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MURRUMBIDGEE ECOLOGICAL MONITORING PROGRAM

FIELD OBSERVATION REPORT: SPRING 2011

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Front Cover Photograph: Damselfly resting on lily leaf at Bobeyan Road Bridge (MUR 3 - Upper Murrumbidgee River) spring 2011.

TABLE OF CONTENTS

LIST OF PLATES

LIST OF TABLES

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 spring 2011, including on-site observations from the field team. This is to give a quick indication of expected river health condition and any key observations before the detailed analytical assessment reports are provided at the end of March 2012.

Environmental flows in the upper Murrumbidgee River were released from Tantangara Reservoir between the 14th and the 21st of October. Flows were released at approximately 1500ML/d for 8 days and continued at lesser volumes for the remainder of October to encourage fish spawning.

These scheduled releases from Tantangara Reservoir meant that spring sampling was planned to be brought forward to enable representative samples being collected prior to the releases. However, rainfall over the three day period leading up to the scheduled MEMP sampling run resulted in a sharp increase in flow across several of the key sites in the Murrumbidgee River, thus preventing ALS proceeding with the sampling run. As Burra Creek and the Queanbeyan River were not affected by the rainfall event, it was decided to undertake the Burra Creek component of the MEMP on the 4th and 5th of October.

The remainder of the MEMP subcomponents were completed between the 7th – 17th of November.

Sampling conditions were good during both sampling periods although there was some heavy regional rainfall on the 9th and 10th of November. The weather did not inhibit the sampling run to any degree and flows remained at a level such that 93% of samples were collected on this sampling run. There were 6 missed samples due to site specific reasons listed below (Table 1).

Table 1. Samples missed in the spring 2011 sampling run

SITE	Number of missed samples (Habitat)	Reason
BUR 1a	2 (1 Riffle, 1 Edge)	Very low flows in the upper section of Burra. Riffle habitat was very limited
BUR 1c	1 (1 Riffle)	Low flows resulted in limited riffle habitat at this site
MUR 16	1 (1 Edge)	Edge on the true left hand side was not accessible.
MUR 28	1 (1 Edge)	Limited habitat available at this site.
MUR 937	1 (1 Edge)	Limited habitat available at this site.

Sampling included the collection of :

- water samples for nutrient analysis;
- in-situ water quality measurements;
- periphyton samples;
- macroinvertebrates samples from both riffle and edge habitats; and
- current velocity readings;

at the Murrumbidgee, Burra Creek and Queanbeyan River sites listed in Table 2 (pg. 8).

2 Summary of the spring sampling run

2.1 Burra Creek

The spring sampling run for Burra Creek was completed on the 4th and 5th of October 2011. Six sites were sampled in this sampling run; one site was missed due to access permission from one on the land owners being revoked (BUR 1b: Table1), which was not because of ALS. QBYN 2 and BUR 3 are still inundated by Googong dam water (Plate 1) and for this reason were not sampled. BUR 2c is a new site that was added to the programme as an alternative to BUR 3 under these circumstances. There is no suitable alternative for QBYN 2.

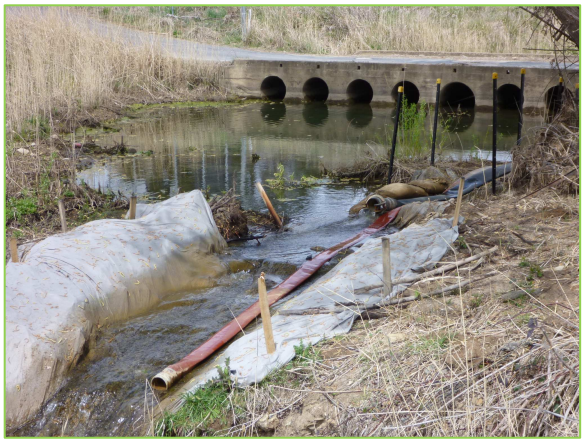
Plate 1. Bur 3 inundated by Googong Reservoir water level

The noticeable differences since autumn are that:

a) the M2G construction works, upstream of Williamsdale Road bridge has intensified (Plate 2) - current work involves excavation for the pipe installation and discharge structure, which also involves diverting the upstream flow around the trench via pumping and hoses, to the downstream side to enable this work to proceed. A silt boom is in place on the downstream side (Plate 3).

b) Flows upstream of Williamsdale Bridge were lower than autumn, evidenced by larger and more frequent patches of ion bacteria flocs along the edges at BUR 1a and BUR 1c - indicating increased ground water contribution to the base flow.

