Australian Government
Commonwealth Environmental Water Office

UNIVERSITY OF CANBERRA

INSTITUTE FOR APPLIED ECOLOGY

Long Term Intervention Monitoring Project

Lachlan River System Selected Area

Project Progress Report

Report period: ***1 January to 31st March 2015***

Larval Murray cod and mayfly. Photo Emily Belton

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Inquiries regarding this document should be addressed to:

Dr Fiona Dyer
Phone: 02 6201 2452
e-mail: Fiona.Dyer@canberra.edu.au

Document history and status

Version	Date Issued	Reviewed by	Approved by	Revision Type
Draft 1	25 March 2015	Ben Broadhurst	Fiona Dyer	Internal
FINAL	3 June 2015	Ebony Coote	Fiona Dyer	External

Distribution of copies

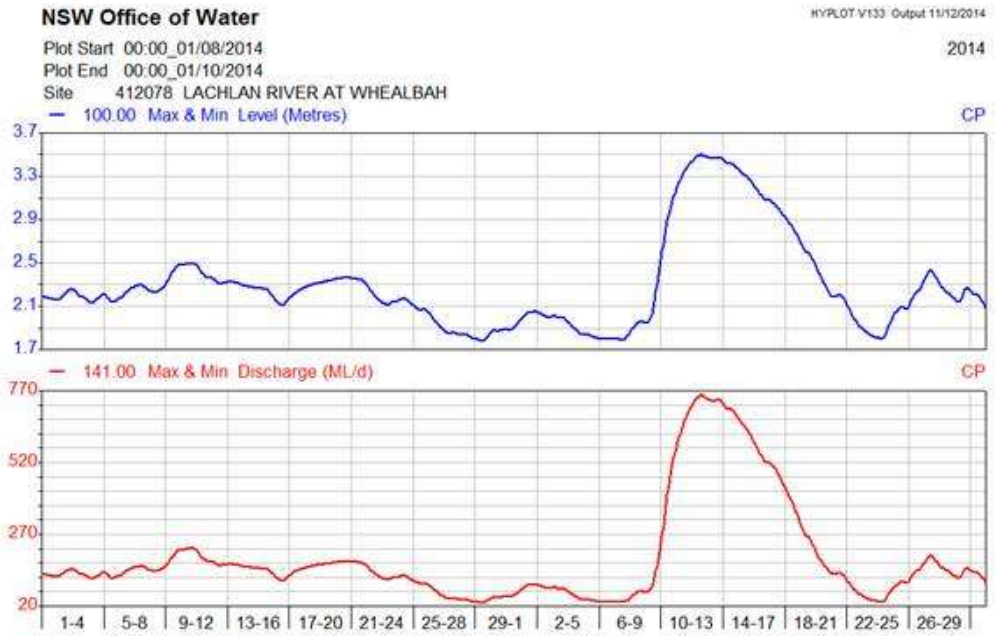
Version	Type	Issued to
FINAL	Electronic	Commonwealth Environmental Water Office

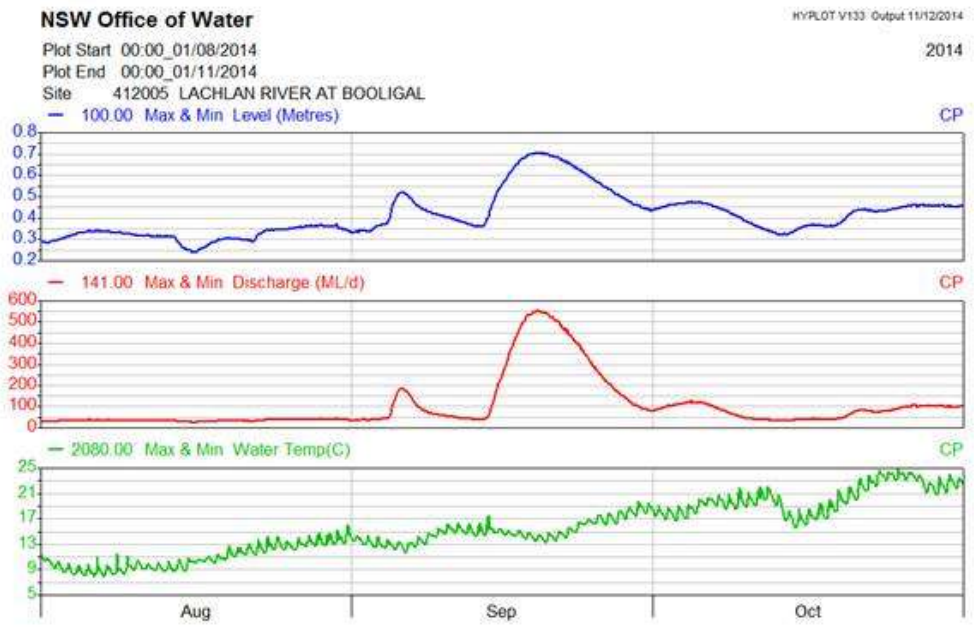
1 Objectives of Commonwealth environmental water use in the Lachlan River system during 2014-15

