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MURRUMBIDGEE ECOLOGICAL MONITORING PROGRAM

FIELD OBSERVATION REPORT: AUTUMN 2012

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Front Cover Photograph: Freshwater Crayfish collected at Kambah pool during the autumn 2012 sampling run

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1 Introduction

The field observation report is a component of the Murrumbidgee Ecological Monitoring Program, being undertaken by Australian Laboratory Services (ALS), on behalf of ActewAGL. The purpose of the report is to provide a summary of the macroinvertebrate sampling run for autumn 2012, including on-site observations from the field team.

Autumn sampling was carried out between May 1st and May 11th. Weather conditions were fine during the sampling period although there was some rain on the 2nd of May which did not affect the sampling schedule. The sampling continuity of the Angle Crossing sites was interrupted slightly by the operation of the Bendora main scour valve which meant that MUR 28 was sampled some days after the remaining sites had been completed - once we were able to organise the valve to be temporarily turned off.

River flows in the Queanbeyan River and Burra Creek were stable following a high flow event in mid-April. The Murrumbidgee flows were higher than the past four sampling events and volumes were approximately four times that of autumn 2011.

There were four missed samples due to site specific reasons listed below (Table 1). The Burra Creek samples were missed because of low flows, especially in the Native reach and a lack of adequate habitat to sample. The two Murrumbidgee samples were missed in relation to the high flows. At MUR 28, the high flows were preventing access to the second section of edge habitat, while at MUR 37; the Burrinjuck Dam is backing up several kilometres upstream of the delta, which is inundating the riffle habitat which was present in the last sampling run.

Autumn sampling included the collection of:

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

at the Murrumbidgee, Burra Creek and Queanbeyan River sites listed in Table 2 (pg. 7).

Table 1. Samples missed in the spring 2011 sampling run

SITE	Number of missed samples (Habitat)	Reason
BUR 1c	1 riffle	Riffle habitat was very limited
BUR 2a	1 riffle	Limited riffle habitat at this site
MUR 28	1 Edge	Limited edge habitat
MUR 37	1 Riffle	Burrinjuck reservoir backing up and inundating the riffle habitat

2 Summary of the autumn 2012 sampling run

2.1 Burra Creek

Autumn sampling of Burra Creek was conducted on the 3rd and 4th of May.

Sites BUR 3 and QBYN 2 remain inundated by water backing up from Googong reservoir (Plate 1) and consequently BUR 2c was sampled as a replacement for BUR 3; however, there are no appropriate alternatives for QBYN 2. Flows in the Queanbeyan River were still dropping after a small event in mid-April and flows in Burra Creek were stable (Figure 1).

Considering the large rainfall event in early March, which resulted in wide spread flooding; the physical characteristics of both the Queanbeyan River at Flynn's Crossing (QBYN 1) and Burra Creek remained much as they were when ALS sampled in spring. However, there were clusters of fallen trees along both banks of the Queanbeyan River and there were patches of fresh sand deposition within the reach.

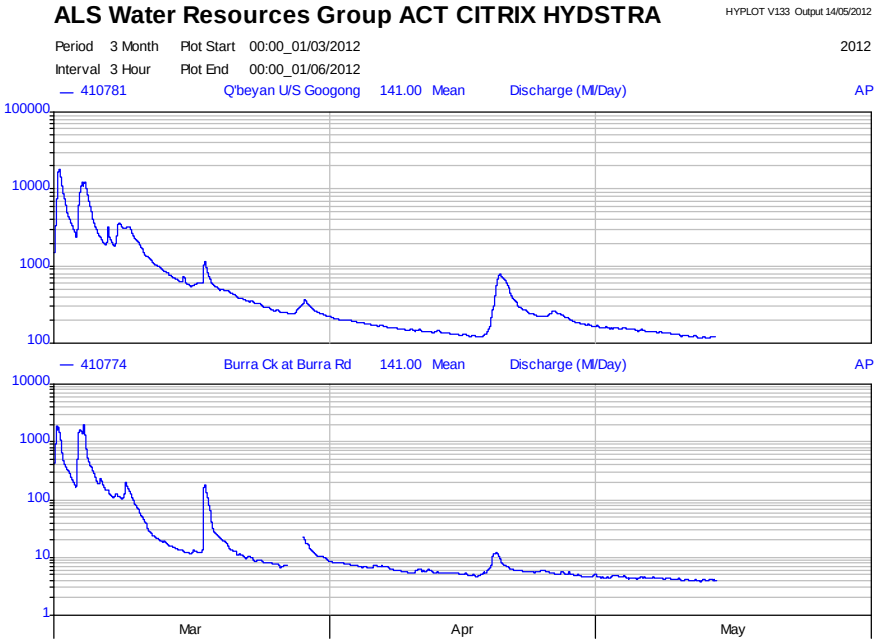

Figure 1. Queanbeyan River (top) and Burra Creek hydrograph for March and April and including the sampling period in early May 2012

Plate 1. Bur 3 inundated by Googong Reservoir water level

Since spring 2011 some of the restricted, fenced off areas upstream of Williamsdale Bridge has been removed (Plate 2); the silt boom downstream of the bridge has been removed as have the pipes diverting Burra Creek water from the upstream section to downstream of the bridge.

