

Long Term Intervention Monitoring Project Murrumbidgee System

Selected Area Project Progress Report #19

Report period: 1 January 2019 – 31 March 2019

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Piggery Lake January 2019

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Ecological responses to Commonwealth environmental water in the Murrumbidgee system as of 31 March 2019

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 January and 31 March 2019. 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](#).

Three of the four South Redbank sites held water at the time of both January and March surveys. Two of the four wetland sites monitored in Nimmie-Caira held sufficient water for nets at the time of the March surveys. Three of the four mid-Murrumbidgee sites were dry at the time of both January and March surveys and Yarradda Lagoon dropped from full in January to around 50% in March.

Preliminary outcomes to 31 March 2019

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 January and March 2019. At this stage it is too early to provide monitoring insights on water quality and microcrustaceans. The January monitoring period was disrupted by prolonged and extreme high temperatures, which occurred in conjunction with a period of construction activity affecting access to sites within the Nimmie-Caira. This meant that not all of the Nimmie-Caira survey sites were monitored in the January period. All three of the South Redbank sites that held water were monitored on both occasions. One Nimmie-Caira site (Nap Nap Swamp) was monitored in January, and two sites (Telephone Creek and Avalon Dam) were monitored in March. Eulimbah and Nap Nap Swamps retained insufficient water to set nets in March. Three of the four mid-Murrumbidgee sites remained dry throughout the reporting period and Yarradda Lagoon was monitored in both January and March.



Plate 2: Setting fyke nets at Two Bridges Swamp, March 2019.

Frogs and tadpoles

Frog calls and activity increased in January and continued into March at several sites, particularly at Nap Nap Swamp. Spotted and barking marsh frogs (*Limnodynastes fletcherii* and *L. tasmaniensis*), Peron's tree frogs (*Litoria peroni*), and plains froglet (*Crinia signifera*) were heard (January) and observed (January and March) at multiple sites. Southern bell frogs (*Litoria raniformis*) were observed at Nap Nap Swamp in high numbers during surveys in both January (75 adults) and March (331 adults), and were observed in small numbers in March at Eulimbah Swamp and Telephone Creek. Southern bell frogs were also heard calling at several sites (Piggery Lake, Two Bridges) in January, and several individuals were heard calling at Two Bridges during the March survey. Tadpole numbers were highest at Yarradda Lagoon in January where 572 Peron's tree frog tadpoles were captured. Spotted and barking marsh frog tadpoles, and giant banjo frog tadpoles (*Limnodynastes interioris*), were also captured in small numbers at Two Bridges, Yarradda Lagoon and Piggery Lake. During the March

surveys a large number of late tadpoles were captured at Two Bridges
(*Limnodynastes* species – 506, *L. interioris* – 35).



Plate 3: Measuring fish at Yarradda Lagoon, January 2019.

Waterbird diversity

Waterbird surveys were completed at 9 wetland survey sites in the January period and all 12 wetland survey sites in March 2019. Inundated sites supported a diverse assemblage of waterbirds despite the dry conditions across much of the Murrumbidgee Selected Area. In total, 38 waterbird species were detected during the January and March LTIM surveys, which included endangered Australasian bitterns (EPBC Act) at Two Bridges Swamp (Redbank zone) in the January and March surveys. Complementary monitoring funded by NSW OEH was done between December 2018 and January 2019 at nine locations, including Tarwillie rookery. Both Australasian bittern and Australian little bitterns were detected during these surveys. There was also confirmed nesting in both species in inundated sites in Yanga National Park (Herring 2019) following delivery of environmental water.

Piggery Lake (28 species), Two Bridges (20 species) (Redbank zone) and Nap Nap Swamp (17 species) (Nimmie-Caira - Gayini zone) 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. January and March 2019 surveys at Yarradda Lagoon showed an increase in total species richness (14 species in January and 13 species in March, 18 species overall) compared to November 2018 (5 species) when water levels were very low.

Waterbird breeding activity was limited across the survey sites in the January and March surveys with only small numbers of darters and cormorants detected nesting at Piggery Lake and Nap Nap swamp. Broods of Pacific Black Duck and a small number of great cormorants and Australasian darters were also detected breeding at Yarradda Lagoon during the LTIM surveys.