Plate 2. Looking just upstream of Williamsdale Bridge



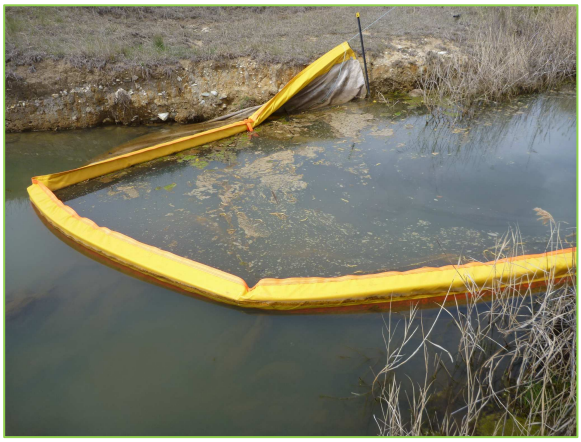


Plate 3. Creek water diverted to the downstream section of Burra Creek (left) and silt boom in place downstream of hose discharge

Despite the increase in construction related activity, the indication from our water samples is that water quality is currently not being compromised in the vicinity of these works. All parameters recorded in situ were within the natural range of Burra Creek water quality parameters collected to date. There were slight increases in dissolved oxygen readings at all sites compared to autumn, but this is likely due to increased photosynthetic activity as the surface temperature warms and primary production increases. Field observations throughout the length of Burra Creek indicate that algal biomass appears to have increased considerably since our last sampling run especially in the semi-isolated pools (Plate 4).

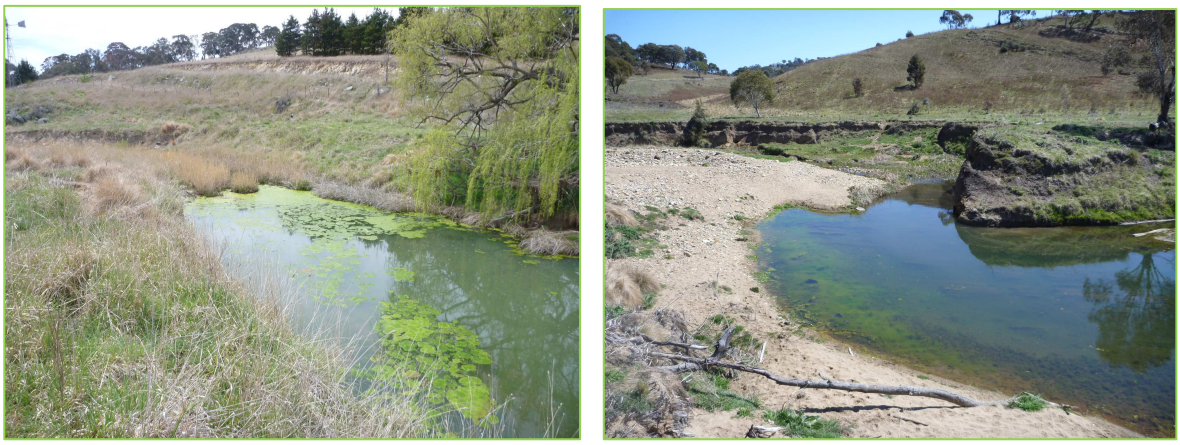


Plate 4. Pools downstream of Williamsdale Bridge (left) and upstream of London Bridge (right) showing increased algal growth.

Stream-side scans of the macroinvertebrate samples in the field revealed several highly sensitive taxa both upstream and downstream of Williamsdale Bridge suggesting that; overall, Burra Creek appears to be in good condition (Plate 5) despite some areas of decreasing flows and reduced habitat availability as a result of these low flows.

Some increase in organic matter in the form of decaying macrophytes and woody debris from the December 2010 flood is moving through Burra Creek. This may further influence dissolved oxygen in the upcoming warmer months, especially in the deeper pools; however it should be pointed out that this is occurring naturally throughout Burra Creek and is unrelated to the M2G works occurring at Williamsdale Road.

Plate 5. Local sensitive taxa collected within Burra Creek: Plecoptera [Stonefly] (left and centre) and Ephemeroptera [Mayfly] (right).

2.2 The Murrumbidgee River

The Murrumbidgee River components of the MEMP were completed between 7th -17th of November, during which time all 23 of the designated sites were sampled.

2.3 Angle Crossing

Flow and water quality parameters were similar between sites upstream and downstream of Angle Crossing. Most water quality parameters were within the ANZECC guidelines, however at MUR 23 (Point Hut Crossing) and MUR 28 (Upstream of the Cotter River Confluence) pH was slightly higher than the guideline value of 8 (8.1 and 8.08 respectively) and D.O (% saturation) was only slightly above the upper limit of 110% at MUR 23. These exceedances are probably the result of photosynthetic activity, and correspond also to higher periphyton cover at both of these sites and a more notable filamentous algal growth and the common macrophyte – *Myriophyllum sp.*at MUR 23 (and this is consistent with our previous monitoring runs).

More generally however, there was a lack of submerged macrophytes and filamentous algae at the majority of the sites sampled (with the exception of MUR 23) which were likely scoured out during the recent environmental flow release from Tantangara Reservoir. These flows also appear to have removed some of the silt and sand from the riffle habitat, which may have a positive effect on the macroinvertebrate populations.

In fact, stream-side scans of the macroinvertebrate samples showed early indications of a healthy community, with a high abundance of stoneflies (Gripopterygidae) and mayflies (Leptophlebiidae) and what appears to be a diverse assemblage of other taxonomic groups. However, it was noted during rain periods at MUR 19, that turbid runoff was entering the stream on both sides of the crossing (Plate 6) which could lead to an accumulation of fines downstream.

