

HEAVY RAINFALL & FLOODING BOYNE RIVER

February 2003

Introduction

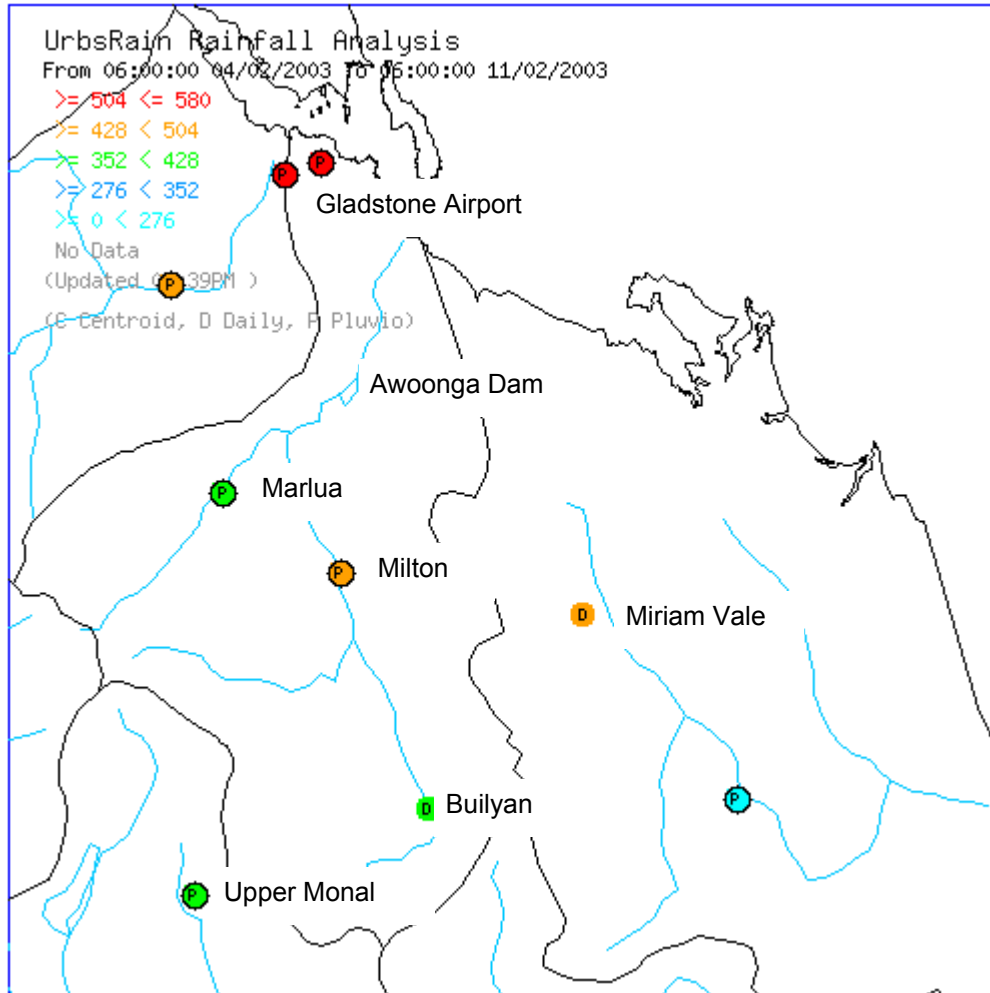
This report includes some observations on the heavy rainfall and flooding that occurred in the Boyne River at the beginning of February 2003. It uses operational data from stations operated by the Bureau and the Department of Natural Resources and Mines (NRM). More detailed data may be available from Bureau and NRM loggers in future.

Two rainfall stations, Gladstone Airport AWS and Milton TM, were selected as being representative of the rainfall in their surrounding areas and were analysed in detail. Locations mentioned in the report can be found in the figure below.