Plate 4: Inundated sites such as Two Bridges Swamp (Yanga National Park) provided habitat for a diverse range of waterbirds including the endangered Australasian bittern (EPBC Act)

Fish and turtles (wetlands)

Total fish numbers were similar in January (4298) and March (4665). Native carp gudgeon were numerically dominant, comprising over half the total fish captures in both surveys. Also present in small numbers during both surveys were native rainbowfish, flathead gudgeon and bony bream. One small silver perch (77mm) was captured at Yarradda Lagoon in January. Native fish diversity was highest at Yarradda Lagoon in March (4 species). An unusual find was the capture of two juvenile Murray cod at Avalon Dam in March.

Exotic fish species (European carp, gambusia, goldfish and weatherloach) were present at most sites during both surveys. European carp were the numerically dominant exotic species. An increase in exotic gambusia and weatherloach was noted during March, particularly at Avalon Dam (193 gambusia) and Two Bridges (218 weatherloach).

Turtle captures were low in January (4 individuals) but increased in March as the wetlands began to dry and individuals congregated around residual pools, with a total of 59 individuals recorded from five wetlands. Eastern long-necked turtles (*Chelodina longicollis*) dominated the catch (56) in March, and were prominently caught at Two Bridges (40), Yarradda Lagoon (10), Avalon Dam (6) and Piggery Lake (1). The broad-shell turtle (*C. expansa*) was recorded at Wagourah Lagoon (2) and a single Macquarie River turtle (*Emydura macquarii*) was caught at Yarradda Lagoon.

References

Herring, M. (2019) Bitterns Surveys in the Lowbidgee Wetlands: December 2018 – January 2019 Summary Report. Report prepared for NSW Office of Environment and Heritage. Matt Herring, Murray Wildlife

Appendix 1 Summary of monitoring activities undertaken during January(J) and March (M) 2019 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	Full/ ½ full	J/M	J/M	J/M				J/M	J/M	J/M	J/M	
South Redbank	Mercedes	Dry	dry	dry	dry				dry	J/M	J/M	J/M	J/M
	Two Bridges	¾ full/ ½ full	J/M	J/M	J/M				J/M	J/M	J/M	J/M	
	Piggery Lake	1/2 full/ low	J/M	J/M	J/M				J/M	J/M	J/M	J/M	
	Waugorah Lagoon	Low	J/M	J/M	J/M				J/M	J/M	J/M	J/M	
Nimmie-Caira	Nap Nap	Low/dry	J	J	J				J	J/M	J/M	J/M	
	Avalon	March – dam full	-/M	-/M	-/M				-/M	-/M	-/M	-/M	
	Telephone	½ full	-/M	-/M	-/M				-/M	-/M	-/M	-/M	
	Eulimbah	March - dry	dry	dry	dry				dry	-/M	-/M	-/M	
River sites	McKennis (Carrathool zone)		Complete: October-December 2018						Apr 19	Complete: October-December 2018	Mar/Apr 2019		
	Bringagee (Carrathool zone)												
	Yarradda (Carrathool zone)												
	Narrandera (Narrandera zone)					Apr 19							
	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>