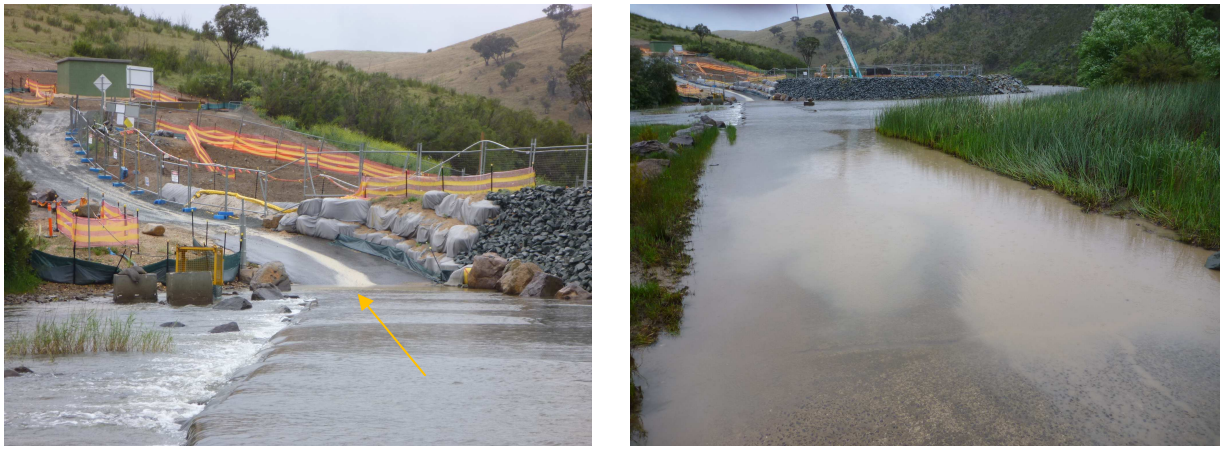


Plate 6. Angle Crossing, showing turbid runoff from the right hand (indicated by the orange arrow) and from the left hand side

2.4 Murrumbidgee Pump Station

Dissolved oxygen and pH was above the recommended ANZECC limits at MUR 935, 28 and 29. All the exceedance values occurred in early to mid-afternoon when photosynthetic activity reaches its peak. Other than these exceptions, the water quality values for the monitored parameters were all within the range of values that have been seen throughout this monitoring program.

As with the Angle Crossing sites, there was an obvious absence of submergent macrophytes across all sites, which is likely a result of continual high flows since the last sampling run and the more recent environmental flows from Tantangara Reservoir. Periphyton covered >80% of the riffle substrate at MUR 28 and 29, while at MUR 931 the bedrock-dominated riffle was relatively clean.

The macroinvertebrate scan at MUR 935 turned up a sensitive (SIGNAL=8) family of mayfly (Coloburiscidae: Plate 7) that has not been collected this far north, during the MEMP, prior to this sampling run. Whether this family is locally rare and has not been picked up before, or has been transported downstream from the high flow events is unclear at this stage, though it should be pointed out that at sites where they have previously been collected, they were more abundant than in previous sampling runs.

Plate 7. The mayfly-Coloburiscidae (stream horse)

2.5 Tantangara to Burrinjuck

The physico-chemical water quality recorded at the reaches extending from Tantangara Dam to upstream of the Burrinjuck Reservoir delta were generally within the ANZECC guideline values, with the exception of seven sites (30%) exceeding the upper pH limit and three sites (13%) exceeding the upper limit of recommended dissolved oxygen saturation. Nutrient data have not been analysed at this point, but we predict that there will be a high incidence of exceedances (of Total Phosphorus and Total Nitrogen) given the periods of (at times) heavy rainfall during this sampling run. This may be especially noticeable at MUR 2 and MUR 3 given the proximity of these sites to grazing stock. Stock was also common at MUR 6, which also may account for predicted high nutrient values.

Other general observations throughout the catchment include:

- vegetation has been cleared from MUR 1, both manually (felling dead trees) and there is some loss of in-stream vegetation from the environmental flow releases which has reduced the amount of shade provided to the river;
- the willow-clearing operation has now been completed along Pilot Creek Road (in the proximity of MUR 6 – downstream of Cooma);
- foul smelling sediment deposits at MUR 27 (Kambah pool). The source is unknown at this stage, but this is likely caused by high rates of decomposition creating anaerobic conditions in these sediments, releasing hydrogen sulphide gases;
- the Burrinjuck Reservoir level has dropped since autumn and as a result riffle and edge samples were collected from MUR 37 (Boambolo). The drop in water level has created several disconnected back waters (isolated pools) in the reach, in which algae are proliferating. The wetted sediments smell anaerobic. Poor edge habitat at this site due to vegetation damage from both the inundation of the site for several months and the recent high flow events. Vegetation is mainly willow, which is growing back and there are signs of macrophyte beds re-establishing in the wetted sediments along the edges.

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