Rainfall Totals

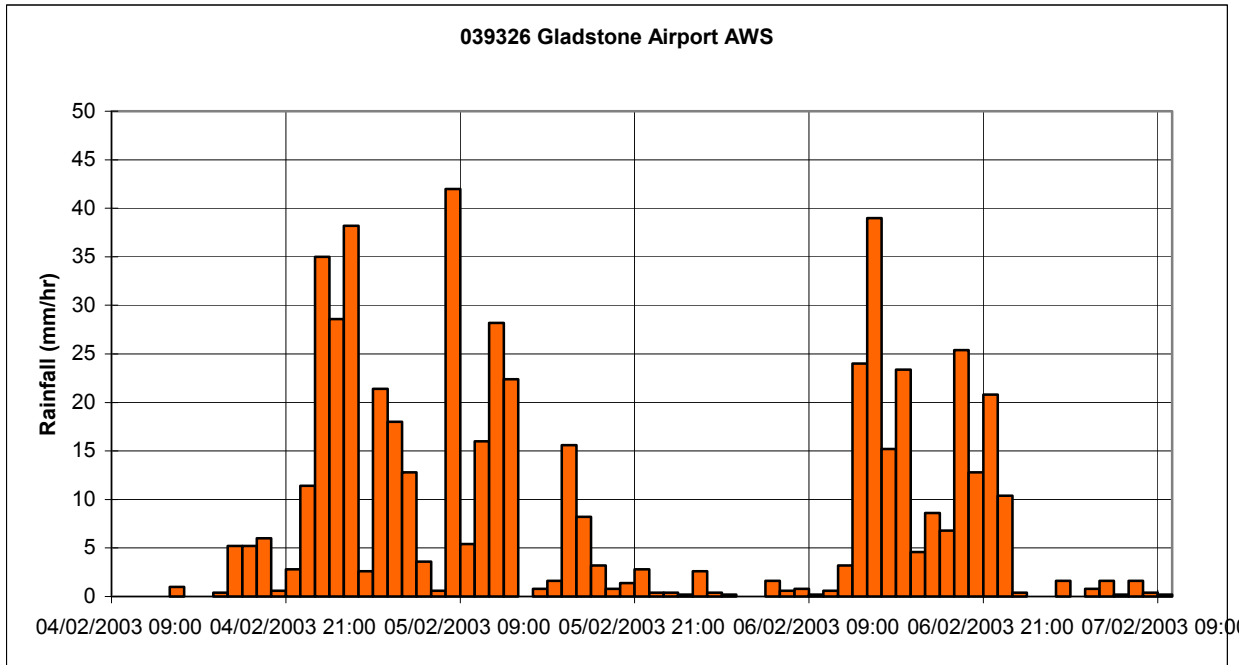
- In the 24 hours to 9am Wednesday 5th February, there was heavy rainfall in the coastal river and streams between Rockhampton and Gladstone. Up to this time, heaviest rainfall were recorded east of the Calliope Range in the coastal area from Gladstone and south about 100 kilometres.
- Ex-Tropical Cyclone Beni crossed the coast just south of Rockhampton in the early hours of Thursday morning 6th February. In hours that followed, heavy rainfall fell in the coastal region between Rockhampton and Gladstone and penetrated some 100 to 150 kilometres inland. The highest falls were recorded in the Boyne catchment area around Milton.
- Daily rainfall for the 3 days to 7th February is shown below in millimetres for a selection of stations in the catchment.

Station Name	24 hours to 9am			Total
	5	6	7	
Upper Monal TM	141	137	100	378
Builyan	151	157	72	380
Milton TM *	152	168	106	426
Marlua TM *	107	154	98	359
Gladstone AWS *	248	80	229	557
Gladstone Airport AWS *	256	93	214	563