Primary objective: Commonwealth environmental water will contribute to the preservation of the integrity of small to medium unregulated flows through the Lachlan River system through spring-summer to provide natural cues for native fish

Secondary objectives: It is anticipated that this action will contribute to improved habitat access, fish condition, recruitment opportunities, larval survival, and will provide more natural flow variability by restoring a portion of small to medium freshes.

Commonwealth Water delivered as at 30 September 2014: 5,000 ML combined with NSW water of 821 ML. As further natural trigger events did not occur, no further watering has been undertaken since the September 2014 flows.





2 Summary on progress against core monitoring and evaluation activities

ACTIVITIES	PROGRESS TO DATE	UPCOMING ACTIVITIES
Monitoring activities		
Ecosystem type	• Initial data collected	• Processing of data and verification of ANAE type for sites
Fish (river)	• No sampling required	• Sampling in Autumn 2015
Fish (larvae)	• Sampling commenced 15/10/14 and finished 12/12/14 • Samples have had larvae extracted and 10% of formal identification completed	• Processing of samples collected during field program
Waterbird breeding (optional)	• No sampling required	• None
Water quality and stream metabolism	• Sampling sites established 25/8 • Data downloaded and ready for processing	• Processing of field data.
Vegetation diversity	• Sampling commenced 3/11 and finished5/12 • 50% of field data processed	• Processing of field data
Frogs (optional)	• No sampling required	• None
Evaluation activities		
Monitoring data entry	• Database not yet available	• Enter data into database when available
Communication and engagement		
Selected Area Working Group	• Meeting schedule being established. Expected first meeting early April 2015	• Meeting schedule to be established for 2015 and quarterly meetings held
Project team teleconference	• Scheduled for 30 March	• Set next teleconference date
Other Stakeholder	• Land access protocols developed for	• Provision of information to

Engagement	all sites being accessed for sampling	landholders

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

- **Appendix A** provides additional information about the project for the Lachlan system and its context in terms of ecological monitoring and evaluation within the Murray-Darling Basin
- **Appendix B** provides a map showing the location of hydrological zones that will be monitored
- **Appendix C** provides a summary of monitoring to be undertaken under the project from 2014-2019.

3 Observations

3.1 Larval Fish Sampling

Following the fish spawning flow, fortnightly sampling of Larval fish was conducted between mid-October and mid-December at three sites on the lower Lachlan River (Wallanthry, Hunthawang and Lanes Bridge). Field observations of retrieved nets and traps confirmed that larval fish were present at all sites. All larvae have been extracted from the samples and approximately 10% of the larvae have been formally identified. Identifications are ongoing, however, it is noted that so far Murray cod (*Maccullochella peelii*), Australian smelt (*Retropinna semoni*) and catfish (*Tandanus tandanus)* have been identified. Timing of sampling looks to have been ideal for capturing the peak Murray cod drifting phase.

Honours student Emily Belton has been investigating the stomach contents of Larval Murray cod from our monitoring sites and has collected samples of the microinvertebrates available as food sources. She is interested in understanding if the larvae display a preference for certain prey items. Emily has finished her laboratory processing and is now working on analysing her data. Initial indications are that Murray cod are exhibiting some selectivity with differences in the between microinvertebrates found in benthic and pelagic samples and the composition of the larval Murray cod diet.

