



Long Term Intervention Monitoring Project Edward-Wakool River System Selected Area Project Progress Report #1

Report period: 1 July to 30 September 2014



Retrieving a larval fish light trap from a sample site (Photo J. Abell)

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Long Term Intervention Monitoring Project, Edward-Wakool river system Selected Area, Progress Report Number 1

Summary on progress against core monitoring and evaluation activities

Note: for the Long-Term Intervention Monitoring Project, Edward-Wakool River system Selected Area:

- **Appendix A** provides additional information about the project for the Edward-Wakool 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.

Activities	Progress
Monitoring activities	
Hydraulic modelling	<ul style="list-style-type: none"> • Doppler survey and modelling will be undertaken later in 2014-15
River hydrology	<ul style="list-style-type: none"> • Inception field trip undertaken 21-22 July to finalise selection of sites • Hydrological data from July to Sept 2014 has been downloaded from NSW Office of Water website • Depth loggers were installed in early August and will be downloaded monthly • Staff gauges were installed by contractor in mid September and the first reading was made in the week starting 29th September
Stream metabolism	<ul style="list-style-type: none"> • Dissolved oxygen loggers were installed in early August. Probes will be cleaned fortnightly and data download monthly • Sampling for nutrients and carbon commenced in the first week in September. Samples to be collected monthly
Carbon & water quality (core)	<ul style="list-style-type: none"> • Sampling for carbon characterisation commenced in first week in September. Samples to be collected monthly
Riverbank and aquatic vegetation	<ul style="list-style-type: none"> • Fixed transect markers were surveyed and installed in September. Vegetation monitoring will commence in early October.
Fish larvae	<ul style="list-style-type: none"> • Light trap sampling (for the Selected Area evaluation) commenced in the week beginning 15th September and will be undertaken fortnightly between September and March each year • Drift net and light trap sampling (for Basin-scale evaluation) will be undertaken in five consecutive weeks commencing 10th November
Fish recruitment	<ul style="list-style-type: none"> • Sampling of fish recruits will commence in February 2015
Fish (river)	<ul style="list-style-type: none"> • The fish community sampling will be undertaken in April and May 2015
Fish movement	<ul style="list-style-type: none"> • Fish movement monitoring will commence in 2015
Evaluation activities	
Area evaluation report	<ul style="list-style-type: none"> • 2014-15 Selected Area evaluation report – Draft due 30 Aug 2015, Final due 31 Oct 2015
Progress reports	<ul style="list-style-type: none"> • First progress report submitted 3 October 2014, to be submitted quarterly
Monitoring data entry	<ul style="list-style-type: none"> • Data management system training will be undertaken in November 2014
Communication and engagement	
Edward-Wakool Stakeholder Committee	<ul style="list-style-type: none"> • Meeting of EWSC held 11th June 2014 and the EWSC members provided feedback on the draft M&E Plan. CEWO requested the monitoring team revise the plan and the final M&E Plan was submitted to CEWO on 10th Sept 2014 • The next meeting of EWSC is on Thursday 9th October. An update on the LTIM monitoring will be presented at that meeting.
Edward-Wakool Environmental flows Group	<ul style="list-style-type: none"> • Members of the M&E Team (CSU, DPI Fisheries, MLLS) contributed to Edward-Wakool Environmental Watering Group teleconferences on 20 August and 18 September
Other stakeholder engagement	<ul style="list-style-type: none"> • Murray LLS contacted all landholders that could potentially be impacted by the Commonwealth environmental watering action in Yallakool Creek. All were happy for the action to proceed • Prior to each monitoring trip the monitoring team have contacted all landholders whose properties we will access to undertake sampling

Objectives of Commonwealth environmental water use in the Edward Wakool River system during 2014-15

Primary objective: Commonwealth environmental water will contribute to maximising Murray cod recruitment by providing a Murray cod maintenance flow – about 500 ML/day - in Yallakool Creek through to end of the Murray cod spawning season. **Secondary objectives:** It is expected this action will also contribute to increased hydrological connectivity, improved opportunities for movement, condition, reproduction and recruitment of other native animals (e.g. small bodied native fish, frogs, shrimp etc), maintain/improve vegetation condition and water quality.

Water delivered as at 26 September 2014: approx 9,750 ML.