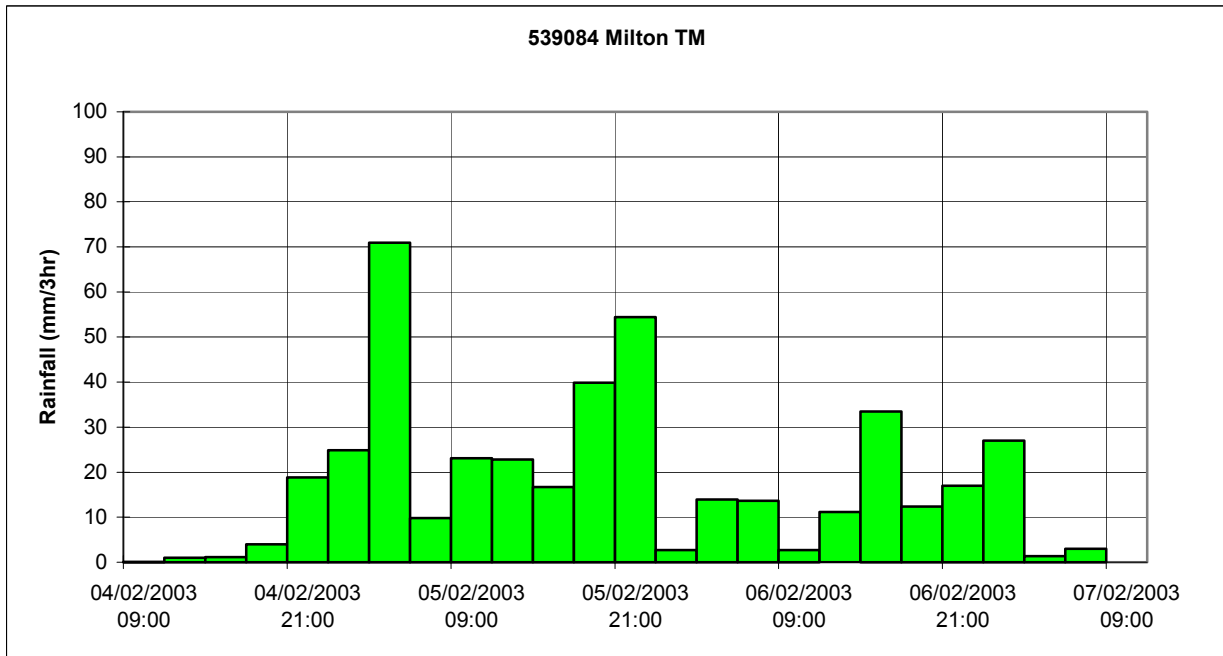


Temporal Patterns

- During the period, rainfall data was collected hourly from Automatic Weather Stations (AWS) and 3 hourly from telephone telemeters (TM) in the region.
- A one hourly plot for the period 9am 4th to 9am 7th February is presented for the AWS at Gladstone Airport. The rainfall pattern at Gladstone Airport shows several bursts of intense rain over the period with the highest hourly rainfall of 42mm occurring at 8am on 5th February.
- The most intense 3 hourly rainfall of 101 mm was recorded in the 3 hours to 1am 5th February.

