ACTEW Water

MEMP

Macroinvertebrate Sampling

Field observation report: spring 2012

November 2012

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1. Introduction

The field observation report is a component of the Murrumbidgee Ecological Monitoring Program (MEMP), which is being undertaken by GHD on behalf of ACTEW Water. This report provides a summary of the sampling run and includes comments on site specific and overall conditions observed by the field team in spring 2012.

1.1 Scope and limitations

GHD Standard Report Conditions:

This report has been prepared by GHD for ACTEW Water and may only be used and relied on by ACTEW Water for the purpose agreed between GHD and the ACTEW Water as set out in the MEMP proposal 2012/2013 (GHD, 2012.

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The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

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2. Summary of the spring 2012 sampling run

Sampling for the spring period was undertaken between 29th October and 16th November 2012 for Murrumbidgee River and Burra Creek/Queanbeyan River. Weather conditions during this time were variable, with periods of heavy rain on the 7th November, ultimately leading to a two day delay due to rising river levels. Poor weather, combined with the logistics of shutting off the Bendora main scour valve, which is required to allow sampling at one of the sites, meant that as in the autumn sampling run MUR 28 was sampled two days after the other sites in the Angle Crossing component of the MEMP.

Two notable rainfall events at the end of September and mid-October, caused river levels to be variable in spring and a further 30 mm of rain fell in early November causing a four day delay in sampling for some sites. Surface flows in Burra Creek fluctuated considerably in early spring due to commissioning of the Murrumbidgee to Googong pipeline and the high rainfall event in mid–October. In the Murrumbidgee River, flows were relatively stable apart from the already mentioned rainfall events.

Only two replicate samples were missed from this sampling run (Table 1). One of the two proposed Murrumbidgee edge samples at MUR 28 was missed due to high flows preventing safe access to the upper section of the reach; while one edge sample was missed at BUR 1a due to low surface flows and a reduction of wetted width, which limited the available habitat for sampling.

Spring sampling included the collection of:

- In-situ water quality measurements;
- Water samples for nutrient analysis;
- Periphyton samples;
- Current velocity;
- Macroinvertebrate samples collected from riffle and edge habitats;

Site visits also included habitat assessments in accordance with the ACT AUSRIVAS habitat data sheets. Stream-side scans were also conducted on the riffle and edge macroinvertebrate samples to provide a qualitative and a generalised indication of the condition of a given site.

Table 1. Samples missed in the autumn 2012 sampling run

Site	Number of missed samples	Reason for missed samples	Comments
BUR 1a	1 Edge	Limited habitat due to low flow	
MUR 28	1 Edge	Limited habitat.	At the time of sampling the hydrograph was in recession. Access to edge slightly upstream difficult under these conditions.

2.1 Burra Creek

Sampling in Burra Creek and the Queanbeyan River was conducted on the 29th and 30th of October 2012. The original BUR 3 and QBYN 2 sites remain inundated by water backing up from Googong reservoir (Plate 1).

Plate 1. BUR 3 inundated by Googong Reservoir (Drawdown crossing is in the background)

Flows in Burra Creek were variable leading up to the sampling run (Figure 1) due to the commissioning of M2G in early August and continuing through September. All construction related machinery boundary fences and silt booms have now been removed from the M2G site adjacent to Burra Creek.

There was a notable reduction of silt and organic material from the riffle habitats across all sites. This was particularly evident at BUR 1c, which because of its situation upstream of the M2G outlet, suggests that the high flow events in early and mid-spring contributed to this, rather than being solely due to the M2G commissioning (Plate 2).

Plate 2. Substrate at BUR 1c in autumn 2012 (left) and spring 2012

Overall, there was an obvious absence of instream macrophyte growth and filamentous algae abundance was lower than previous sampling runs. However, common emergent macrophyte recruitment was seen through the downstream sections; where some species have colonised in deposited sand and sediment on the flood plain following high flow events and during the commissioning period in September. Further evidence from recent high flow events included some scouring and bank undercuts at BUR 2c and some flattening of bankside vegetation.

