



Long Term Intervention Monitoring Project Murrumbidgee System Selected Area Project Progress Report #2 Report period: 1st October to 31st December 2014



Nap Nap Swamp Nimmie-Caria

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Summary on progress against core monitoring and evaluation activities

Indicator Year 1	Progress
Ecosystem Type	Underway
Hydrology Cat 1	Depth loggers deployed 16 th -20 th September at inundated LTIM wetlands. Units were downloaded between 24-30 November.
Stream Metabolism	<p>Nutrient samples were collected and a D-opto dissolved oxygen logger was installed in the Carrathool reach on 17 September 2014. Data could not be recovered from this first logger placement and the unit was replaced on 17 November and will be serviced monthly for the next six months.</p> <p>A second D-opto dissolved oxygen logger was installed at Narrandera on 17 November and will be serviced for three months.</p> <p>Weather stations have been installed at Balranald, Carrathool and Narrandera to inform metabolism monitoring and provide climate information for other sampling associated with the LTIM Project.</p>
Wetland nutrients	Second of four annual sampling rounds undertaken between 23 rd -30 th November 2014 samples currently being analysed
Microcrustaceans	<p>Second of four annual sampling rounds undertaken between 23 - 30 November 2014 samples currently being analysed</p> <p>In-channel monitoring of Microinvertebrates commenced in October 2014 in line with larval fish monitoring</p>
Fish community (river)	Not yet scheduled, commencing April-May 2015
Fish recruitment	Not yet scheduled, commencing April-May 2015
Larval fish	Underway
Wetland fish, tadpoles and frogs	Second of four annual sampling rounds undertaken between 23 - 30 November 2014
Vegetation diversity	<p>Fixed transects and photo points established at 12 wetlands.</p> <p>Second of four annual sampling rounds undertaken between 23 - 30 November 2014</p>
Waterbird diversity	Second of four annual sampling rounds undertaken between 23 - 30 November 2014

Commonwealth environmental water use in the Murrumbidgee system as of December 2014

This report outlines 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 2014. Monitoring includes assessment of ecological outcomes in the Murrumbidgee River and connected wetlands through the mid-Murrumbidgee and Lowbidgee floodplains wetlands as outlined in the Murrumbidgee Monitoring and Evaluation Plan.

In 2014-15 Commonwealth environmental water has been delivered to the North Redbank system and South Redbank systems of the Lowbidgee floodplain and Yarradda Lagoon in the mid-Murrumbidgee wetlands (refer to map at appendix 1). The key objectives of these Commonwealth environmental watering actions are 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.

Commonwealth environmental water provided to the North Redbank system also includes return flows from wetlands adjacent to the Murrumbidgee River with the objectives of returning carbon and nutrients from the surrounding wetlands to the river in order to support primary productivity, and microinvertebrate production, all of which are important sources of food for larval fish. Dissolved oxygen monitoring of return flows is being undertaken for hypoxic blackwater risk management.

Observations, and recommendations, from monitoring activities undertaken during this period support adaptive management of environmental water.

Wetland monitoring

The second of four annual routine monitoring of nutrients, water quality, microinvertebrates, fish, frogs, tadpoles, waterbirds and vegetation diversity commenced on the 22nd of November 2014 at the LTIM Project wetland monitoring sites (see appendix 1) (see appendix 2).

Field observations

Wetland fish

Four exotic fish species (carp, goldfish, gambusia and weatherloach) and three native fish (Australian smelt, bony herring and carp gudgeon spp.) were recorded during the November 2014 surveys. Overall native fish, particularly carp gudgeon dominated fish catches at the LTIM sites, with the largest catches of native fish recorded at Nap Nap and Telephone Creek located in the Nimmie-Caira zone. However, exotic fish were abundant at one wetland (Two Bridges in the Redbank zone), with large numbers of newly recruited common carp and oriental weatherloach recorded. Weatherloach have only recently colonised wetlands through the mid and lower Murrumbidgee and their ecological impacts are poorly understood.

Frogs and tadpoles

Southern bell frogs (*Litoria raniformis*, EPBC 1999) tadpoles (pictured next page) were recorded at Nap Nap Swamp where they were recorded calling in September 2014. As expected, rising flows achieved through the use of NSW environmental water triggered significant calling activity through target wetlands with between 10 and 30 individuals recorded calling through the Eulimbah Swamp and Telephone Creek systems in the Nimmie-Caira zone.



Southern bell frog tadpole from Nap Nap Swamp (November 2014)(Photo J. Ocock).