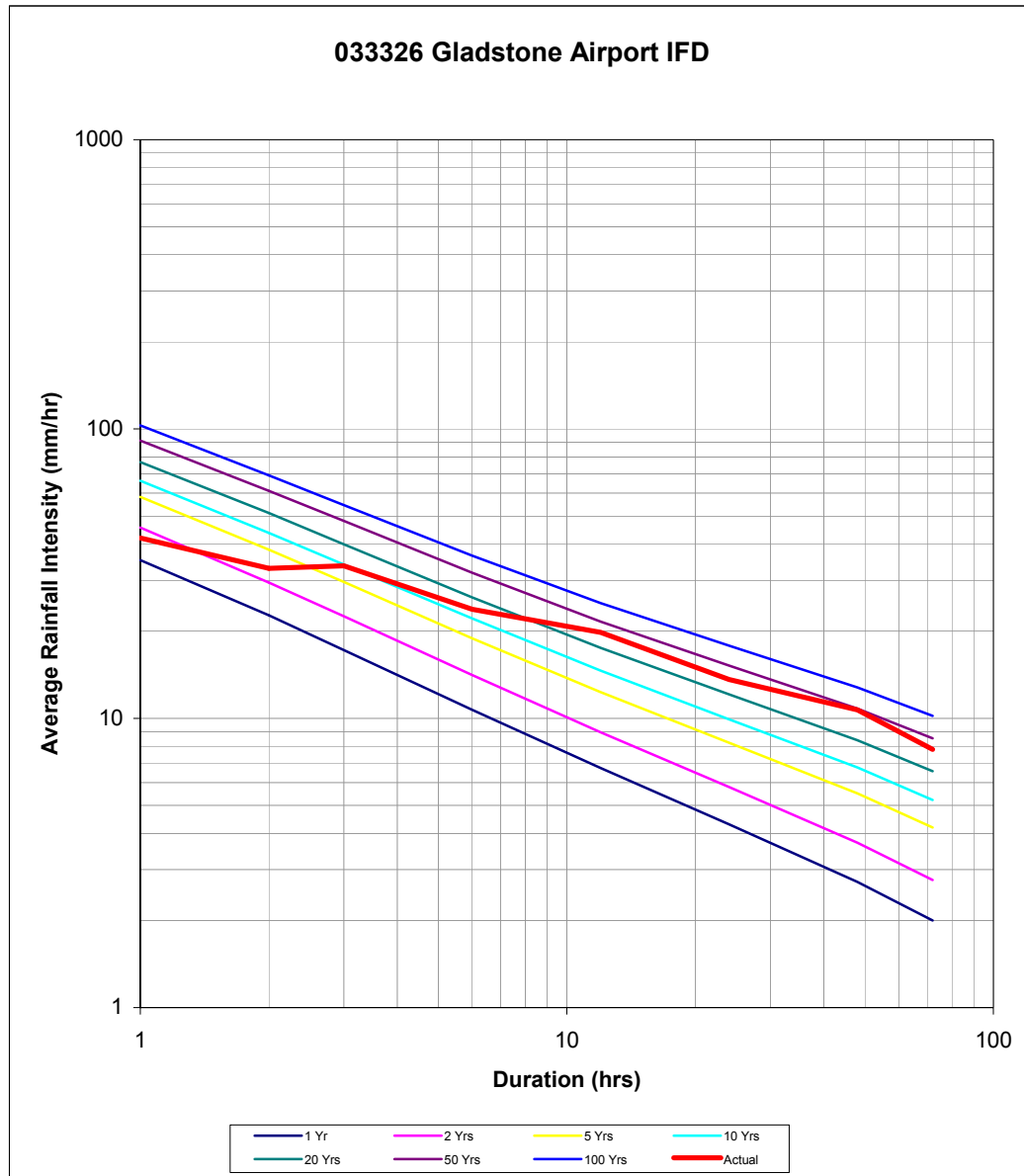


- A three hourly plot for the same period is shown for the DNRM station at Milton. The station at Milton shows a similar pattern to that of Gladstone Airport. At Milton, the highest three hourly rainfall of 71 mm occurred between midnight and 3am on Wednesday 5th February.

