



ROSS RIVER

February/March 2000

This report includes some observations on the floods and hydrology of Ross River Dam in the months of February and March 2000 and is subject to confirmation.

Rainfall

- The table below shows the daily rainfall (mm) which occurred in the Ross River over a 3 week period from 14 February to 21 March 2000. The three days of the heaviest rainfall are highlighted.

Date/Time	Brabons	Nettlefield	McDonalds	Cormacks	Repeater	Dam	Weighted Catchment Average
15/02/00 09:00	2	0	0	0	0	4	1
16/02/00 09:00	28	4	12	10	10	12	12
17/02/00 09:00	20	22	20	14	20	30	20
18/02/00 09:00	137	175	134	163	77	83	139
19/02/00 09:00	1	31	57	21	9	14	24
20/02/00 09:00	23	38	9	9	10	12	21
21/02/00 09:00	35	38	19	31	49	44	35
22/02/00 09:00	11	1	5	7	13	18	7
23/02/00 09:00	8	2	7	4	5	5	5
24/02/00 09:00	87	45	31	84	39	36	53
25/02/00 09:00	136	55	50	84	128	147	88
26/02/00 09:00	23	11	6	12	19	19	14
27/02/00 09:00	14	16	17	8	8	4	13
28/02/00 09:00	38	25	21	33	27	25	28
29/02/00 09:00	31	10	9	16	24	25	17
01/03/00 09:00	0	0	0	0	0	0	0
02/03/00 09:00	3	1	1	5	4	7	2
03/03/00 09:00	0	0	0	0	0	0	0
04/03/00 09:00	0	0	0	0	0	0	0
05/03/00 09:00	0	0	0	0	0	0	0
06/03/00 09:00	0	0	0	4	0	0	0
07/03/00 09:00	0	0	0	0	0	0	0
08/03/00 09:00	0	0	0	0	0	0	0
09/03/00 09:00	0	0	0	0	0	0	0
10/03/00 09:00	31	25	22	13	10	9	21
11/03/00 09:00	6	5	0	2	7	4	4
12/03/00 09:00	1	0	0	0	0	0	0
13/03/00 09:00	0	0	0	0	0	0	0
14/03/00 09:00	5	0	0	1	6	2	2

15/03/00 09:00	0	0	0	0	0	0	0
16/03/00 09:00	1	1	0	0	0	1	1
17/03/00 09:00	188	145	119	111	133	147	143
18/03/00 09:00	51	34	21	30	34	39	35
19/03/00 09:00	0	0	0	0	0	0	0
20/03/00 09:00	0	0	0	0	0	0	0
21/03/00 09:00	1	1	0	0	0	0	0
Total	881	685	559	662	632	687	685

- The highest daily total recorded in the period was 188mm at Brabons on Friday 17 March. The highest average catchment rainfall also occurred on this day.
- Over the 21 days ending 9am Tuesday 21, rainfall totals ranged from 559mm at McDonalds in the south eastern part of the catchment to over 880mm at Brabons in the western part of the catchment.
- Most intense recorded rainfalls in the Ross River catchment were:

Rainfall (mm)	Period (hrs)	Station	Ending Time/Date
60	1	Nettlefield	0035 17/02/00
101	3	Brabons	0820 25/02/00
127	6	Brabons	0900 25/02/00
174	12	Brabons	1100 17/03/00
234	24	Brabons	0435 17/03/00
239	48	Brabons	0900 18/03/00

- Intensity-Frequency-Duration (IFD) analysis of rainfall at Brabons, Nettlefield, McDonalds and Cormacks has been carried out for each of the three periods of heavy rainfall, as detailed in the attachment. Average Recurrence Intervals (ARI) did not exceed 5 years at any station for durations between 1 and 48 hours during the three week period.
- This rainfall is well below the 549mm recorded at Townsville Met Office in the 24 hours to 9am 11 January 1998. This exceeded the 100 year ARI for all durations from 1 to 24 hours.