Plate 2. M2G construction site on the western side of Williamsdale Road Bridge

Physico-chemical water quality parameters were largely within ANZECC guidelines although downstream of Williamsdale Bridge, there was a noticeable spike in Total Nitrogen (TN) and NOx. It should be pointed out however that TN was above the recommended upper limits at all Burra Creek sites and the Queanbeyan River site.

Stream side scans of the macroinvertebrate samples indicated reasonably "healthy" assemblages of invertebrates with a wide range of SIGNAL scores from each site. There was a noticeable decline in the abundance of Stoneflies (Plecoptera) compared to spring, which could be a seasonal factor. BUR 1c showed the lowest macroinvertebrate diversity and this is probably related to the high level of blanketing silt observed in the riffle habitat (Plate 3), which likely accounts for the few EPT taxa and the lower diversity at this site.

Plate 3. Silted substrate at BUR 1

2.2 The Murrumbidgee River

Flows in the Murrumbidgee were up to four times the volume compared to the same period last year (Figure 2). March, according to the Bureau of Meteorology (www.bom.gov.au), was the third wettest on record and subsequently most of the upper catchment was saturated during this period of high rainfall, resulting in higher base flows throughout the autumn.

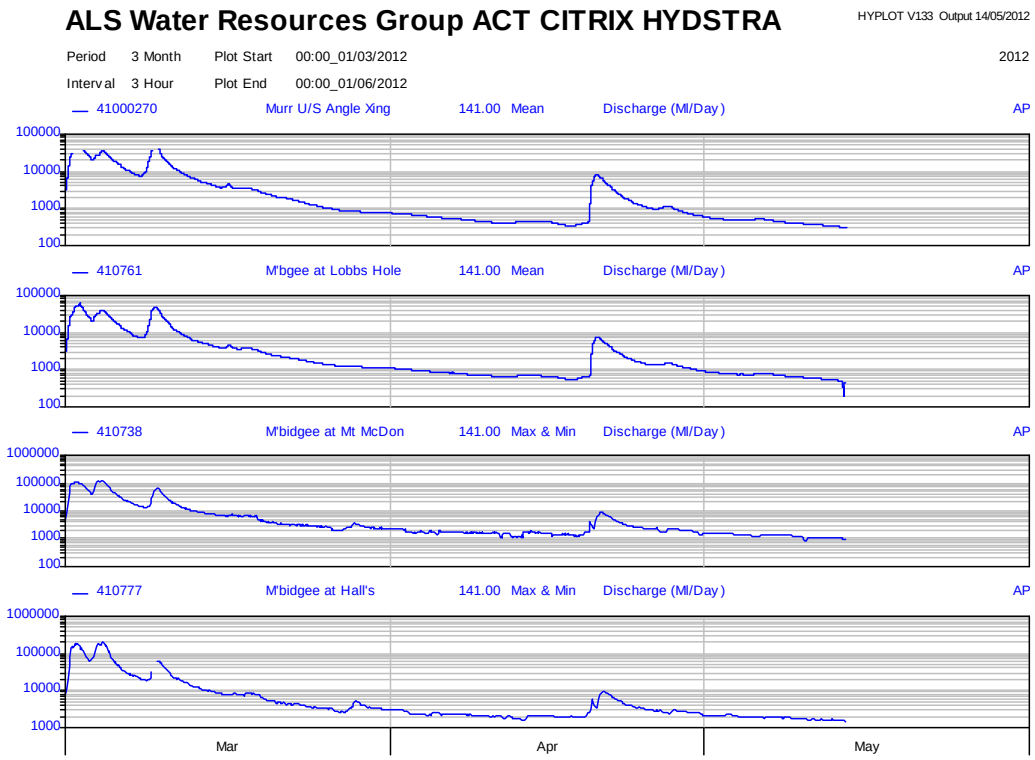

Figure 2. Hydrograph for March, April and including the sampling period in early May 2012 for the key sites on the Murrumbidgee River

2.2.1 Angle Crossing

The in-situ water quality results were consistent across the sampling sites - both upstream and downstream on Angle Crossing. All sites exceeded guidelines levels of total phosphorus and total nitrogen. Two of the sites below Angle Crossing (MUR 19 & 28) showed elevated pH readings compared to the other sites, if only slightly. NO_X values also exceeded guidelines at all sites with the exception of MUR 28. This discrepancy could be due to MUR 28 having been sampled a week and a half later than other Angle Crossing sites due to inaccessibility. The site was not accessible due to the Bendora scour valve being active for this period of time (Plate 3). Flow was consistently dropping for the sampling period, with a small increase resulting from the rainfall event that occurred on the 2nd May while ALS was sampling MUR 19.