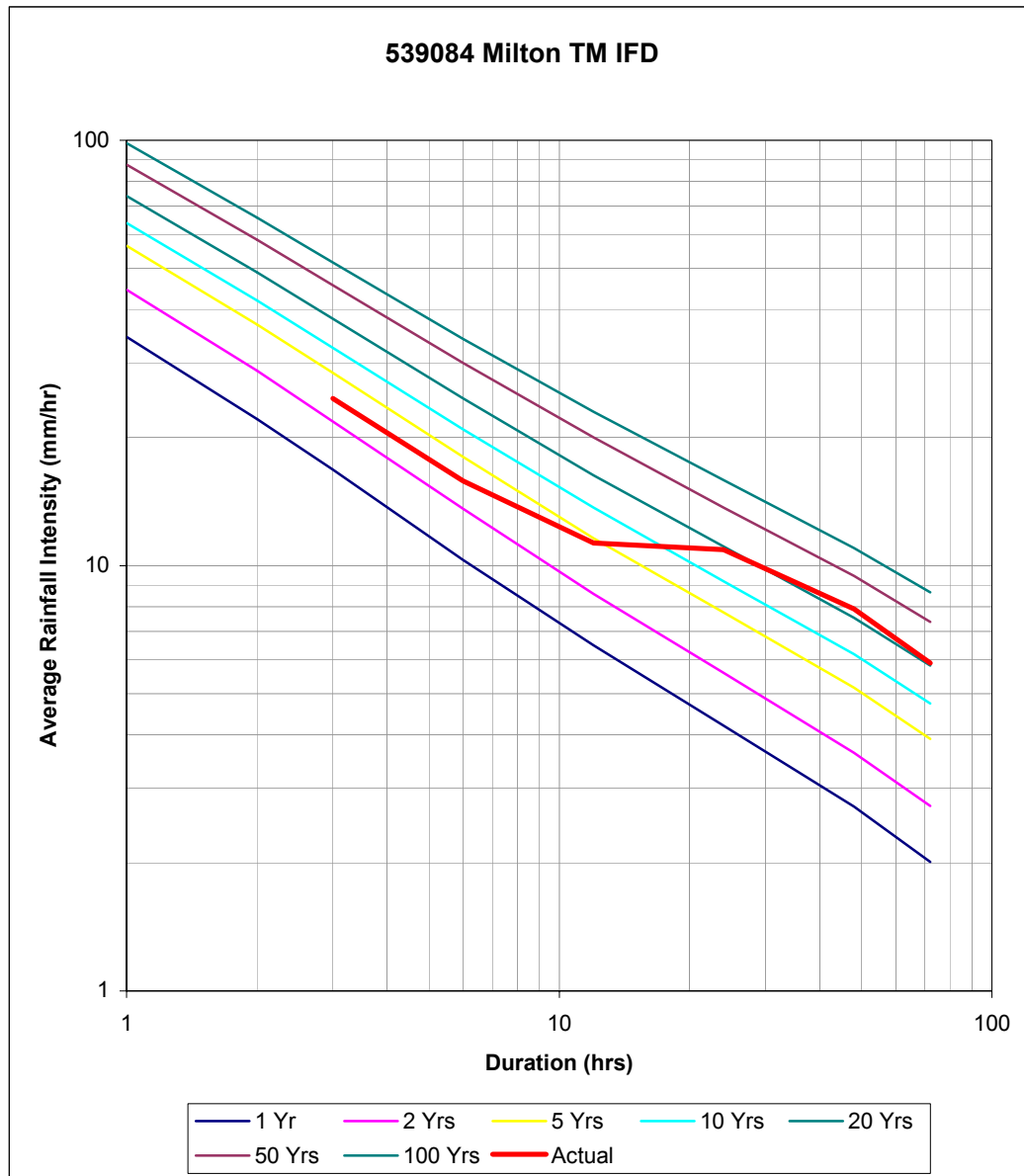


Intensity- Frequency- Duration Analysis

- Intensity-Frequency-Duration (IFD) analysis of the actual event rainfall was conducted at the two selected stations.
- The IFD analysis of the stations at Gladstone shows that the short duration less than 2 hours were less than 1 in 5 year Average Recurrence Interval (ARI). The most statistically significant rainfall appears to be the longer duration of 48 hours, which is about 50 year ARI.

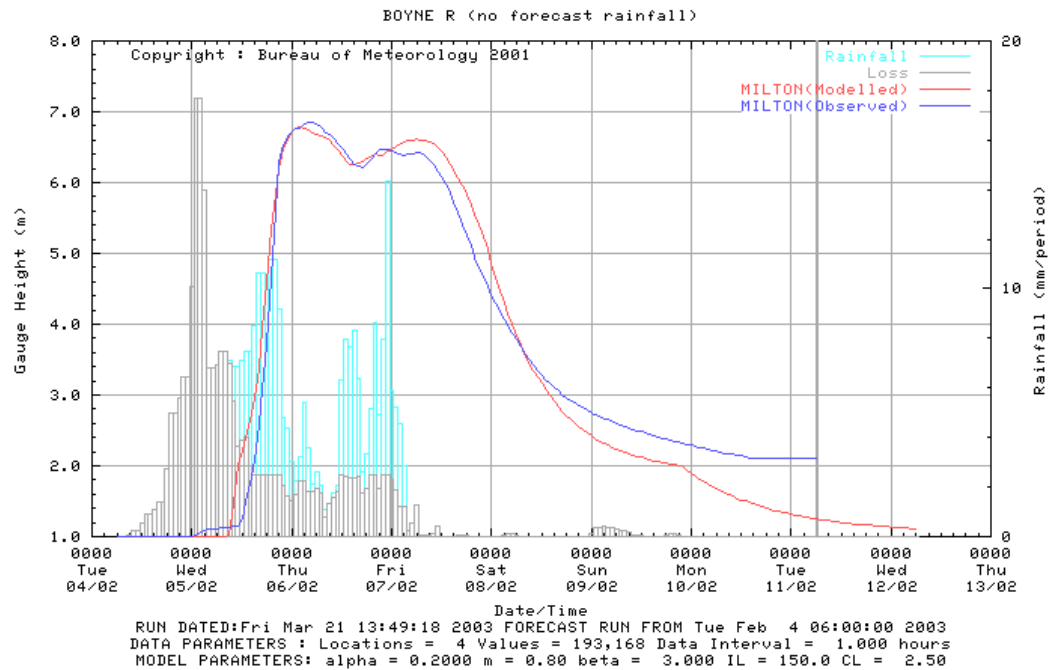


- The IFD analysis of the stations at MiltonTM only starts from 3 hour durations. The 3 hour duration at Milton was between a 2 and 5 year ARI while the longer durations up to 72 hours were just over 20 year ARI.

