ACTEW Water

Murrumbidgee Ecological Monitoring Programme

Field observation report: autumn 2013

June 2013

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1. Introduction

This report is a component of the Murrumbidgee Ecological Monitoring Programme (MEMP), which is being undertaken on behalf of ACTEW Water. This report provides a summary of the autumn sampling run and includes comments on site specific and overall conditions observed by the field team in autumn 2013.

1.1 Standard Disclaimer

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2. Summary of the autumn 2013 sampling run

Autumn sampling was undertaken between 6th of May and 31st of May 2013. During this sample collection period, weather conditions were mostly fine although some rainfall occurred on May 13th. Under these conditions, there were no flow related disruptions to the autumn sampling schedule. However, because of the current dry period, eight samples were missed from this sampling run including all four from BUR 1a due to the site being completely dry. Site locations and details are described in Table 2.

Table 1 Samples missed in autumn 2013

Site	Number of missed samples	Reason samples were missed	Comments
BUR 1a	2 riffle 2 edge	Site dry	Last time this site was dry was autumn 2009
BUR 1c	1 riffle sample	Insufficient habitat	Channel choked with *Eleocharis sp.*
MUR 16	1 edge sample	Insufficient habitat	Connection between main channel and channel edges/margins had decreased since spring meaning there was insufficient habitat available for the collection of two samples
MUR 28	1 edge sample	Insufficient habitat	
MUR 937	1 edge sample	Insufficient habitat	

2.1 Burra Creek

At the time of sampling, flows in Burra Creek and the Queanbeyan River were low. There were two small natural events in the Queanbeyan River during March and April respectively. There were no natural flow events in Burra Creek during autumn 2013, however there were two scheduled maintenance runs of the M2G pumps during March and May, which are shown on the hydrograph for the autumn period (Figure 1).

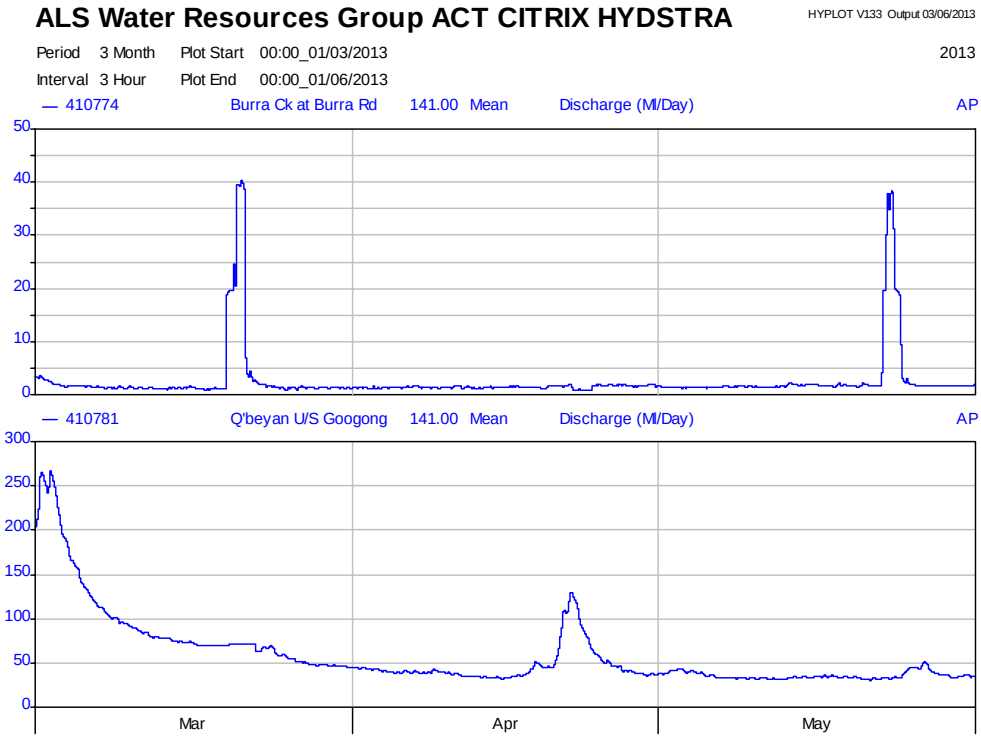

Figure 1. Hydrographs for Burra Creek (top, 410774) and Queanbeyan River (bottom, 410781) for the autumn 2013 period

