

Water Quality Event Monitoring



Regional Natural Resource Management in Queensland

ID: WQEM 0631

EVENT SUMMARY LOAD CALCULATION

Lower Burnett River (Mt Lawless) February-March 1976

Introduction

This fact sheet presents Event Mean Concentration (EMC) sediment load estimates collected from the Lower Burnett at the Mount Lawless gauging station (Fig.1) from late February to early March 1976 (Fig.2).

Methodology

Four suspended sediment samples (Tab.1) were collected from the gauging station GS136002D and recorded in the DNR archives. Discharge was assumed to be $\pm 10\%$ of actual flow (http://www.nrm.qld.gov.au/water/monitoring/pdf/wm_data_col_stds.pdf), although accuracy during high flows is likely to be poorer (David Amos, NRW Hydrographer, *pers. comm.*). Field replicates were not collected, so there was no precision estimate for concentration data.

Suspended sediment concentrations (TSS in mg/L) could be related to discharge (m^3/s), so it was possible to model hourly TSS concentrations from hourly discharge (Fig.4). Error margins were 2 standard errors around the power function, which were propagated with the 10% variation in flow (Tab.2). The event load was the sum of the products of hourly discharge and TSS concentrations. The EMC was calculated by dividing the event load by the event volume (Tab.2). Note that because samples did not represent the most intense flow period, it is likely that there is systematic error in the estimation of sediment load and EMC for this event.

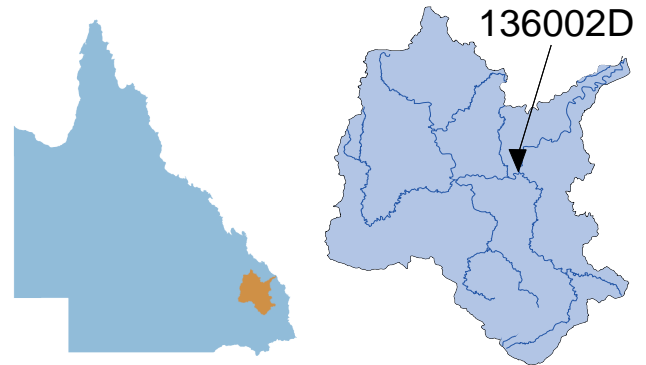


Figure 1. Lower Burnett event sampling location at Mt Lawless.

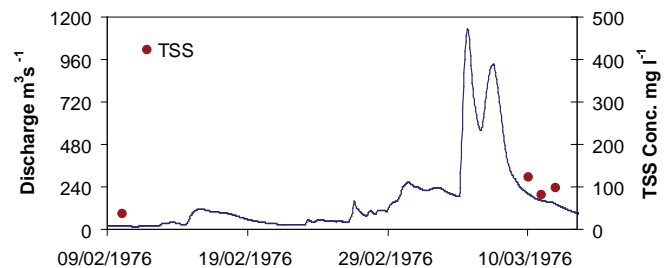


Figure 2. Sample times, discharge and TSS concentration of samples collected at Mt Lawless.

Flow Event Description

Catchment:	Burnett
Location:	GS136002D, Mount Lawless 25° 32' 46"S; 151° 39' 15"E
Catchment Area:	33,273 km ² (29,395 km ² upstream of the gauge)
Dominant Land Use:	Grazing (79%), Forestry (9%), Nature Conservation (3%), Cropping (3%)(upstream of gauge)
Event Duration:	15/02/1976 - 15/03/1976

Cumulative Rainfall 10/02/1976-12/03/1976

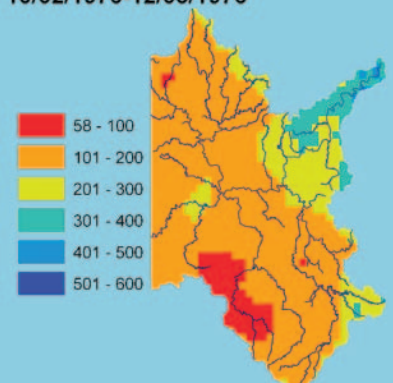


Figure 3. Cumulative rainfall during the event.