Water Quality

Water quality conditions (temperature, conductivity, dissolved oxygen, pH and turbidity) at wetland and river sites were within expected ranges for the time of year sampled. Low dissolved oxygen (2-4 milligrams per litre) was observed overnight at recently inundated forested wetlands (e.g. Piggery Lake) and sites that were drying down (e.g. Nap Nap swamp). These conditions are expected for forested wetlands at particular stages in the hydrological cycle.

Return Flows

The first of three planned return flows commenced on 8 October 2014. Water quality and nutrient conditions were monitored in the wetland behind the escape regulator and at river sites above and below the release point. Monitoring took place on various occasions including 1, 14, 21 October and 31 November. Delivery volumes averaged around 50 ML/day during the two-week release period with a small amount continuing to spill until at least 1 December. Early results show concentrations of dissolved organic carbon (DOC) in the wetland behind the escape regulator were low relative to concentrations reported for the same wetland complex during 2013-14. All data is currently being processed. Further return flows are planned for January 2015.



Wetland water being returned to the Murrumbidgee River from the Wynburn Escape on 14 October 2014.

Vegetation diversity

Vegetation surveys are undertaken to determine the response of water dependent species to environmental watering actions. By November 2014 there had been a positive response of water dependent species to Commonwealth and state environmental watering actions in the Redbank system (pictured next page). Data for the November surveys is currently being processed and we expect vegetation cover and diversity to increase over summer with further surveys planned for January and March 2015.



Two Bridges Swamp Transect 1: September 2014 (left) and November 2014 (right).

Waterbird diversity

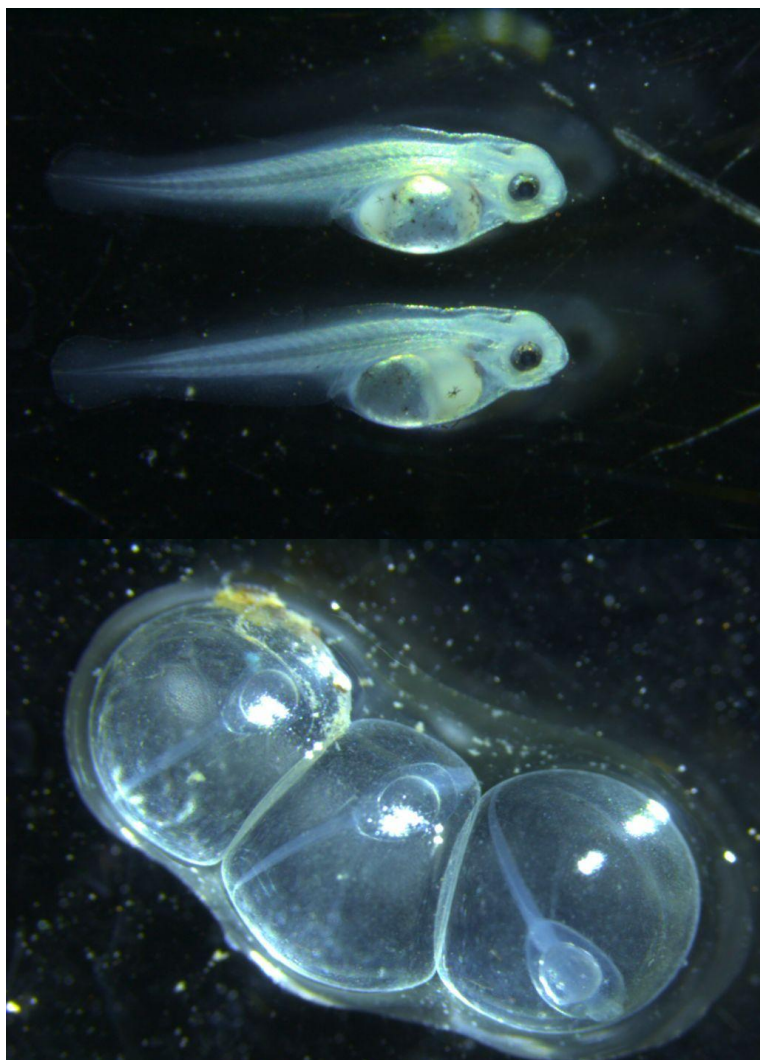
In total 18 waterbird species were recorded during the surveys of the 12 LTIM wetland sites in November 2014. The most abundant species being pink-eared ducks, grey teal and Eurasian coots, no breeding activity was detected at the LTIM monitoring sites. We expect waterbird activity to increase in the Nimmie-Caira and Redbank wetland zones over January following extended floodplain inundation over December 2014-January 2015.