Field observations

1. Commonwealth environmental water was observed to have improved hydrological connectivity through inundation of some low lying benches and backwaters in zone 3. In late July prior to the watering action the backwater in the images below was not inundated. In-channel hydraulic modelling to be undertaken as part of LTIM Project will help identify critical discharge levels at which geomorphic features and backwaters such as this are inundated.



Above: Site 3, zone 4, 21st July 2014. The discharge in Wakool River @ Wakool-Barham Rd was 148 ML/d



Above: Site 3, zone 4, 1st October 2014 during the environmental watering. The discharge in the Wakool River @ Wakool-Barham Rd was 468 ML/d



Above: Inundated backwater at site 3, zone 4
1st October 2014



Above: Inundated backwater at site 3, zone 4
1st October 2014

2. Commonwealth environmental water was observed to have increased opportunities for reproduction of frogs. Three species of frogs ([Plains Froglet *Crinia parsignifera*](#), [Common Froglet *C. signifera*](#), [Spotted Marsh Frog *Limnodynastes tasmaniensis*](#)) were heard calling in the inundated backwater in zone 3 on 1st October. Approx 20 egg masses of *L. tasmaniensis* were observed during a quick survey of the backwater. Egg masses were approx 1 day to 1 week old.



Above: *L. tasmaniensis* egg mass in backwater
1st October 2014

3. Light trap sampling for larval fish commenced in the week beginning 15th September and will be undertaken fortnightly between September and March each year. No Murray cod larvae were observed in September, and this is expected at this time of the year because the water temperature remained below 16° C.
4. The Commonwealth environmental watering action was observed to have inundated sedges and grasses in a band along the riverbank at sites in zone 1 (Yallakool Creek), and zones 3 and 4 (Mid Wakool River) that received Commonwealth environmental water. Fixed transect markers can be seen on the riverbank in the photo below. Riverbank and submerged vegetation will be surveyed monthly.



Above: Inundated riverbank vegetation, 1st October 2014

5. Commonwealth environmental water may have a role in increasing connectivity through the Griminal Creek anabranch. On 1st October 2014 water was observed to be flowing through Griminal Creek, a 3-4 km long anabranch of the Wakool River that exits the Wakool River between site 4 and 5 in zone 3 and flows into Merrabit Creek (see Appendix B for map of sample zones, and image below for location of sample sites relative to Griminal Creek in zone 3). As a staff gauge was installed in this creek after the commencement of the Yallakool Creek environmental watering action, it is not known if this anabranch was flowing prior to the Commonwealth environmental watering action. At the end of the environmental watering action when the Wakool River returns to regulated base flows we will be able to report on the role of Commonwealth water in connecting this anabranch.



Above: Location of sample sites in zone 3 (mid-Wakool River) showing location of Griminal Creek

Above: Image of Griminal Creek anabranch in the mid-Wakool River



Above: Griminal Creek, October 2014

Appendix A: The Long-Term Intervention Monitoring Project for the Edward-Wakool 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 Edward-Wakool 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 Charles Sturt University (Institute for Land, Water and Society) and includes, NSW Department of Primary Industries (Fisheries), Monash University (Water Studies Centre), Griffith University, NSW Office of Environment and Heritage, and Murray Local Land Services.

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).