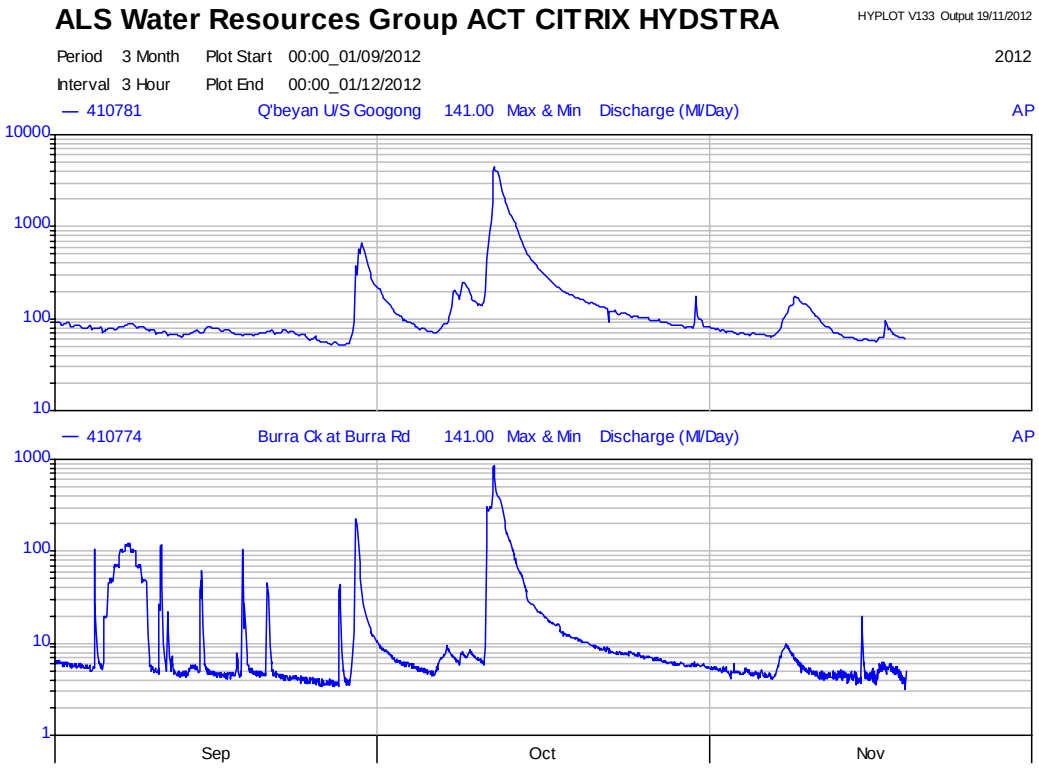

Figure 1 Hydrographs for the Queanbeyan River (top) and Burra Creek for September and October and the sampling period in November

In-situ water quality parameters indicate that most parameters met the ANZECC guidelines. pH was marginally over the guideline value of 8.0 at sites downstream of Williamsdale Bridge, however, it should be noted that the reference site on the Queanbeyan River also exceeded this upper limit. Total Nitrogen (TN) exceeded the guideline limit of 0.25 mg/L but again, the upstream control sites and the Queanbeyan River all shared similar values suggesting that a common influence, such as recent rainfall runoff from agricultural land or naturally high background concentration are likely contributors.

Macroinvertebrate scans showed that despite the improvement in the riffle quality at BUR 1c, diversity was still relatively low compared to the other sites. Despite this, there was a notable increase in mayfly diversity and an increase in the size and abundance of the stonefly family, Gripopterygidae. Across all sites the visual assessment of the macroinvertebrate communities show a range of families with SIGNAL scores ranging from 2-8, indicating healthy communities at each of the Burra Creek sites.

2.2 Angle Crossing

Nutrient data show that Total Nitrogen (TN) and Total Phosphorous (TP) are outside of the water quality guidelines. However, these parameters commonly exceed the ANZECC guidelines in this section of the Murrumbidgee River. The concentrations seen in this sampling run are very similar (±5%) to the values seen in spring 2011. pH was exceeded at 2 upstream sites (MUR 16 and MUR 18) and immediately downstream of Angle Crossing; albeit only by 0.1 pH unit (8.1 at MUR 16).

The Murrumbidgee River was approximately 30% higher during the same sampling period in 2011 at MUR 15, and even though the regular access could be used, GHD were able to gain landowner approval for access to the left hand side of the river, which provided an easier and safer option.

Periphyton cover was fairly high among all sites (60-90%) but there was a definite absence of common submerged macrophytes such as *Myriophyllum sp.* and filamentous algae in this section of the Murrumbidgee. One likely reason for this observation is the effect of scouring and bed movement during the previous high flow event in mid-October (Figure 2).

Overall, there appeared to be little change in the site characteristics, macroinvertebrate communities and water chemistry for this time of year. A point of note however is that there appears to be a large amount of sand still moving down the Murrumbidgee catchment. This was particularly obvious at MUR 15, MUR 18 (in the upper section of the reach) and MUR 19. The riffle samples had a greater amount of sand in them compared to autumn and indeed spring 2011.