Storage Behaviour

- The Ross River Dam URBS flood forecasting model was developed in July 1998 and calibrated on four events (Dec/Jan 1991, Feb 1991, Feb 1997 and Jan 1998) It was also used successfully during the August 1998 event. Refer to the Bureau's report *Ross River URBS Model*, July 1998, for further information.
- The URBS model of the Ross River consists of 28 sub-catchments to the dam spillway. Subarea 11 is mostly within the reservoir area of the dam and is represented as fully impervious.
- Stage-Storage-Discharge data used in the URBS model is shown below:

Reduced Level (m AHD)	Gauge Height (m)	Storage (Ml)	Storage above FSL (Ml)	Volume to Spill (Ml)	Spillway Discharge (m3/s)
25.00	-13.2	1458		210630	0
25.50	-12.7	1845		210243	0
26.00	-12.2	2312		209776	0
26.50	-11.7	2874		209214	0
27.00	-11.2	3542		208546	0
27.50	-10.7	4326		207762	0
28.00	-10.2	5243		206845	0
28.50	-9.7	6314		205774	0
29.00	-9.2	7569		204519	0
29.50	-8.7	9066		203022	0
30.00	-8.2	10936		201152	0
30.50	-7.7	13622		198466	0
31.00	-7.2	16875		195213	0
31.50	-6.7	20724		191364	0
32.00	-6.2	25530		186558	0
32.50	-5.7	31433		180655	0
33.00	-5.2	38554		173534	0
33.50	-4.7	46919		165169	0
34.00	-4.2	56685		155403	0
34.50	-3.7	67729		144359	0
35.00	-3.2	80710		131378	0
35.50	-2.7	95721		116367	0
36.00	-2.2	112673		99415	0
36.50	-1.7	131642		80446	0
37.00	-1.2	152624		59464	0
37.50	-0.7	175690		36398	0
38.00	-0.2	201187		10901	0
38.21	0.0	212088	0	0	0
38.44	0.2	230149	18061		18
39.12	0.9	260528	48440		50
39.58	1.4	290906	78818		92
40.04	1.8	325593	113505		143
40.49	2.3	362919	150831		202
40.95	2.7	400246	188158		268
41.41	3.2	441801	229713		343
42.09	3.9	486677	274589		473
42.55	4.3	531553	319465		572
43.01	4.8	580415	368327		680
43.47	5.3	632956	420868		798
44.15	5.9	685497	473409		994
44.61	6.4	742250	530162		1138
45.07	6.9	803565	591477		1291
45.53	7.3	864879	652791		1454

- A few days prior to the onset of the rainfall in March, the level of the Ross River Dam was 37.17 m AHD or 0.91 metres below the spillway crest. This is about 41000 ML below full supply.
- Reservoir levels commenced to rise on the afternoon Thursday 17 February.
- Three distinct peaks were recorded at the spillway:

Date/Time	RL (m AHD)	Height over spillway (m)
25/02/00 2310	40.17	1.96
28/02/00 1820	40.17	1.96
17/03/00 2230	40.07	1.86

- As shown on the attached plot, the URBS model overestimated the outflow from the dam during the first few days. However, it modelled the peaks of 25 and 28 February very well.
- At the onset of the heavy rain on 16 March, the outflow from the reservoir was overestimated by about 20 m³/s or 0.5 metres. This resulted in the third peak being overestimated by about 0.2 metres.
- The peak inflow to the reservoir during February was estimated to be 1800 m³/s at 1000 Friday 25 February with the peak outflow of 170 m³/s occurring some 13 hours later on the same day.
- In the March event, the peak inflow was estimated to be 1700 m³/s at 1100 Friday 17 March and the peak outflow of 165 m³/s occurred about 11 hours later.
- By comparison, the peak inflow during the January 1998 flood was estimated to be 3300 m³/s and the peak outflow about 280 m³/s or 2.8 metres over the spillway.

Further Information

- Contact Peter Baddiley (07 3239 8768) or Terry Malone (07 3239 8765).