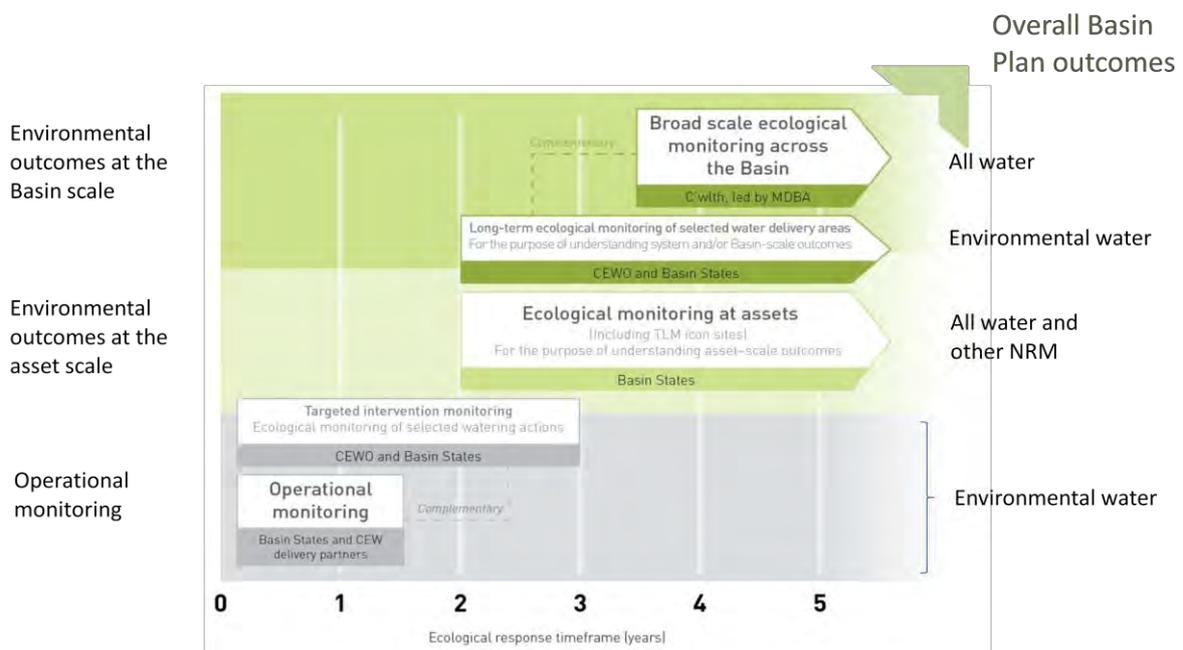
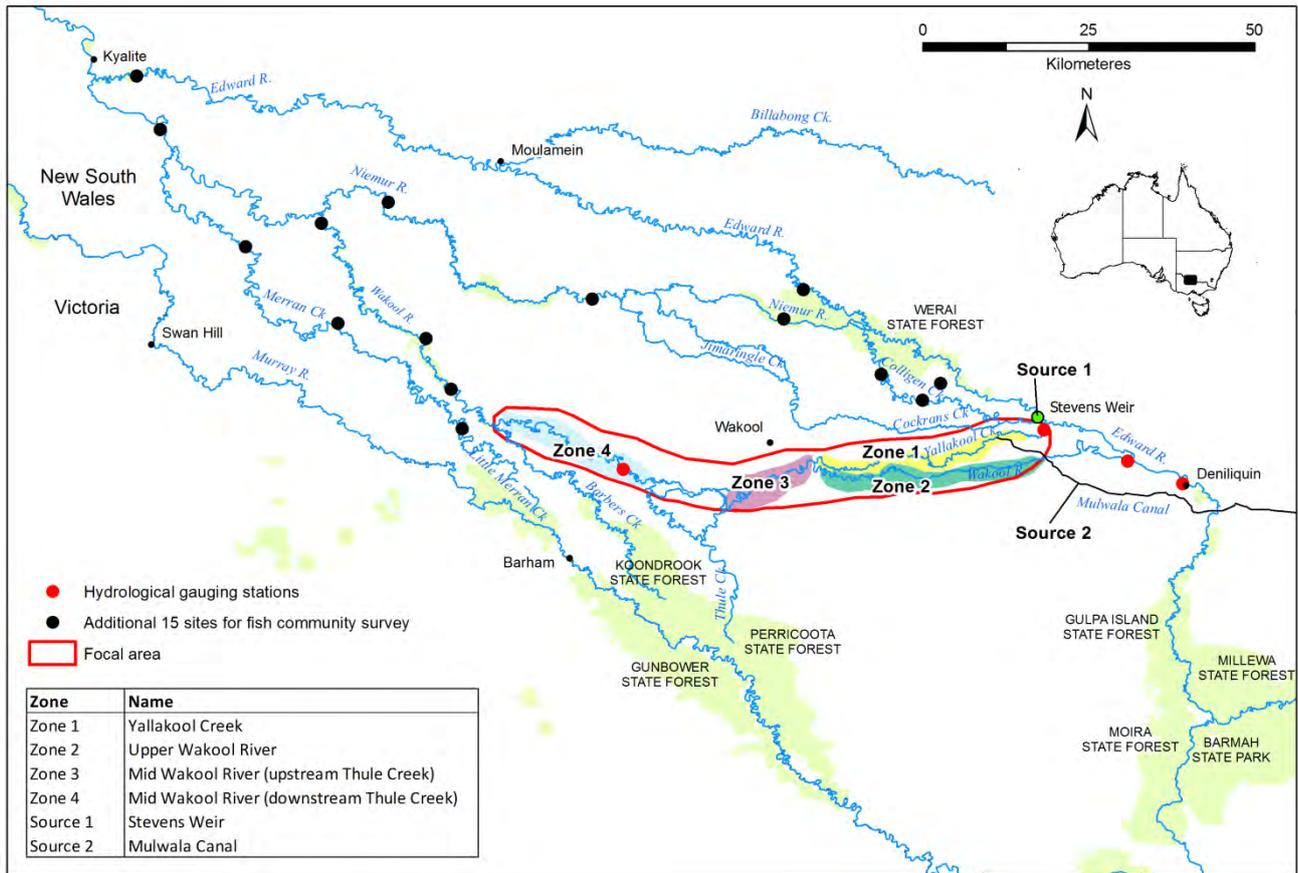


