Oct 18						
	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

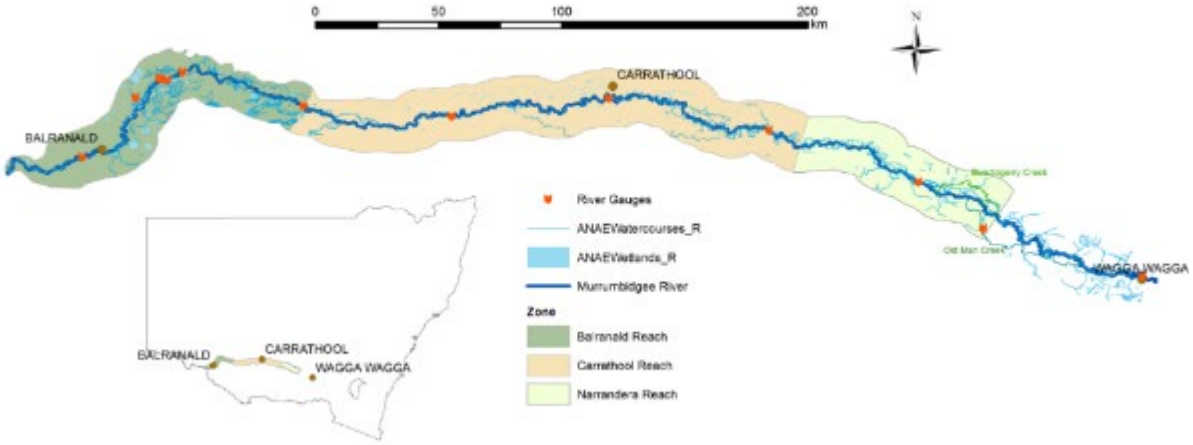

Figure 2 Distribution of riverine zones in the Murrumbidgee Selected Area.

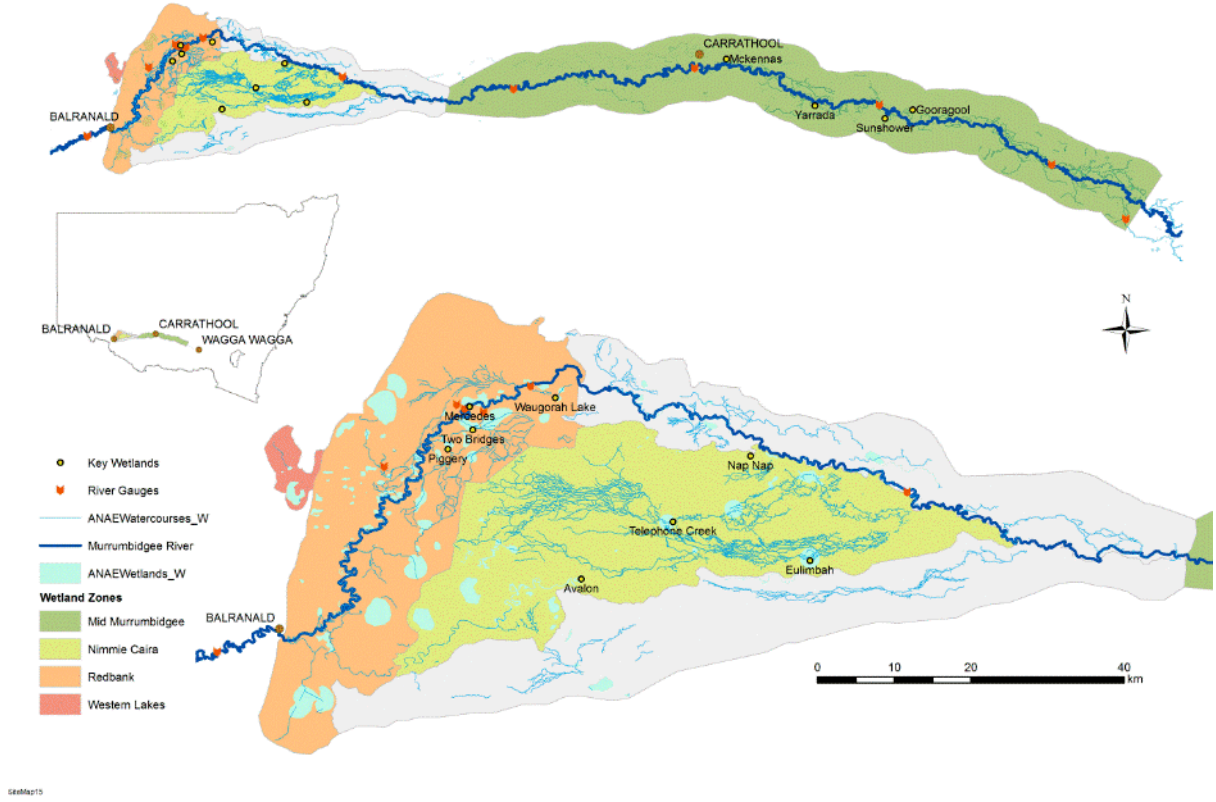

Figure 3 Distribution of wetland zones in the Murrumbidgee Selected Area and locations of key wetlands.