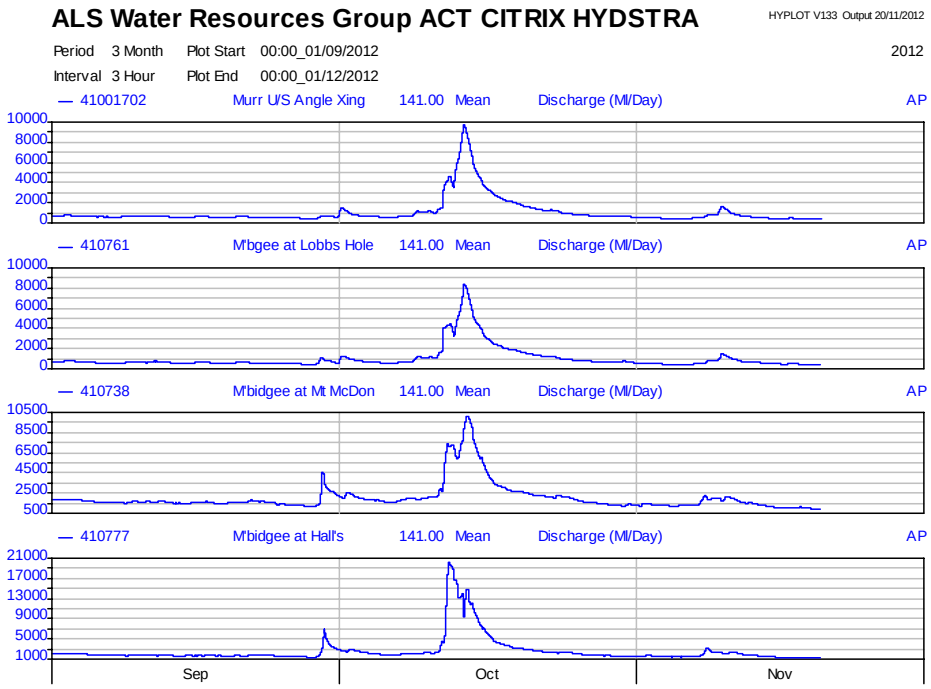

Figure 2 Hydrographs for the Queanbeyan River (top) and Burra Creek for Spetember, October and the sampling period in November

2.3 Murrumbidgee Pump Station

It was mentioned that in spring 2011, following the environmental flow release that several Coloburiscidae appeared in the macroinvertebrate scan, which had not been collected previously in this section of the Murrumbidgee River. Following the latest sampling run, it appears that this family of sensitive (SIGNAL=8) mayfly is still populating MUR 935 where they were first collected, but are also being found in the majority of samples, suggesting that they are recolonising with increased flows and more frequent high flow events, rather than being transported downstream with the Environmental Flow Release as previously suggested.

Water quality data indicates highly comparable nutrient concentrations both upstream and downstream of the Murrumbidgee Pump Station (MPS), despite these parameters being above the guideline values. To reiterate, these concentrations are not considered high for the Murrumbidgee River at this time of year and in this section of the catchment. Dissolved Oxygen (DO) was low compared to spring 2011, which may reflect lower macrophyte and algal communities (although periphyton cover was high at the MPS sites ; >80% on average) but at the same time a large amount of organic matter in the riffle and edge zones in the form of large woody debris, decaying leaf and other plant material would also reduce DO levels.

2.4 Tantangara to Burrinjuck

There was one small flow release from Tantangara Reservoir on the 3rd of November (http://www.snowyhydro.com.au/wpcontent/uploads/pdfs/watrel/Tant30dayRels.pdf) during this sampling period.

Nutrient data analysis are yet to be completed for MUR 31, 34 and 37. However the information at hand shows that TP concentration exceeded the ANZECC guidelines at 90% of the sampling sites and was on the boundary limit at 30% of the sites. Sites that were within the limit or on the boundary value were sites MUR 1 to MUR 4; while those exceeding the guideline value occurred downstream of Cooma. A similar pattern is seen for the Total Nitrogen data. pH exceeded the guidelines downstream of MUR 28 and although there were a few instances further up the catchment, near Angle Crossing (MUR 18 and 19), these values were only just over the upper guideline limit. Most other parameters were very similar between sites and for the most part were within the guideline values.

Additional observations from the upper Murrumbidgee River catchment include:

- The level at Burrinjuck Reservoir dropped by up to two metres since the last sampling run, meaning that the riffle habitat was accessible in spring 2012;
- The edge habitats at MUR 1, 2 and 3 were highly silted;
- Strong effluent smell in sediments at MUR 3 due to grazing stock;
- Several heavily eroded sections of both banks at MUR 9; high sediment deposits in edge habitat;
- Sand deposition and movement evident across several sites most notably at MUR 12, 15 and 22. These deposits may have occurred after the event in October, but have most likely been progressively moving downstream since the event in early March 2012;
- Macroinvertebrate communities throughout include several highly sensitive taxa and a broad diversity of species, including abundances of species in the EPT group of taxa. MUR 9 appeared to have the lowest diversity in both habitats which probably reflects high erosion and deposition of sand and colloidal material.

Table 2. Sampling site location 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

Notes:

= Site currently inundated due to Googong Reservoirs high water level (not sampled)

= Site discontinued

= Site access revoked

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