Figure 1. A summary of roles various agencies play a in the reporting on environmental outcomes, consistent with the Basin Plan.

Appendix B: Map showing location of hydrological zones that will be monitored in the Edward-Wakool system for the Long-Term Intervention Monitoring Project.

The monitoring will be focussed in Yallakool Creek (zone 1), the upper Wakool River (zone 2) and mid reaches of the Wakool River (zones 3 and 4). In addition to the fish surveys undertaken in the focal area, a further 15 sites throughout the Edward-Wakool system will be surveyed for fish populations in years 1 and 5. In addition to water quality sampling in the focal area, water quality will also be sampled in Stevens Weir (source 1) and the Mulwala canal (source 2) as these sites are the potential source of Commonwealth environmental water in this system.



Appendix C: Summary of monitoring to be undertaken in the Edward-Wakool system for the Long Term Intervention Monitoring Project from 2014-2019

The monitoring has a strong focus on fish, including fish movement, reproduction, recruitment and adult populations. Several other indicators (e.g. water quality, hydraulic modelling, primary productivity, aquatic vegetation) will also be monitored as they indirectly influence fish population dynamics and will also be used to evaluate the whole of ecosystem responses to Commonwealth environmental watering.

Indicator	Zone	Evaluation of responses to Commonwealth environmental watering in the Edward-Wakool system	Data will contribute to evaluation of responses to Commonwealth environmental watering at whole of Basin-scale	Notes
River hydrology	1,2,3,4	✓	✓	Discharge data from NOW website, depth loggers, staff gauges
Hydraulic modelling	1,2,3,4	✓		The extent of within channel inundation of geomorphic features under different discharge will be modelled with ground truthing and an acoustic doppler survey at selected sites
Stream metabolism and instream primary productivity	1,2,3,4	✓	✓	Dissolved oxygen and light will be logged continuously in each zone between August and March. Nutrients and carbon samples will be collected monthly and spot water quality monitored fortnightly. Results will be reported to the Edward-Wakool environmental watering group monthly
Characterisation of carbon during blackwater and poor water quality events	1,2,3,4	✓		The type and source of carbon will be monitored monthly. There is an option for CEWO to fund additional sampling (weekly) during blackwater or other poor water quality events
Riverbank and aquatic vegetation	1,2,3,4	✓		The composition and percent cover of riverbank and aquatic vegetation will be monitored monthly between September and March. Results will be reported to Edward-Wakool environmental watering group each month
Fish reproduction (larvae)	1,2,3,4	✓	✓	The abundance and diversity of larval fish will be monitored fortnightly between September and March using light traps and drift nets. The samples will be processed in the week following monitoring and results reported to the Edward-Wakool environmental watering group each fortnight
Fish recruitment (young of year)	1,2,3,4	✓		Targeted capture of young fish will be undertaken by back-pack electrofishing between February and April. Young of year recruitment will be assessed using otoliths.
Fish population survey	1,2,3,4 (plus 15 sites in yr 1 and 5)	✓	✓	Fish population surveys will be undertaken annually in the focal area. An additional 15 sites throughout the system will be surveyed in years 1 and 5 to report on long-term change in the fish community
Fish movement	1,2,3,4	✓		To be undertaken starting in 2015 with a focus on golden perch and silver perch