All sites in the Burra Creek component of the MEMP were sampled on the 20th and 21st of May 2013, with the exception of BUR 1a which was dry (Plate 1). The completion of sampling was delayed to accommodate the possibility that surface flow may have re-commenced following rainfall which was forecasted in late May. After returning to BUR 1a on the 31st May 2013 the site remained dry; and this included all of the pools in the sampling reach which usually hold at least small amounts of surface water. The low surface flow was evident through Burra Creek where some large stands of in stream macrophytes were noted. This was especially obvious upstream of the M2G outlet at BUR 1c, where the main channel was heavily encroached by spike rush (*Eleocharis sp.*) (Plate 1).

Water quality parameters recorded in-situ show consistency with water quality readings from autumn 2012 with all Burra Creek sites, including the upstream site BUR 1c, slightly exceeding the ANZECC & ARMCANZ (2000) pH guidelines of 8.0. The total nitrogen levels at all sites have dropped since autumn 2012 to below the ANZECC & ARMCANZ (2000) guideline of 0.25 ml/L, with the exception of BUR 1c.

Stream-side scans of the macroinvertebrate samples indicated that most sites were healthy and contained a range of tolerant and sensitive taxonomic families. The exception to this rule was BUR 1c, where the macroinvertebrate communities were dominated by midge larvae, tolerant beetles and other taxa with SIGNAL scores of less than 4. This reflects the high silt and organic loads documented at this site and the low water levels and low current velocities.

Plate 1. Dry creek bed at BUR 1a (left) and channel encroachment at BUR 1c (right) and

2.2 The Murrumbidgee River

Flows in the Murrumbidgee River during the sampling period were low (Figure 2), with a small increase resulting from an event on the 14th of May (61.6 mm recorded at Lobbs Hole). The flows leading up to and during this sampling period were the lowest autumn flows since autumn 2010 (Figure 3).

2.2.1 Angle Crossing

The in-situ water quality parameters (turbidity, DO, pH, and EC) were all within the ANZECC & ARMCANZ (2000) guidelines with the exception of the pH which exceeded the upper limit of the guidelines at all sites except for Point Hut Crossing (MUR 23). There was higher compliance with the ANZECC and ARMCANZ guidelines for Total Nitrogen and Total Phosphorus compared to autumn 2012. MUR 15 was the only site to exceed the phosphorus guideline level whereas MUR 15 and MUR 23 were the only two sites to exceed the total nitrogen guideline level.

The M2G abstraction which occurred in March 2013 appears on the Lobb's Hole (410761) hydrograph showing an initial drop of approximately 20 ML/d followed by a further drop of 20 ML/d indicating a maximum pumping rate of approximately 40 ML/d before returning to base flow levels after the pumping operation ceased.

All sites within the Angle Crossing monitoring component displayed signs of the current low base flow conditions in that there was a noticeable reduction in the available edge habitat for sampling and the wetted width of the river retreating. In stream, there were more macrophytes and filamentous algae than the previous autumn and there was a notable change in the extent of coverage by the periphyton layer at certain sites.

At the upstream extent of the Angle Crossing monitoring component, there had been a recent willow removal program along the river bank (LHS only) immediately upstream of MUR 15. Although any change in the turbidity at the site was not detected and was within the guidelines

there was a large amount of willow detritus in the riffle habitat and in the pools at MUR 15 and MUR 16.

There was maintenance work was being carried out on Point Hut Crossing Bridge during sampling of MUR 23 (Plate 2); however it is unlikely that this would have any impact on the results because most of the work was being carried out on top of the bridge itself and did not involve in-stream work.

Scans of the macroinvertebrate samples indicate relatively low family diversity compared to autumn 2012, although the samples were highly abundant and contained commonly collected taxa in the EPT suite of sensitive taxa, and these were found both upstream and downstream of Angel Crossing and as such there were no obvious differences between locations in the macroinvertebrate composition. .