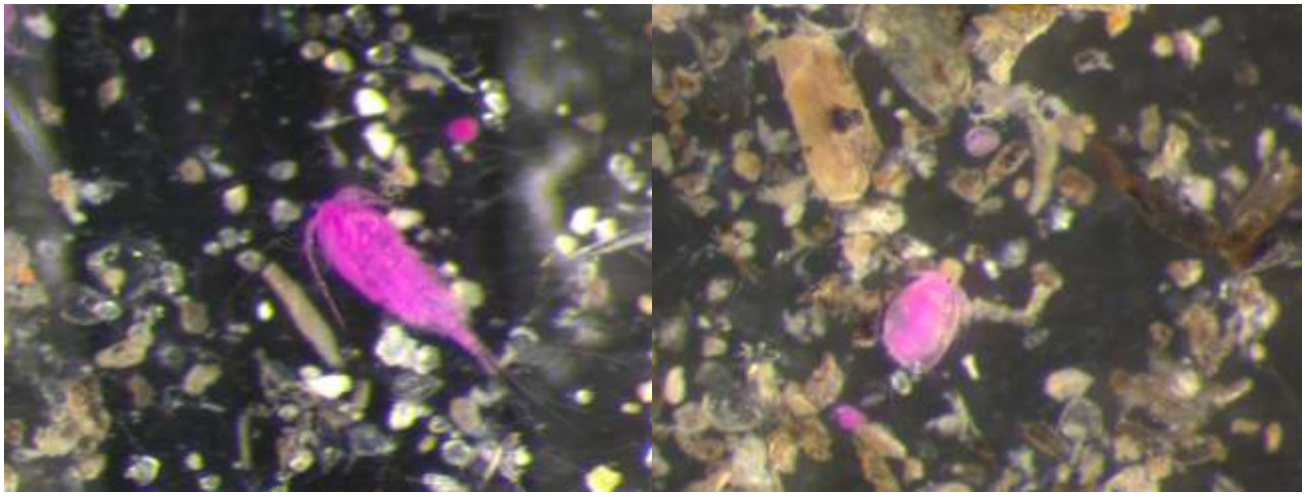


Figure 1. Microinvertebrates (stained pink) from samples collected in association with the fish larvae. These creatures form part of the diet of larval Murray cod. Photos by Emily Belton

3.2 Vegetation Monitoring

Vegetation monitoring was conducted between 3 November and 5 December between the Great Cumbung Swamp and Lake Brewster. Approximately 50% of the groundcover samples have been identified revealing a typical mix of species from the region.

Figure 2. Vegetation samples from the Lachlan. Upper Left: grey germander (Teucrium racemosum), Upper Right: caustic weed (Euphorbia drumondii); Lower left: galvanized burr (Sclerolaena birchii) Lower Right: swamp Chinese lantern (Abutilon theophrasti) Photos by Fiona Dyer

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), Central Tablelands Local Land Services, 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 Long-Term Intervention Monitoring Project Logic and Rationale Document. 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 Monitoring and evaluation for the use of Commonwealth environmental water.

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 asset-scale 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).

