Water Quality Event Monitoring

Regional Natural Resource Management in Queensland

ID: WQEM 0627

EVENT SUMMARY LOAD CALCULATION

Lower Barambah (Ban Ban) April 1989

Introduction

This fact sheet presents Event Mean Concentration (EMC) sediment load estimates collected from the Lower Barambah at Ban Ban Springs gauging station in April 1989 (Figure 1).

Methodology

Three suspended sediment samples (Table 1) were collected from the gauging station GS136207A (Figure 2) and recorded in the DNR archives. Discharge was assumed to be ±10% of actual flow (http://www.nrm.qld.gov.au/water/monitoring/pdf/wm_data_col_stds.pdf) although during high flows accuracy is 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 mgl^{-1}) with discharge ($m3s^{-1}$), the average TSS value for the three samples was assumed across the hydrograph. Error margins were 2 standard errors around the average TSS concentration, which were propagated across the hydrograph with the 10% variation in flow. The event load was the sum of the products of hourly discharge and TSS concentrations (Table 2). The EMC was calculated by dividing the event load by the event volume (Table 2).

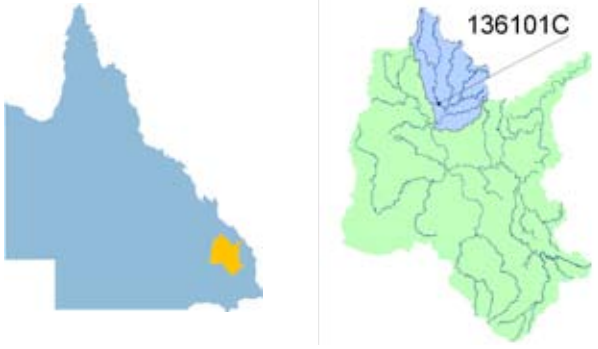

Figure 1. Lower Barambah event sampling location at Ban Ban Springs.

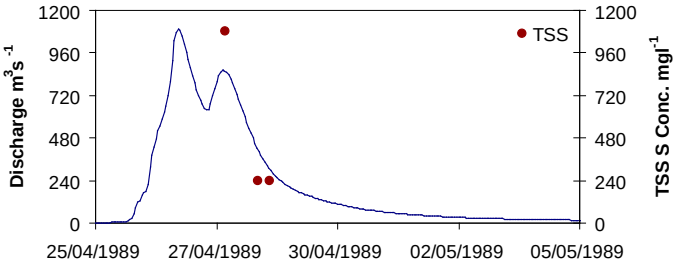

Figure 2. Sample times, discharge and TSS concentration of samples collected at Ban Ban Springs.

Flow Event Description

Catchment:	Burnett
Location:	GS136207A, Ban Ban, 25° 42′ 45″ S, 151° 48′ 26″ E
Catchment:	Area 33,273 km2 (5563km2 upstream of the gauge)
Dominant Landuse:	Grazing (73%); Nature conservation (8%), Forestry (6%), Cropping (6%), Pine forest (2%), Dairy (2%), Rural residential (1%)
Event Duration:	25/04/1989 - 05/05/1989

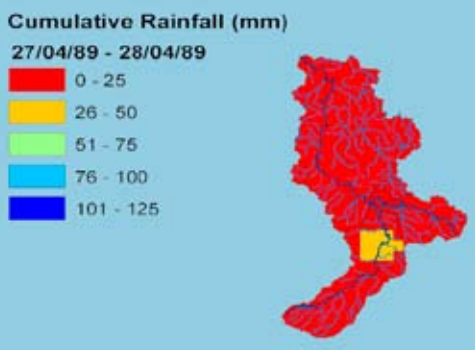

Figure 3. Cumulative rainfall during the Ban Ban rainfall event.

Results

This was a strong runoff event derived mainly from just downstream of the Bjelke Petersen Dam, in the first year after dam completion. The sub-catchment has an underlying geology of acid-intermediate igneous rocks (50%), sedimentary rocks (25%) and basalts (21%). Soils are moderately to highly susceptible to erosion if not stabilised by vegetation (36% vertosols, 28% sodosols, 17% rudosols). The EMC for TSS (521 mgl^{-1}) was higher than unit discharges of similar magnitude from the Burnett Mary Region: Mimdale (Baffle Creek) in 1973 (45 mgl^{-1}) and 1988 (55 mgl^{-1}), Gympie (Mary River) in 2005 (200 mgl^{-1}), and Bauple East in 1988 (46 mgl^{-1}).

Table 1. Discharge and sediment data for the April 1989 event at Ban Ban Springs

Date/Time	Gauge Height (m)	Q (m3/s)	TSS (mg/l)
27/04/1989 16:06	5.78	810.9	1082
28/04/1989 8:50	4.33	397.4	240
28/04/1989 14:40	3.84	326.7	240

Table 2. Estimated load and event EMC for the April 1989 event at Ban Ban Springs.

Gauging station number	136207B		
Site Name	Ban Ban		
Total Event Discharge (ML)	181,599		
Number of samples	3	Lower Bound	Upper Bound
TSS Load (kilo-tonnes)	95	-	216
TSS EMC (mg/L)	521	-	1190
Maximum Event Discharge (m3/s)	1094		
Period of record (yrs)	40		
Percent of time that the peak is equalled or exceeded	0.06		

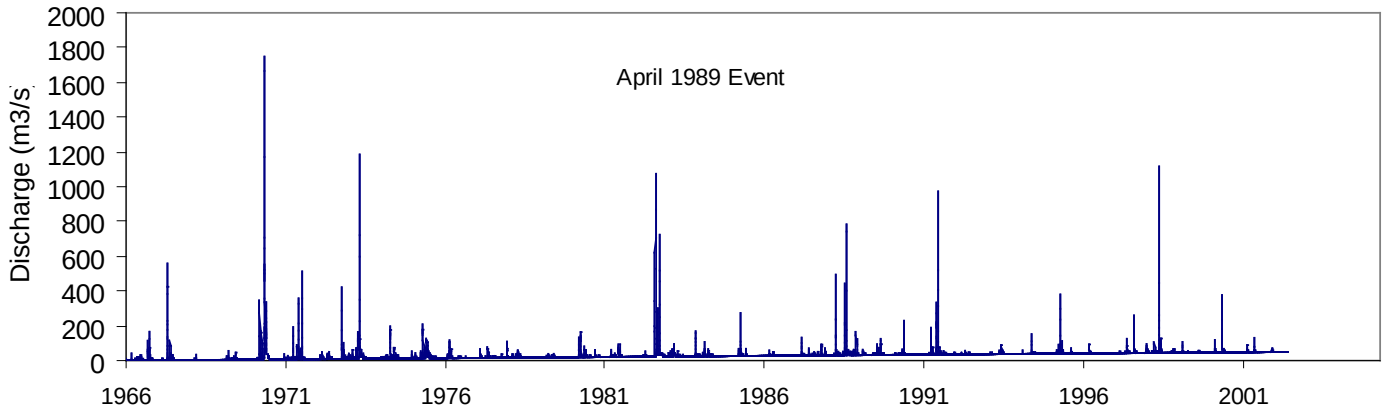

Figure 4. April 1989 event sampled at Ban Ban Springs in the context of historical (mean daily) discharge.

For Further Information

Contact your regional NAP water quality officer.

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Or 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 factsheet:
Esslemont, G. (2006) Water Quality Event Monitoring – Lower Barambah (Ban Ban) April 1989: Event Summary Load Calculation (WQEM 0627) Department of Natural Resources and Water. ISBN .

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