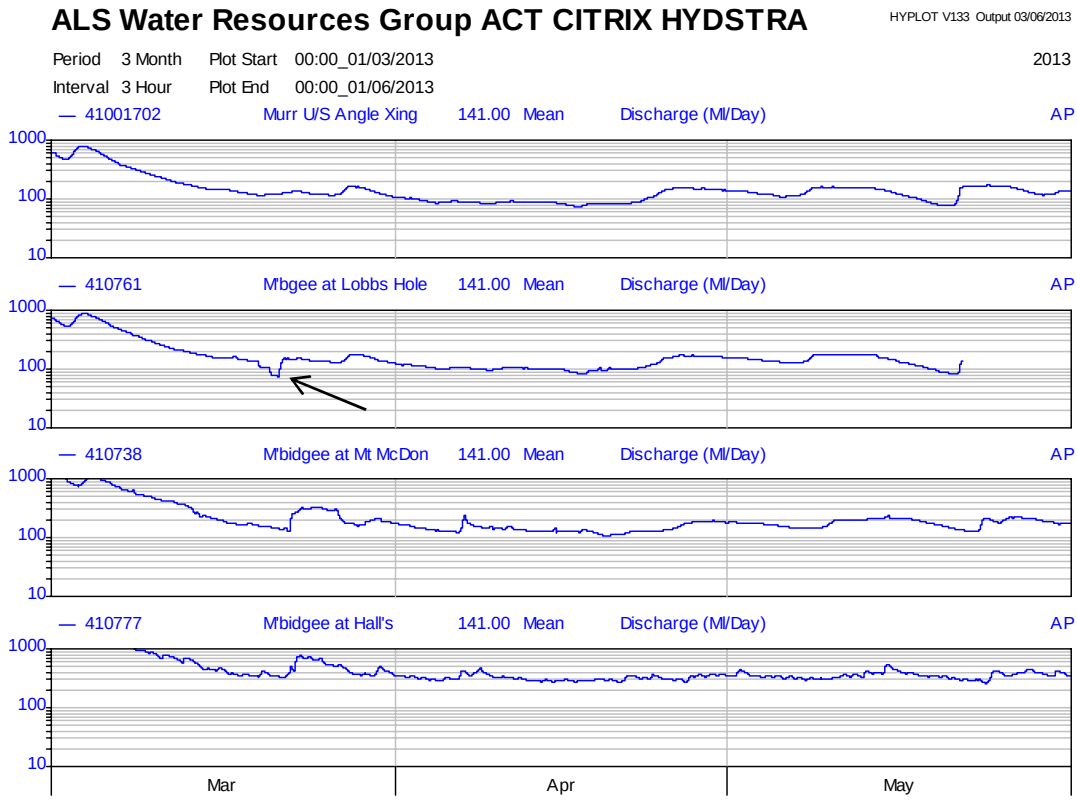

Figure 2. Hydrograph from the Murrumbidgee River for autumn 2013 at upstream Angle Crossing (41001702), Lobb's Hole (410761), Mt MacDonald (410738) and Hall's Crossing (410777)

Note: * The arrow on the Lobbs Hole hydrograph indicates the abstraction at Angle Crossing for scheduled M2G maintenance run