Intensity Frequency Duration Analysis

- 48 hours ending 0900 18 February 2000

Rain (mm)	Period (hrs)	Ending Date/Time	ARI (yrs)	Rain (mm)	Period (hrs)	Ending Date/Time	ARI (yrs)
Brabons				Nettlefield			
44	1	0220 18/02/00	1-2	60	1	0035 17/02/00	2-5
57	3	0245 18/02/00	< 1	71	3	0045 17/02/00	1-2
74	6	0355 18/02/00	< 1	110	6	0510 17/02/00	2-5
96	12	0225 18/02/00	< 1	132	12	1040 17/02/00	2-5
141	24	0355 18/02/00	< 1	175	24	0805 18/02/00	2-5
156	48	0900 18/02/00	< 1	197	48	0900 18/02/00	1-2
McDonalds				Cormacks			
44	1	0035 17/02/00	1-2	41	1	1645 17/02/00	1
49	3	0050 17/02/00	< 1	67	3	1650 17/02/00	1-2
84	6	1735 17/02/00	< 1	108	6	1650 17/02/00	1-2
99	12	2100 17/02/00	< 1	115	12	2155 17/02/00	1-2
135	24	0515 18/02/00	< 1	163	24	0845 18/02/00	1-2
154	48	0900 18/02/00	< 1	177	48	0900 18/02/00	< 1

- 48 hours ending 0900 25 February 2000

Rain (mm)	Period (hrs)	Ending Date/Time	ARI (yrs)	Rain (mm)	Period (hrs)	Ending Date/Time	ARI (yrs)
Brabons				Nettlefield			
37	1	0820 25/02/00	< 1	16	1	0550 24/02/00	< 1
101	3	0820 25/02/00	2-5	37	3	0845 25/02/00	< 1
127	6	0900 25/02/00	2	46	6	0855 25/02/00	< 1
130	12	0900 25/02/00	< 1	47	12	0855 25/02/00	< 1
136	24	0900 25/02/00	< 1	54	24	0855 25/02/00	< 1
223	48	0900 25/02/00	< 1	99	48	0900 25/02/00	< 1
McDonalds				Cormacks			
11	1	0615 25/02/00	< 1	40	1	0740 24/02/00	< 1
20	3	0830 25/02/00	< 1	64	3	0825 24/02/00	< 1
31	6	0845 25/02/00	< 1	79	6	0900 25/02/00	< 1
37	12	0845 25/02/00	< 1	81	12	0900 25/02/00	< 1
50	24	0845 25/02/00	< 1	97	24	0615 25/02/00	< 1
80	48	0900 25/02/00	< 1	168	48	0900 25/02/00	< 1

- 48 hours ending 0900 18 March 2000

Rain (mm)	Period (hrs)	Ending Date/Time	ARI (yrs)	Rain (mm)	Period (hrs)	Ending Date/Time	ARI (yrs)
Brabons				Nettlefield			
26	1	0000 17/03/00	< 1	27	1	0035 17/03/00	< 1
66	3	0200 17/03/00	< 1	49	3	0210 17/03/00	< 1
98	6	0500 17/03/00	1	77	6	0315 17/03/00	1-2
174	12	1100 17/03/00	1-2	132	12	0945 17/03/00	2-5
234	24	0435 17/03/00	1-2	176	24	1750 17/03/00	2-5
239	48	0900 18/03/00	< 1	179	48	0900 18/03/00	1-2
McDonalds				Cormacks			
35	1	0025 17/03/00	< 1	25	1	0015 17/03/00	< 1
48	3	0030 17/03/00	< 1	50	3	0040 17/03/00	< 1
65	6	0250 17/03/00	< 1	64	6	0050 17/03/00	< 1
108	12	1055 17/03/00	< 1	99	12	1030 17/03/00	< 1
138	24	1120 17/03/00	< 1	140	24	1500 17/03/00	< 1
140	48	0900 18/03/00	< 1	141	48	0900 18/03/00	< 1