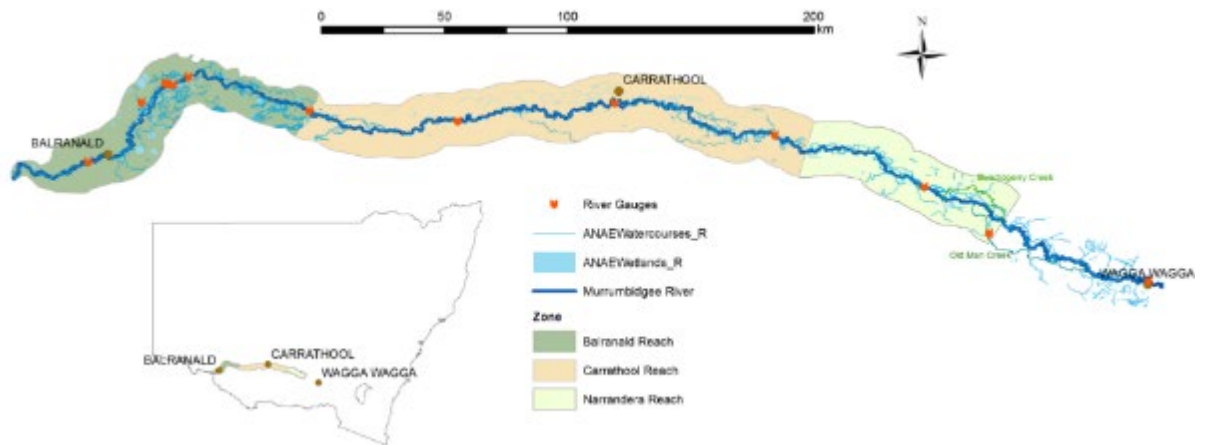


Figure 2 Distribution of riverine zones in the Murrumbidgee Selected Area.

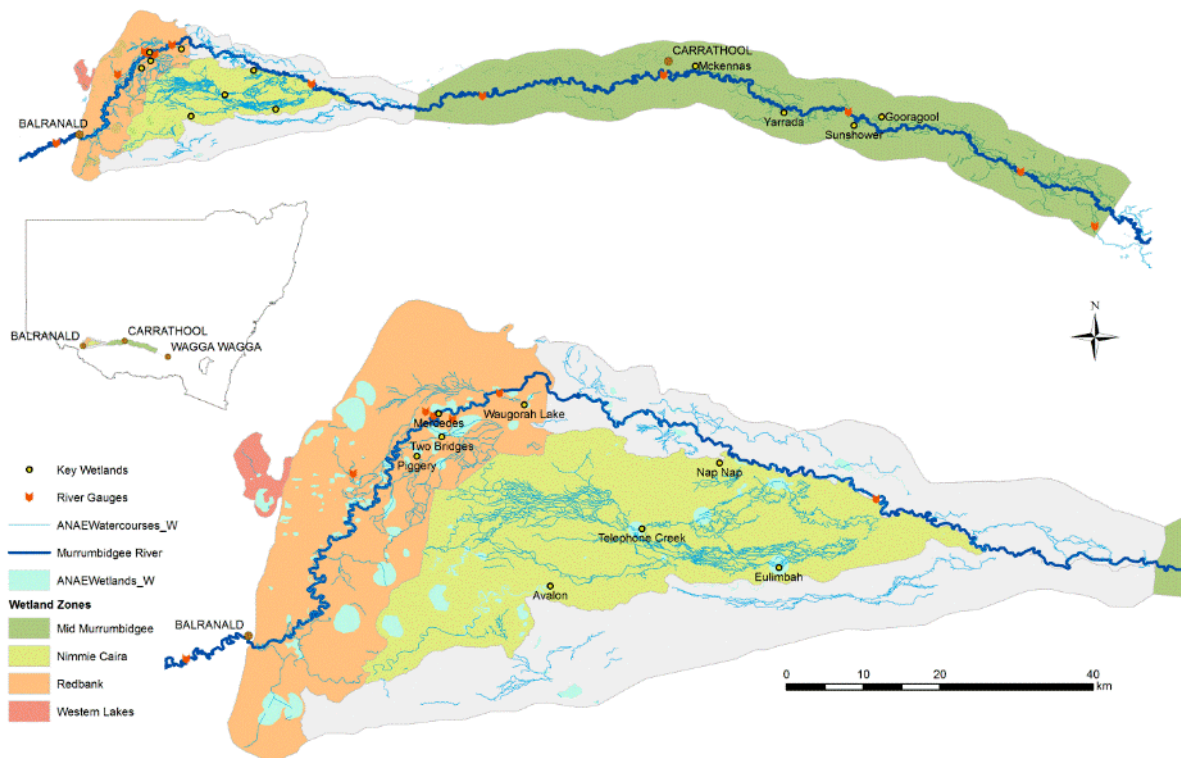


Figure 3 Distribution of wetland zones in the Murrumbidgee Selected Area and locations of key wetlands.