



## Lachlan River

## Long Term Intervention Monitoring Project

## **Progress Report**

1<sup>st</sup> April – 30<sup>th</sup> June 2018







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Cover Photo: Fiona Dyer and Patricia Murray surveying vegetation transects. Photo: Alica Tschierschke (IAE-UC)

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### **1** Conditions in the Lachlan River system April – June 2018

Conditions remained warm and dry across the catchment between April and June, completing 6 months of very dry conditions. Rainfall was particularly low in February, March and April (Figure 1). The total rainfall for April to June 2018 was less than half of the long term median<sup>1</sup> rainfall (70.4 mm) and one third of the long term average (94.2 mm).



### *Figure 1. Rainfall at Hillston (075032) in the Lower Lachlan River Catchment for the first half of 2018 compared with the long term average monthly rainfall and the long term median monthly rainfall. Data from the Bureau of Meteorology.*

Average daily maximum temperature in April was 6 degrees warmer than the long term average whereas May and June average daily maximums were only slightly warmer than the long term averages (Figure 2). Average daily minimum temperatures were just slightly warmer in April than the long term average (Figure 2) but cooler in May and June reflecting a greater diurnal range in temperatures often associated with dry conditions.

<sup>&</sup>lt;sup>1</sup> Median rainfall is the mid-point of all observed rainfall records when they are sorted in order of magnitude. The median is the preferred measure of 'typical' rainfall from a meteorological point of view. This is because of the high variability of rainfall; one extreme rainfall event will have less effect on the median than it will have on the arithmetic mean.



*Figure 2. Maximum and minimum temperatures for the first half of 2018 at Hillston in the Lachlan River catchment comparing 2018 average daily temperatures with the long term average daily temperatures. Data from the Bureau of Meteorology.* 

## **2** Summary on progress against core monitoring and evaluation activities

ACTIVITIES	PROGRESS TO DATE	UPCOMING ACTIVITIES					
Monitoring activities							
Ecosystem type	<ul> <li>Data collection complete and suggested Australian National Aquatic Ecosystems (ANAE) types for all sites included in the Monitoring and Data Management System (MDMS).</li> </ul>	No more data collection required					
Fish (river)	• 2017-18 fish sampling completed	Data analysis and reporting					
Fish (larvae)	<ul> <li>2017-18 larval fish sampling completed</li> </ul>	Data analysis and reporting					
Waterbird breeding (optional)	• Not undertaken in 2017-18	• None					
Water quality and stream metabolism	Logger data downloaded	<ul> <li>Checking, calibrating and downloading logger data. This will occur again once river levels allow access to the loggers</li> </ul>					
Vegetation diversity	Autumn vegetation surveys     completed	Data analysis and reporting					
Frogs (optional)	• Not undertaken in 2017-18	None					
Evaluation activities							
Monitoring data entry	Data entry continuing	Data entry continuing					
Communication and engagem	ent						
Selected Area Working Group (EWAG and TAG meetings)	<ul> <li>Attended Quarter 2 EWAG meeting in Forbes</li> </ul>	Attend regular planning meetings					
Project team teleconference	<ul> <li>Meeting held with team members about annual reporting</li> </ul>	Catch up at annual forum					
Other Stakeholder Engagement	<ul> <li>Reports provided to the new property manager from Hazelwood.</li> <li>Vegetation survey data provided to the property manager for Lake Marrool and Clear Lake including imagery from fixed point cameras</li> <li>Discussions with Booligal and Lachlan swamp landholders interested in learning more about the CEWO and LTIM monitoring.</li> </ul>	<ul> <li>To be developed in consultation with CEWO</li> </ul>					

**Note:** for the Long-Term Intervention Monitoring (LTIM) Project, Lachlan River system selected area:

• **Appendix A** provides a summary of monitoring to be undertaken under the project from 2014-2019.

### **3** Observations

### 3.1 Hydrology

Flow in the Lachlan River downstream of Willandra weir was low at the start of April. Two small pulsed flows occurring toward the end of April and early May associated with the delivery of water from Lake Brewster to provide a fresh at Booligal (Figure 3). Stock and domestic deliveries to the increased flow at the start of June and continued to the end of the reporting period.