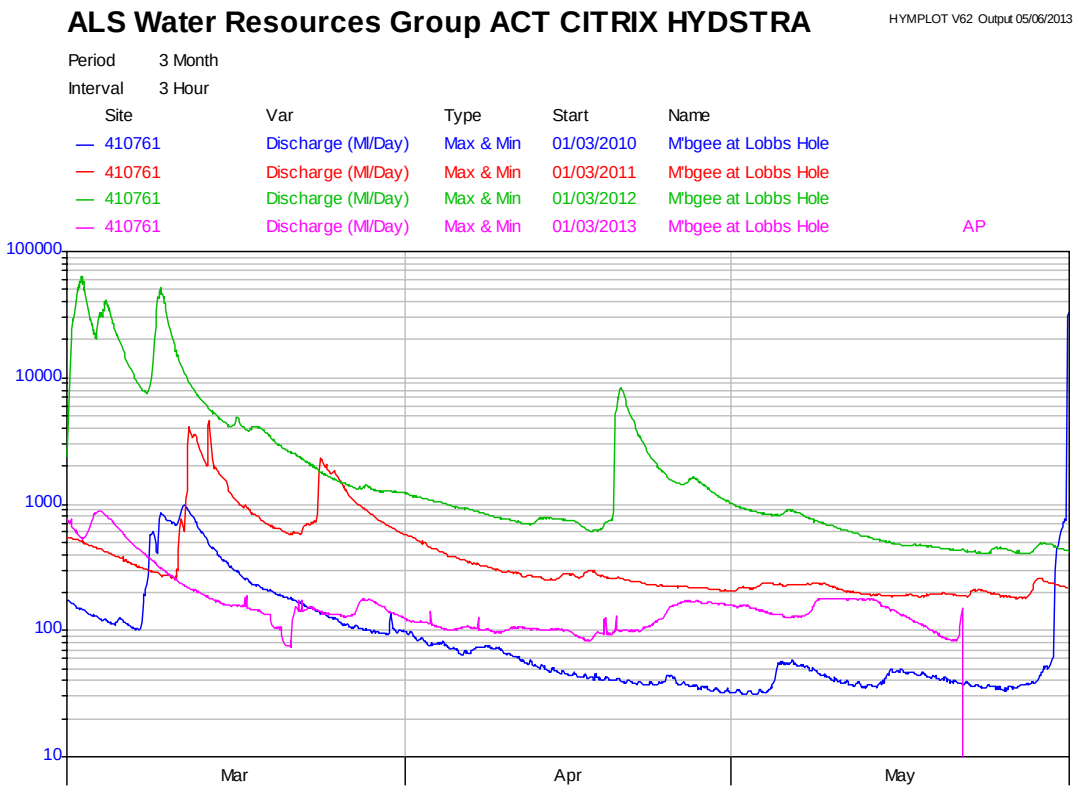

Figure 3. Comparison of flows during autumn* since 2010 at Lobb's Hole (410761)

Note: *Flow data for autumn 2013 has not been verified.

Plate 2. MUR 23 with maintenance work on the bridge (left), riffle at MUR 937 showing exposed bedrock

2.3 Murrumbidgee Pump Station

Sampling was conducted from the 8th to the 13th of May 2013. Plate 3 compares the flows during autumn 2013 to those during autumn 2012 and highlights the reduction in wetted width of the Murrumbidgee River downstream of MUR 28.

The lower river level during sampling exposed significant sections of bedrock and boulder across all sites which are usually inundated by flow (Plate 2), while also exposing larger areas of riffle habitat. Other indicators of the current low flow conditions, were the noticeably more

abundant patches of filamentous algae across the majority of sites and declines in the lateral connectivity (especially at MUR 937 and MUR 29). Heavy sand deposits were noted in the reaches at MUR 937 and MUR 29, which may have been deposited during the high flow events in the past 18 months but have just been exposed with the current low flow period in the Murrumbidgee River. The water quality parameters recorded in-situ during the site visits were generally within the ANZECC & ARMCANZ (2000) guidelines. However, all sites slightly exceeded the guidelines for pH, which is consistent with both autumn and spring 2012. Total nitrogen levels also exceeded or are on the cusp of the guidelines for all sites with the exception of MUR 28.

Gambusia holbrooki were found frequently the riffle samples along with several taxa usually associated with the slow moving edge habitat including: Atyidae (freshwater shrimp); Palaemonidae (freshwater prawn) and Corixidae (water boatman); this probably reflects the declining wetted width of the Murrumbidgee and the reduction of flow volumes. The riffle communities themselves were similar in composition to those collected in autumn 2012. As noted following that sampling run, diversity was not especially high, however the EPT taxa were well represented by moderate to highly sensitive taxa including Leptophlebiidae; which were particularly abundant at most sites.

Plate 3. Downstream MUR 28 during autumn 2012 (left), downstream MUR 28 during autumn 2013 (right)

2.4 Tantangara to Burrinjuck

Sampling of MUR 1 (downstream Tantangara Reservoir) was completed on the 14th of May 2013 when the flow releases from the reservoir was 100 ML/d (Snowy Hydro Limited, 2013). Retrieved form http://www.snowyhydro.com.au/files/Tant30dayRels.pdf)

pH readings were outside the ANZECC & ARMCANZ (2000) guideline at 65% of sites in this sampling run compared to 45% in 2012. It is evident that downstream of MUR 15 the readings are generally within the range of 8.1 – 8.3. With regards to the nutrient concentrations, the number of sites exceeding the guidelines has substantially decreased compared to autumn 2012. In this sampling run, total phosphorus concentrations were exceeded at 22% of sites compared to 70% last autumn and similarly, total nitrogen was exceeded at 48% of sites compared to 80% for the same period last year. This reduction could be a result of reduced rainfall during the autumn period of 2013, which has reduced the level of runoff entering the system combined with more biological uptake under the prevailing flow conditions.