Plate 4. Bendora scour valve operational near MUR 28

All sites within the Angle Crossing component showed evidence of the high flows at the beginning of March, with large volumes of depositional material (mainly sand) found at each site. This was accompanied at some of the sites with distinct sections of scour such as the car park area at MUR 23. Areas along the banks of the sites also showed evidence of the high water levels in March, with sections of dead macrophytes and grasses at some sites and trees and shrubs having been pushed over or removed completely. Periphyton coverage was patchy at most sites attached to the stable substrate, and at those sites where coverage was greater it was limited to a thin (young) film due to the recent high flows and scouring.

MUR 15 was sampled directly upstream of the usual site due to the alteration of the site morphology resulting from the multiple large events that have come through since the spring sampling period leaving a much less stable substrate and scoured out regions in the substrate itself making access difficult and unsafe at the flow levels during autumn sampling. Difficulties were also encountered at MUR 28 where (as previously mentioned) the Bendora scour valve was active delaying sampling. When sampling was possible the flow through the valve had not been completely cut off and was still partially flowing reducing the accessibility to edge habitat resulting in the collection of only one edge sample.

The construction work at Angle Crossing was progressing during sampling with the de-construction of the coffer dam. The preliminary results from our sampling and water quality results show that there is no effect in the section of river directly downstream of the construction zone at Angle Crossing. Preliminary macroinvertebrate data indicate a similar suite of taxa present immediately upstream and downstream of Angle Crossing, with several of these being sensitive taxa.

2.2.2 Murrumbidgee Pump Station

pH was above the ANZECC guidelines at MUR 28, 935 and 937. Dissolved oxygen saturation was also elevated at MUR 937 which was recorded during the mid-afternoon and could correspond to the increased level of periphyton and filamentous algae at the site under optimal photosynthesis conditions. MUR 937 and 29 were the only sites to not exceed the guideline values for total phosphorus while all sites exceeded the total nitrogen guidelines, however they did show a distinct pattern of decreasing levels of nitrogen further downstream, possibly being further diluted by larger volumes of water.

There were obvious signs of flood damage such as areas of deposited material (mainly sand), areas of scoured riparian vegetation including trees, shrubs and macrophyte stands. Large woody debris was deposited throughout these reaches, but was most obvious on the right bank at MUR 28. These sites were also characterised by an obvious absence of both submerged and emergent macrophytes. This may decrease the overall abundance and diversity of macroinvertebrates, especially from the edge habitat, where macrophytes provide an important source of food and shelter. Initial results do show comparatively low diversity, although the taxa which are present are shared amongst all the sampling sites, with moderate to high SIGNAL scores.

2.2.3 Tantangara to Burrinjuck

There were no releases from Tantangara Reservoir during this sampling run. Water releases from April 1st were stepped down gradually from 160 ML/d during the first week of April to 50ML/d at the end of April and finally ceased on the 19th (Snowy Hydro, (2012). Retrieved from http://www.snowyhydro.com.au/files/Tant30dayRels.pdf). Most catchments were subjected to a large rainfall event in early March which has resulted in ongoing high base flows for the autumn period.

Not all of the nutrient analyses have been completed; however, of the sites that have been analysed (20 of 23), 80% exceed the upper limits for total nitrogen, 70% for total phosphorus and 45% for pH. There is a slight change in pH downstream of Angle Crossing which essentially carries through to the farthest site downstream (MUR 37). TN and TP concentrations exceed to recommended upper limits from MUR 12 (downstream of the Bredbo River confluence) to MUR 37.

Although nutrient levels were within the guidelines in zone 1 (MUR 1-4), there was extensive stock movement along the river bank and through the water at MUR 2 and 3 and manure in and along the river at these sites.

Other general observations from the recent sampling run in the upper Murrumbidgee Catchment include:

- Low flows at MUR 1 due to the closure of the release valves. This resulted in a reduced riffle habitat at this site;
- Very few macrophytes throughout the upper Murrumbidgee Catchment. Both in stream macrophytes and some of the larger stands (eg. At Kambah Pool) were completely scoured out by the March flood;
- Damage to the riparian zone is fairly extensive. This is more obvious from Bredbo downstream;
- The construction work at Tharwa Bridge has now finished. There are large sand deposits evident, especially upstream of the bridge. Riffle habitat and edge habitat are dominated by sand and showed low overall diversity when scans were carried out;
- Anaerobic/sewage smelling sediments at MUR 31 in the edge habitat, accompanied by heavy sand deposits throughout the reach. Macroinvertebrate communities appear similar in the riffle habitat although the edge seemed to lack some of the more common taxa that we would have expected to see.

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

Notes:

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

= Site discontinued

= Site access revoked