Results

This was a moderately strong runoff event from the Burnett catchment (Fig.4), which has an underlying geology of acid-intermediate igneous rocks (45%), sedimentary rocks (37%), and minor basalt (14%). Soils are predominantly sodic (31%) so can be vulnerable to erosion if not stabilised by vegetation, annual rainfall is low (650-800mm), and upstream topography is mostly above 150m a.s.l. with a relief change from the headwaters of 565m. The EMC for TSS (131 mg l^{-1}) exceeded similar magnitude unit discharges from the Mary: Miva in 2005 (40 mg l^{-1}), Bauple East in 2005 (30 mg l^{-1}). Furthermore the EMC was low compared with a similar magnitude unit discharge through this gauge one month earlier (384 mg l^{-1}), and through the Stonelands gauge in 1996 (229 mg l^{-1}). The sediment load (66 KT) was predictable on the basis of loads observed at Mt Lawless in 1976 and 1983, and at Walla Weir for this event and in 1982 (Fig.6).

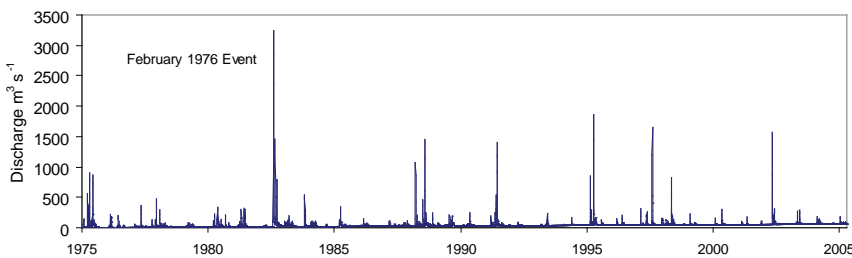


Figure 4. February - March 1976 event sampled at Mt Lawless in the context of historical (mean daily) discharge.

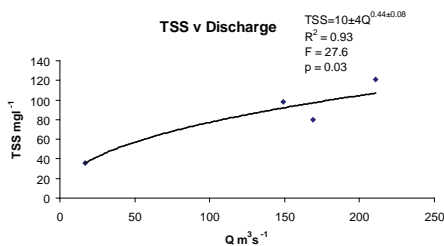


Figure 5. TSS related to discharge at Mount Lawless during the February - March 1996 event. Reported error margins are ± 1 standard error.

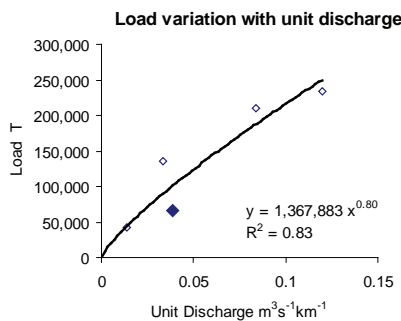


Figure 6. Suspended sediment delivery for the February – March 1976 event (closed symbol), in relation to other events (open symbols).

Table 1. Discharge and sediment data for the February – March 1976 event at Mount Lawless.

Date/Time	Gauge Height (m)	Q (m3/s)	TSS (mg/l)
10/02/1976 14:40	1.12	17.147	36
10/03/1976 12:35	2.32	210.822	121
11/03/1976 12:15	2.13	168.797	80
12/03/1976 11:20	2.03	148.857	98

Table 2. Estimated load and event EMC for the February – March 1976 event at Mount Lawless.

		Lower Bound	Upper Bound
TSS Load (kilo-tonnes)	66	4	367
TSS EMC (mg/L)	131	9	733
Total Event Discharge (ML)	500,899		
Number of samples	4		
Max Event Discharge (m3/s)	1134		
Period of record (yrs)	31		
% of time that the peak is equalled or exceeded	0.26		

For Further Information

Visit Water Quality Online, the NAP Water Quality website:

www.wqonline.info

We would like to thank the NRM&W Hydrographic unit, Bundaberg for collecting samples and supplying data.

To reference this information sheet:

Esslemont, G. (2006) Water Quality Event Monitoring : Lower Burnett River (Mt Lawless) February - March 1976: Event Summary Load Calculation (WQEM 0631) Department of Natural Resources and Water. ISBN 00000

Produced by the National Action Plan for Salinity and Water Quality Queensland Water Quality State-level Investment Project