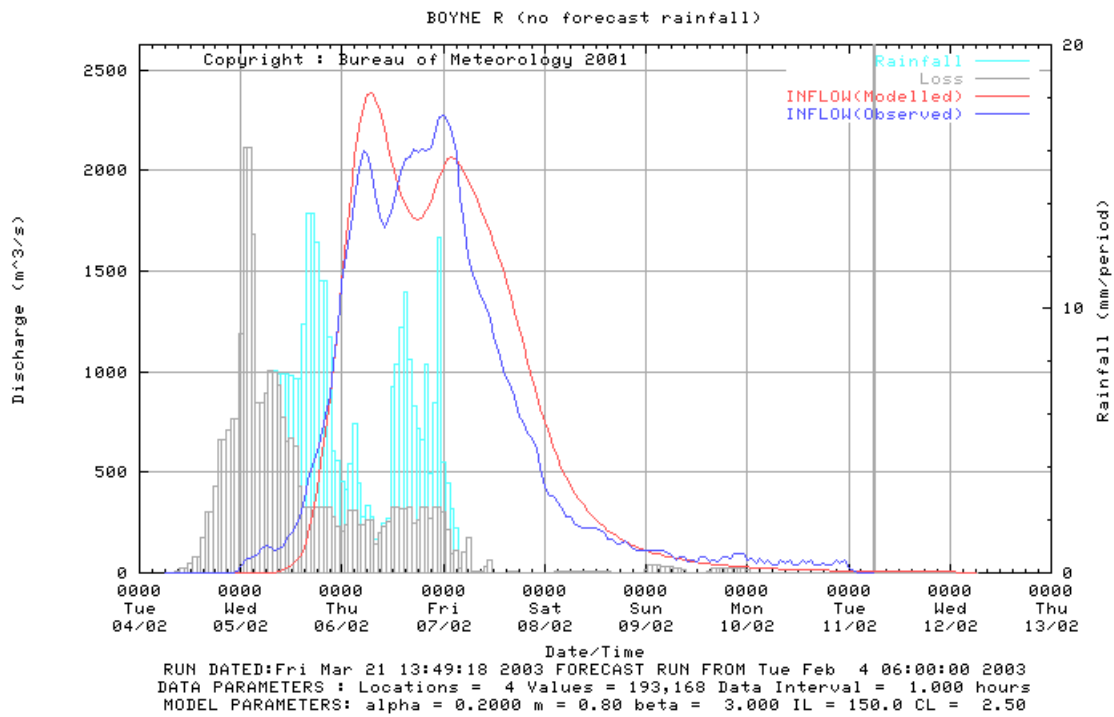


River Heights and Flows

- Prior to the onset of the heavy rainfall, catchment conditions in the Boyme were very dry and the capacity of Awoonga Dam was only about 8% of full capacity or 19 metres below FSL.
- In the Boyme River, river levels are monitored in real time at Nagoorin, Milton and Marlua and sharp river rises commenced about midday on Wednesday 5th. In the URBS model, an initial loss of 150mm was required to match the initial rise at these stations.
- The peak height of 6.86 metres reach at Milton is slightly higher than that of January 1996 when it peaked at 6.77 metres.



- During the period 6am 4th to 6am 11th February, the water level in Awoonga Dam rose from 19.1 metres below FSL to 6.9 metres below FSL, equivalent to a total inflow volume of 336,000 ML.
- During this period, the modelled inflow to the dam was 340,000 ML. In the diagram below, the red (Modelled) hydrograph was estimated by the URBS model while the blue (Calculated) hydrograph was estimated by reverse routing.



- The estimated peak inflow to the dam was 2400 m³/s at 7am 6th February.
- If the dam had of been full at the start of the event and the catchment saturated (i.e. zero initial loss), it is estimated that the dam would have filled and spilled. The peak outflow from the dam would have been about 1600 m³/s or about 4 metres over the spillway.