

Water Quality Event Monitoring



Regional Natural Resource Management in Queensland

ID: WQEM 0636

Event Summary Load Calculation Baffle Creek (Mimdale) February 2003

Introduction

This fact sheet presents Event Mean Concentration (EMC) sediment load estimates collected from Baffle Creek at Mimdale gauging station (Fig.1) associated with five days of heavy rain in February 2003.

Methodology

Four samples (Tab.1) were collected from the gauging station GS 134001B (Fig.2) for analyses of total suspended sediments, total phosphorus, total nitrogen, and nitrate. Data were 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), though 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.

To relate total suspended sediment (TSS in mg/L) with discharge (m^3/s), the first TSS value sampled was used to represent the rising limb, and the average TSS for the three other samples was used for the falling limb. Error margins were 2 standard errors around the average TSS concentration on the falling limb, which were with the 10% variation in flow. The event load was the sum of the products of hourly discharge and TSS concentrations (Tab.2). The EMC was calculated by dividing the event load by the event volume (Tab.2).

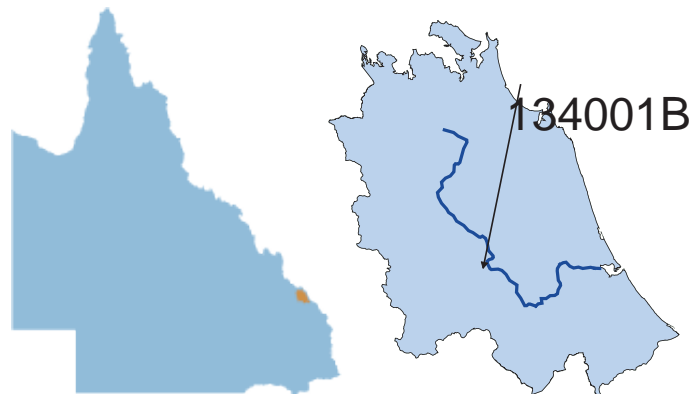


Figure 1. Baffle Creek event sampling location at Mimdale

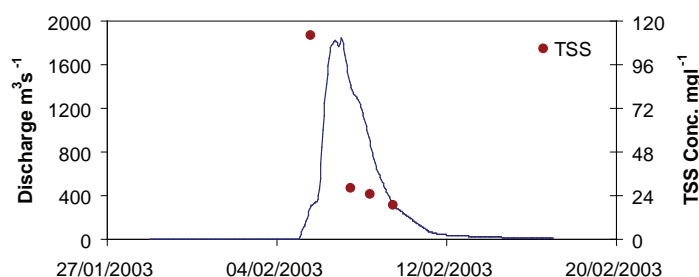


Figure 2. Sample times, discharge and TSS concentration of samples collected at Mimdale

Flow Event Description

Catchment:	Baffle
Location:	GS134001B, Mimdale 24°30'S; 151°44'E
Catchment Area:	3994 km ² (1402 km ² upstream of the gauge)
Dominant Land Use:	Grazing (65%), Nature conservation (18%), Rural residential (6%) (upstream of gauge)
Event Duration:	05/02/2003 - 17/02/2003

Cumulative Rainfall (mm)

05/02/03 - 09/02/03

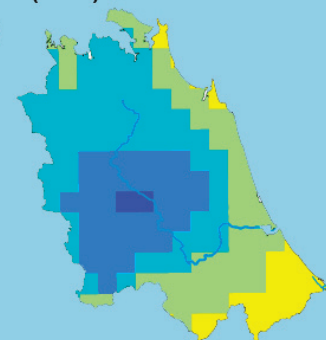
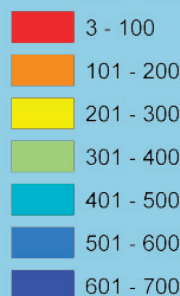


Figure 3. Cumulative rainfall during the event.

Results

This was a very large runoff event from an unregulated catchment (Fig.4), which transported relatively high sediment concentrations on the rising limb. This river system has a number of ephemeral streams, which cattle can access. The sediment load (21 KT) was predictable on the basis of loads observed at Mimdale in 1973, 1988, and 1991 (Fig.5).

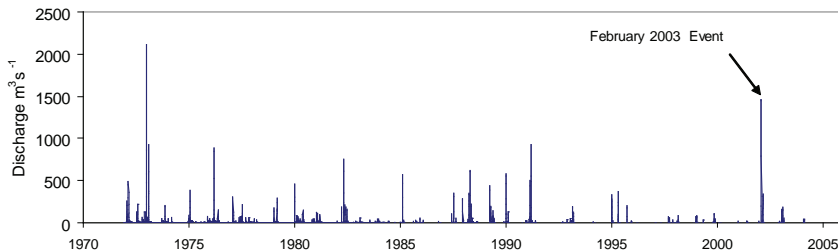


Figure 4. Baffle Creek February 2003 event sampled at Mimdale in the context of historical (mean daily) discharge

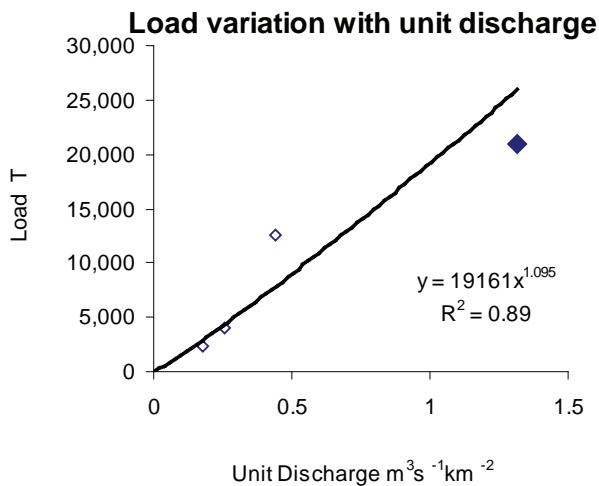


Figure 5. Baffle Creek February 2003 event sampled at Mimdale in the context of historical (mean daily) discharge.

Table 1. Discharge, sediment and nutrient data for the February 2003 event at Mimdale.

Date/Time	Gauge Height (m)	Q (m³/s)	TSS (mg/l)	TP (mg/l)	TN (mg/l)	NO ₃ (mg/l)
5/02/2003 13:45	11.65		112	0.0909	0.7517	0.81
7/02/2003 11:50	16.7		28	0.0592	0.7063	1.08
8/02/2003 9:33	15.1	875.94	25	0.0538	0.6212	0.84
9/02/2003 12:06	11.35	331.5	19	0.0532	0.6687	0.6

Table 2. Estimated load and event EMC for the February 2003 event at Mimdale.

Gauging station number	134001B		
Site Name	Mimdale		
Total Event Discharge (ML)	400,394		
Number of samples	4	Lower-Bound	Upper-Bound
TSS Load (kilo-tonnes)	21	18	25
TP Load (tonnes)	27	23	31
TN Load (tonnes)	278	238	320
NO ₃ Load (tonnes)	332	232	366
TSS EMC (mg/L)	53	44	62
TP EMC (mg/L)	0.07	0.06	0.08
TN EMC (mg/L)	0.69	0.59	0.80
NO ₃ EMC (mg/L)	0.83		
Maximum Event Discharge (m ³ /s)	1847		
Period of record (yrs)	34		
Percent of time that the peak is equalled or exceeded	0.008		

For Further Information

Visit Water Quality Online, the NAP Water Quality website:

www.wqonline.info

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

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