In spring 2017, Commonwealth environmental water was delivered to the Lachlan River, targeting outcomes for native fish in both the mid (Forbes) and the lower (Hillston) Lachlan River. Results from the fish monitoring efforts are found in the Progress report from March 2018. Water from the Forbes environmental water order that was not required to meet the order at Hillston was reregulated into the Brewster outflow wetland. Environmental water (1660 ML) stored in Brewster weir was used in May to achieve a small fresh in the river at Booligal. The small fresh passed Booligal between the 22<sup>nd</sup> May and the 2<sup>nd</sup> June (Figure 4).



*Figure 3. Flow in the Lachlan River recorded at the gauge upstream of Willandra weir (412038). Data from WaterNSW (http://waterinfo.nsw.gov.au/).* 



*Figure 4. Flow in the Lachlan River recorded at the gauge at Booligal (412005). Data from WaterNSW (http://waterinfo.nsw.gov.au/).* 

### 3.2 Field observations

### Vegetation monitoring

The autumn vegetation monitoring was conducted in May and early June. All sites were dry and none of the usual annual or rain responding autumn species were present. Large numbers of chenopods had broken off at ground level and were blowing around the landscape, piling up at fences (Figure 4).



Figure 5. Roly-poly against the fences north of Hillston in the lower Lachlan catchment (photo: Fiona Dyer)

Groundcover was generally low, but the effects of the recent floods were still evident in the vegetation community; trees and small shrubs were in good condition and there was a relatively small proportion of exotic species present at the monitored sites. The lack of exotic species was particularly evident at Lake Tarwong where the channels of the channel mound wetlands were bare instead of the usual mix of thistles and burrs.

### Fixed point cameras

Fixed point cameras have been installed at a number of sites across the catchment to provide daily observations of water levels. The images from these cameras are downloaded and processed following site visits. The cameras from Whealbah billabong were downloaded in early June and the images processed on return to the University. These images cover the period between October 2017 and May 2018 and revealed both changes in water levels in the River (Figure 4) and the use of the river by a range of wildlife (Figure 5 and Figure 6).



Figure 6. Water level changes in the Lachlan River at Whealbah from fixed point cameras.



*Figure 7. Native animals using the banks of the Lachlan River at Whealbah* 



Figure 8. Domestic and feral animals using the banks of the Lachlan River at Whealbah.

### 3.3 Communication and Engagement activities

In March to June 2018, the LTIM project provided access to Booberoi Creek during an environmental flow for a Ngiyaampaa traditional owner, and facilitated the return of a landholder, Marian McGann, to the property (Toopuntal) where she grew up in the Great Cumbung Swamp after more than 40 years away.

Peter Harris and his first cousin Woddy Harris, spent a day assisting with fish monitoring on the Booberoi Creek and explained on camera the cultural and spiritual significance of the creek and its values to LTIM Communications lead, Jo Lenehan. This is the first use of environmental water holdings for cultural– environmental watering in the Lachlan Valley, and is a positive example which the LTIM project will develop and assist the local Aboriginal community showcase to Northern Basin Aboriginal Nations (NBAN).

Marian McGann's presence as a volunteer on the vegetation monitoring (Figure 8) facilitated an in-depth tour of Toopuntal, including a monument that marks the landing of Sturt on the banks of the Murrumbidgee (1839–40). The CEWO and LTIM team will support the transposing of Marian's historical video imagery and photographs into a modern format to be shared with the new owners and interested community.



*Figure 9. Marian McGann, Fiona Dyer and Ebony Mullin at Lake Nooran during the autumn vegetation monitoring.* (*Photo Alica Tschierschke*)

Four Murrin Bridge residents and members of the Grass Roots Aboriginal NRM work team were also trained in the LTIM vegetation tree condition and diversity method (Figure 8). The Grass Roots team were then contracted by CEWO and OEH to obtain baseline date for the oxbow lagoon on Murrin Bridge LALC land, which is planned for environmental–cultural watering in Spring 2019 via a Lachlan first pumping trial.



Figure 10. Grass Roots aboriginal NRM team undertaking training in vegetation monitoring. (Photo: Mal Carnegie)

# Appendix A: The Long-Term Intervention Monitoring Project for the Lachlan River system and its context in terms of ecological monitoring and evaluation within the Murray-Darling Basin.