In channel responses; Larval fish

Fortnightly larval fish sampling commenced at six sites (three in the Carrathool zone and three in the Narrandera zone) on the week of the 20 October 2014. At each site larval fish (drift nets and light traps), water quality, nutrients and carbon, chlorophyll a and microinvertebrate samples are collected.

Sample processing is currently underway, and preliminary observations indicate captures of larval Australian smelt, cod species (*Maccullochella* spp; Murray or trout cod) and carp gudgeon as well as juvenile common carp and redfin. On the third sampling round (week beginning 17 November 2014) staff from NSW DPI captured drifting eggs in larval nets, which were live picked in the field and successfully hatched out in the laboratory. This has resulted in confirmation of golden perch spawning associated with a river level rise in both the Carrathool and Narrandera reaches. In excess of 200 eggs were hatched out and these are currently being processed to determine if silver perch species were collected.

In addition to the larval fish a number of larval Murray crayfish were also collected in drift nets at Euroley Bridge and The Dairy sites in the Narrandera zone during the first week of sampling.



Larval golden perch (top) hatched from eggs (bottom) collected during larval fish monitoring.

Appendix 1 Maps showing location of hydrological zones and key wetlands in the Murrumbidgee system

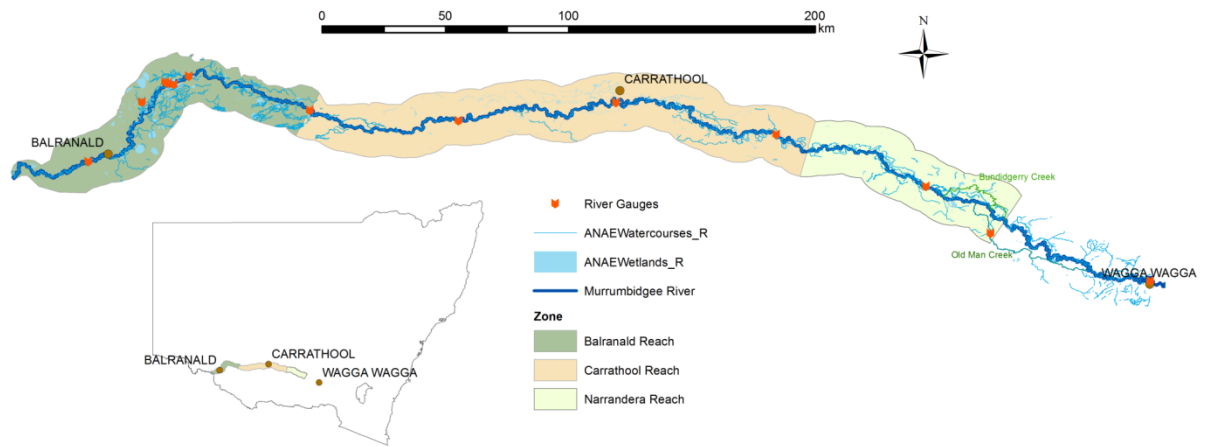


Figure 1 Distribution of riverine zones in the Murrumbidgee Selected Area.