Throughout the catchment the low flows had implications for both edge and riffle habitats. The retreating wetted widths meant that some sites had reduced edge habitat available for sampling, while the habitat still present was shallower than during previous runs. This habitat loss is also thought to be the reason for large numbers of edge taxa being collected in riffle samples, with the potential for these taxa to be using the riffle as a refuge under current low flow conditions. In the riffle habitat large sections of bedrock and boulders were exposed which would normally be inundated. Low velocities along the margins of the channel resulted in patchy areas of filamentous algae growth (Plate 4).

General observations from the recent sampling run in the upper Murrumbidgee River catchment include the following:

- Periphyton, macrophytes and filamentous algae were all more common and abundant the autumn 2012 which are good indicators of the effect of the prevailing low flow conditions..
- Bridge maintenance at MUR 3. Construction occurring in stream to replace structural components of the bridge. This will have no effect on the current data or results.
- Stock movement at MUR 2 in and along the river bank. Manure noted in the river and along the banks.
- Anaerobic smelling sediments at MUR 37 and large amounts of woody debris and sand deposits. Poor edge community composition due to poor habitat quality.

Plate 4. Filamentous algae growth in the shallow margin at MUR 31

Table 2. Sampling site locations and details

Site Code	Location	Habitat sampled	COMPONENT of the MEMP
MUR 1	D/S Tantangara Reservoir	Riffle and Edge	Tantangara to Burrinjuck
MUR 2	Yaouk Bridge	Riffle and Edge	Tantangara to Burrinjuck
MUR 3	Bobeyan Road Bridge	Riffle and Edge	Tantangara to Burrinjuck
MUR 4	Camp ground off Bobyon Road	Riffle and Edge	Tantangara to Burrinjuck
MUR 6	D/S STP Pilot Creek Road	Riffle and Edge	Tantangara to Burrinjuck
MUR 9	Murrells Crossing	Riffle and Edge	Tantangara to Burrinjuck
MUR 12	Through Bredbo township	Riffle and Edge	Tantangara to Burrinjuck
MUR 15	Near Colinton - Bumbalong Road	Riffle and Edge	Angle Crossing
MUR 16	The Willows - Near Michelago	Riffle and Edge	Angle Crossing
MUR 18	U/S Angle Crossing	Riffle and Edge	Angle Crossing
MUR 19	D/S Angle Crossing	Riffle and Edge	Angle Crossing
MUR 22	Tharwa Bridge	Riffle and Edge	Tantangara to Burrinjuck
MUR 23	Point Hut Crossing	Riffle and Edge	Angle Crossing
MUR 27	Kambah Pool	Riffle and Edge	Tantangara to Burrinjuck
MUR 931	“Fairvale” ~4km U/S of the Cotter Confluence	Riffle and Edge	MPS
MUR 28	U/S Cotter River confluence	Riffle and Edge	Angle Crossing & MPS
MUR 935	Casuarina sands	Riffle and Edge	MPS
MUR 937	Mt. MacDonald ~5km D/S of the Cotter Confluence	Riffle and Edge	MPS
MUR 29	Uriarra Crossing	Riffle and Edge	MPS
MUR 30	U/S Molonglo Confluence	Riffle and Edge	Tantangara to Burrinjuck
MUR 31	D/S Molonglo Confluence	Riffle and Edge	Tantangara to Burrinjuck
MUR 34	Halls Crossing	Riffle and Edge	Tantangara to Burrinjuck
MUR 37	Boambolo Road	Riffle and Edge	Tantangara to Burrinjuck
BUR 1	Upper Burra Creek	Riffle and Edge	Burra Creek
Bur 1b	Approximately 1.5km u/s of Williamsdale Bridge	NS	Burra Creek
BUR 1c	Upstream Williamsdale Road	Riffle and Edge	Burra Creek
BUR 2a	Downstream Williamsdale Road	Riffle and Edge	Burra Creek
BUR 2b	Downstream Burra Road Bridge	Riffle and Edge	Burra Creek
BUR 2c	Approximately 1km u/s London Bridge	Riffle and Edge	Burra Creek
BUR 3	Downstream London Bridge	NS	Burra Creek
QBYN 1	Flynn’s Crossing	Riffle and Edge	Burra Creek
QBYN 2	Downstream Burra Confluence	Riffle and Edge	Burra Creek
CAS1	Cassidy Creek	NS	Burra Creek

3. References

ANZECC & ARMCANZ (2000) National water quality management strategy: Paper No. 4. Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Volume 1. The Guidelines. Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand.

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