The Long Term Intervention Monitoring (LTIM) Project for the Lachlan river system selected area is funded by the Commonwealth Environmental Water Office. The project is being delivered by a consortium of service providers lead by University of Canberra and includes NSW Office of Environment and Heritage, NSW Department of Primary Industries (Fisheries), NSW Department of Primary Industries (Office of Water), University of New South Wales and Charles Sturt University.

The LTIM project is based on a clear and robust program logic, as detailed in the <u>Long-Term Intervention</u> <u>Monitoring Project Logic and Rationale Document</u>. That document sets out the scientific and technical foundations of long-term intervention monitoring and is being applied to areas where LTIM projects are being undertaken. It also provides links between Basin Plan objectives and targets to the monitoring of outcomes from Commonwealth environmental watering actions. For more information, see <u>Monitoring and</u> <u>evaluation for the use of Commonwealth environmental water</u>.

Many different agencies play a role in the reporting on environmental outcomes, consistent with the Basin Plan (see figure 1 below). The Murray Darling Basin Authority is responsible for reporting on achievements against the environmental objectives of the Basin Plan at a basin-scale, which are broadly focussed on flows and water quality, fish, vegetation and birds across the whole of the Basin. State Governments are responsible for reporting on achievements against the environmental objectives of the Basin Plan at an assetscale i.e. rivers, wetlands, floodplains. The Commonwealth Environmental Water Holder is responsible for reporting on the contribution of Commonwealth environmental water to the environmental objectives of the Basin Plan (at multiple-scales).



Figure 11. A summary of roles various agencies play a in the reporting on environmental outcomes, consistent with the Basin Plan.



Hydrological zones and monitoring sites of the lower Lachlan for the Long-Term Intervention Monitoring Project.

Figure 12. Lower Lachlan LTIM monitoring sites, hydrological zones and NSW gauging stations

### Monitoring to be undertaken in the Lachlan system for the Long Term Intervention Monitoring Project from 2014-2019

The five year monitoring schedule has been based around the expected watering options and is focussed on the monitoring of Basin Indicators. Monitoring effort is consistent across the five years with the exception of monitoring Waterbird Breeding and Frogs which are options that can be implemented on request from the CEWO.

	ZONE	DATA CONTRIBUTES TO THE EVALUATION OF RESPONSES TO COMMONWEALTH ENVIRONMENTAL WATERING SELECTED AREA WHOLE OF BASIN SCALE		MONITORING FREQUENCY	SITES	EXPECTED SCHEDULE
Ecosystem type	All	✓	✓	Once only	All sites for other indicators	Establishment of ANAE type at the start of the LTIM Project. Expected August- December 2014
Riverine fish	1	✓	$\checkmark$	ANNUAL	Basin Evaluation: 10 fixed sites within Zone 1	Annual sampling between March and May
Larval fish	1	$\checkmark$	$\checkmark$	ANNUAL	3 fixed riverine sites in Zone 1	Annual sampling 5 times during breeding season (September to February)
Stream metabolism	1	✓	✓	CONTINUOUS REGULAR	Four fixed sites matched to riverine fish sampling sites in Zone 1	Continuous monitoring of dissolved oxygen and temperature. 6 weekly sampling of nutrients and water quality attributes.
Hydrology (River)	1	$\checkmark$	$\checkmark$	CONTINUOUS	Gauging sites	
Vegetation diversity and condition	All	$\checkmark$		ANNUAL & EVENT BASED	12 fixed sites	Before and after watering (expected to be April/May and 3 months after first fill)
Waterbird breeding (Option)	1	✓		EVENT-BASED (on request from the CEWO)	One fixed site – Booligal wetland	Fortnightly surveys of bird breeding triggered by breeding events in Booligal wetland.
Frogs (Option)	All	$\checkmark$		EVENT-BASED (on request from the CEWO)	15 sites comprising 2 to 8 wetland sites and 2 to 7 riverine sites depending on watering targets	3 sampling events between August and February (one sample in each of winter, spring and summer).
Hydrology (wetland – Option)		$\checkmark$		EVENT-BASED (in conjunction with Waterbird Breeding or Frog monitoring)	Cameras at 6 roving wetland sites	Cameras installed prior to targeted watering each year and downloaded after the watering event has passed