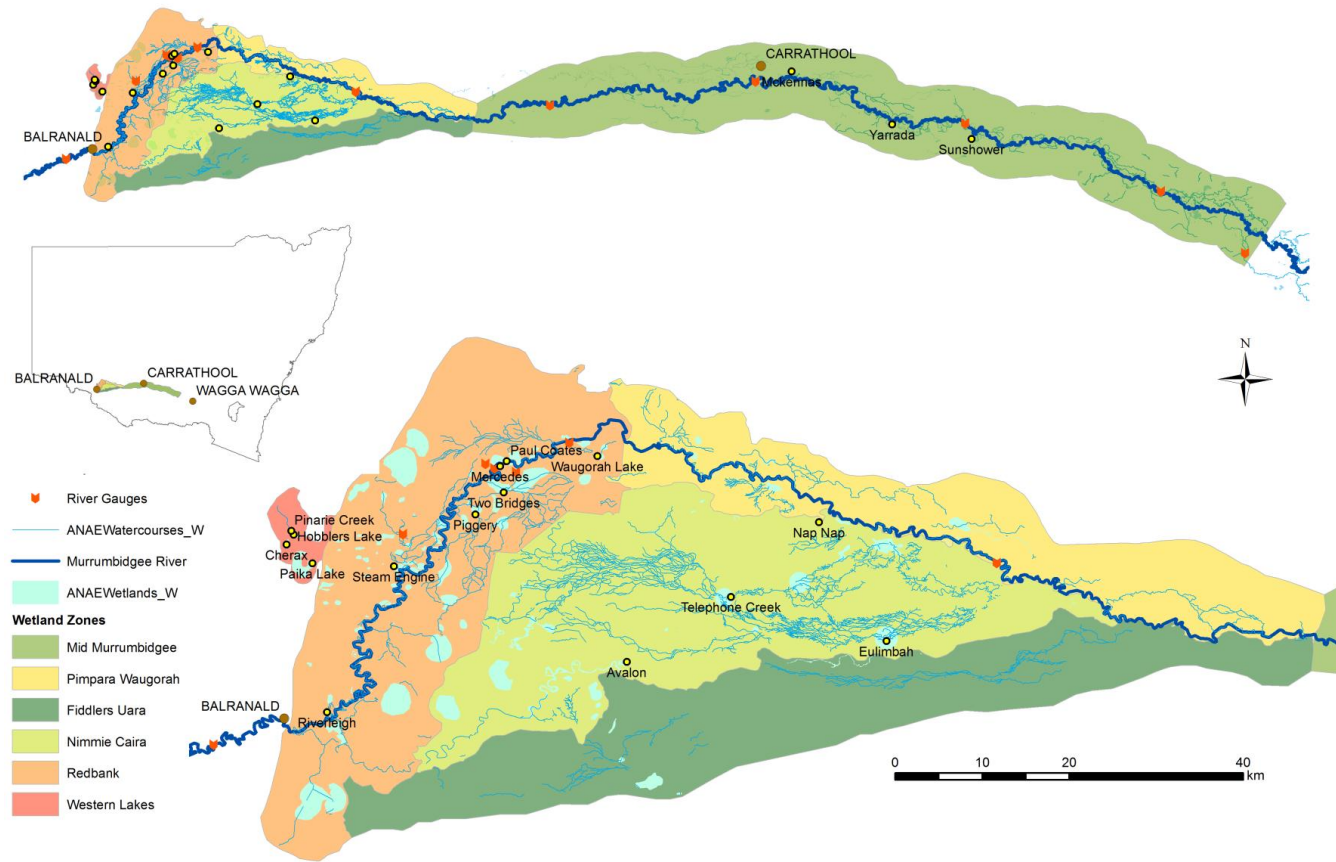


Figure 2 Distribution of wetland zones in the Murrumbidgee Selected Area and locations of key wetlands.

Appendix 2 Summary of monitoring activities undertaken between October and December 2014 as part of the Monitoring and evaluating ecological responses to Commonwealth environmental water use in the Murrumbidgee River Valley, in 2014-15.

Zone	Site name	Status	Water Quality	Microinvertebrates Chlorophyll A	Carbon Nutrients	Larval fish	Tadpoles, fish and turtles (wetlands)	Frogs	Waterbirds	Vegetation	Depth logger	Temperature logger
mid-Murrumbidgee	Gooragool	Dry							✓	✓	✓	✓
	Mckennas	Dry							✓	✓		✓
	Sunshower	Dry							✓	✓		✓
	Yarrada	Dry							✓	✓	✓	✓
South Redbank	Mercedes	Recently inundated	✓	✓	✓		✓	✓	✓	✓	✓	✓
	Two Bridges	Recently inundated	✓	✓	✓		✓	✓	✓	✓	✓	✓
	Piggery Lake	Recently inundated	✓	✓	✓		✓	✓	✓	✓	✓	✓
	Waugorah Lagoon	Recently inundated	✓	✓	✓		✓	✓	✓	✓	✓	✓
Nimmie-Caira	Nap Nap	Residual	✓	✓	✓		✓	✓	✓	✓	✓	✓
	Avalon	Filling	✓	✓	✓		✓	✓	✓	✓		✓
	Telephone	Recently inundated,	✓	✓	✓		✓	✓	✓	✓	✓	✓
	Eulimbah	Recently inundated	✓	✓	✓		✓	✓	✓	✓	✓	✓
River sites	McKennas (Carrathool zone)		✓	✓	✓	✓						
	Bringagee (Carrathool zone)		✓	✓	✓	✓						
	Yarrada (Carrathool zone)		✓	✓	✓	✓						
	Narandera (Narrandera zone)		✓	✓	✓	✓						
	Euroley (Narrandera zone)		✓	✓	✓	✓						
	Dairy (Narrandera zone)		✓	✓	✓	✓						
Return Flow	US Wynburn escape 1km *		✓	✓	✓							
	Immediately US Wynburn escape *		✓	✓	✓							
	Wynburn Wetland *		✓	✓	✓						✓	
	DS Wynburn escape 1km *		✓	✓	✓							
	DS Wynburn escape 2km *		✓	✓	✓							
	DS Wynburn escape 3km *		✓	✓	✓							