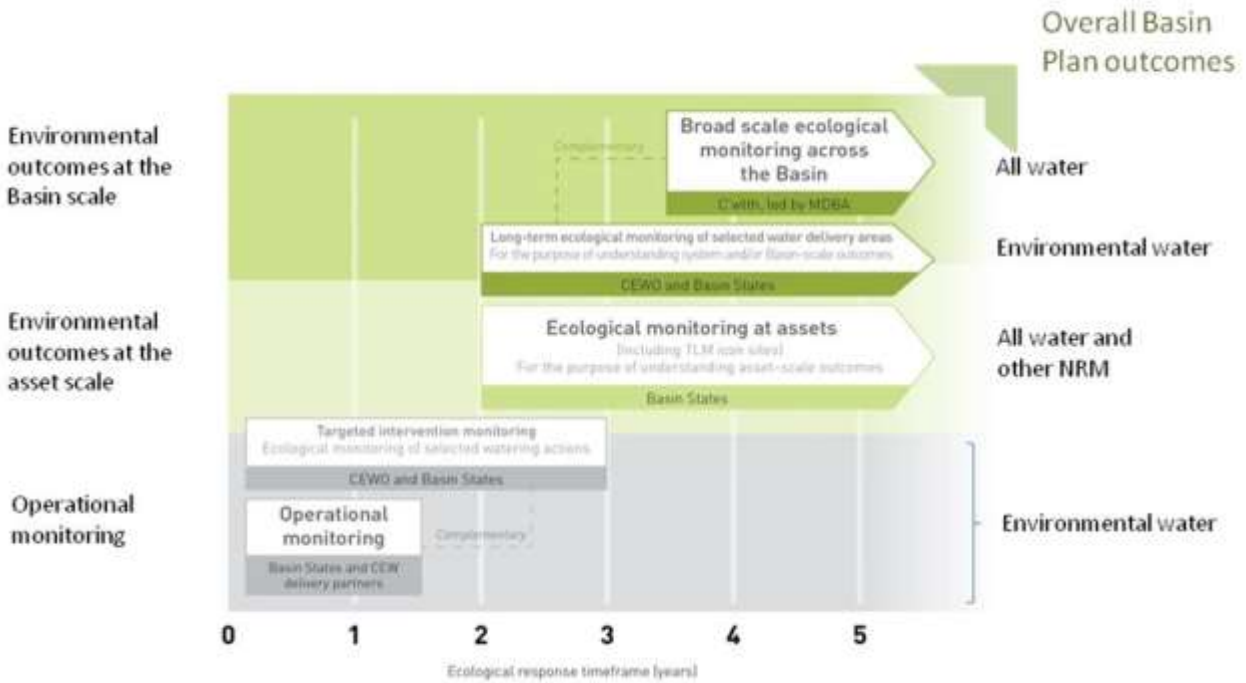
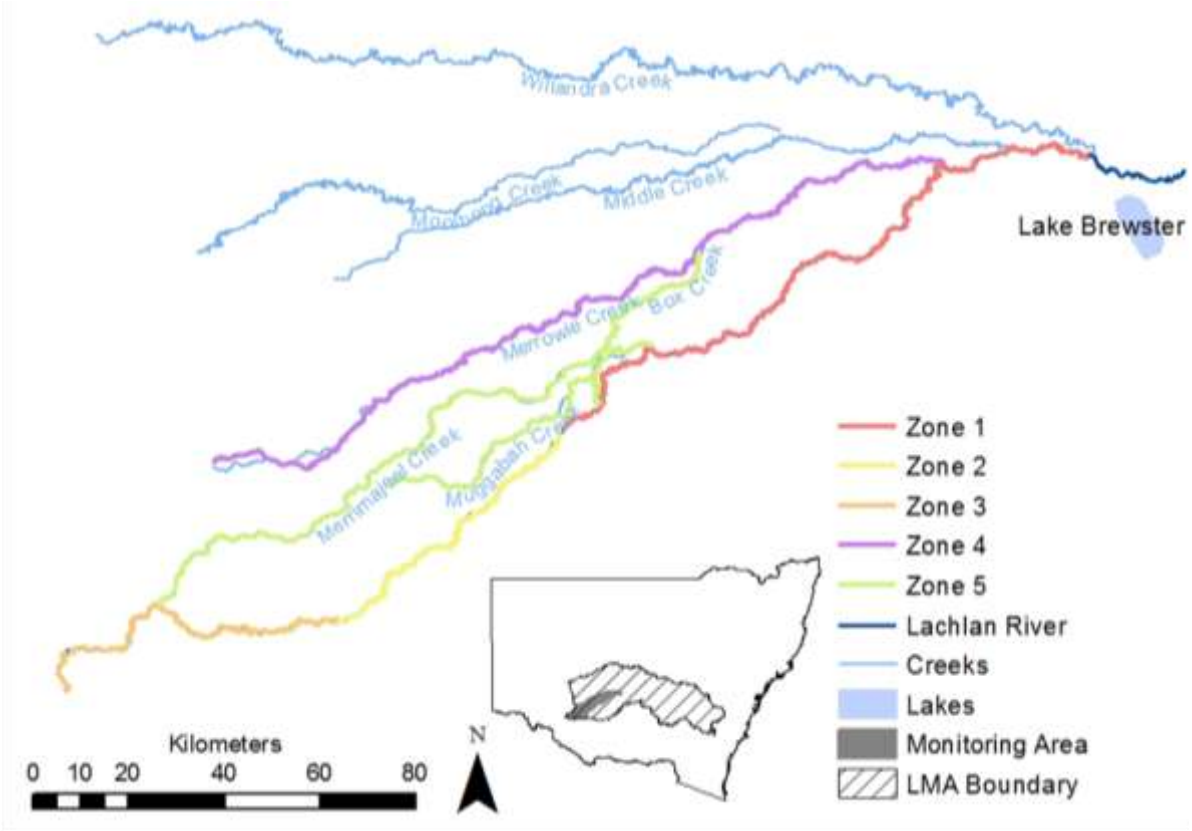


Figure 1. A summary of roles various agencies play a in the reporting on environmental outcomes, consistent with the Basin Plan.

Appendix B: Map showing location of hydrological zones of the Lachlan system for the Long-Term Intervention Monitoring Project.



Appendix C: Summary of 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 the basis of a request from the CEWO.

INDICATOR	ZONE	EVALUATION OF RESPONSES TO COMMONWEALTH ENVIRONMENTAL WATERING IN THE LACHLAN SYSTEM (WHERE APPROPRIATE)	DATA WILL CONTRIBUTE TO EVALUATION OF RESPONSES TO COMMONWEALTH ENVIRONMENTAL WATERING AT WHOLE OF BASIN-SCALE (WHERE APPROPRIATE)	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	✓	✓	ANNUAL	Basin Evaluation: 10 fixed sites within Zone 1	Annual sampling between March and May
Larval fish	1	✓	✓	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	✓	✓	CONTINUOUS	Gauging sites	
Vegetation diversity and condition	All	✓		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. Assumes 3 breeding events in 5

						years.
Frogs (Option)	All	✓		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)		✓		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