

Badger Flood 2003

Situation Report

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1. Background

The Town of Badger has a long history of flooding dating back to 1916. However, the February 15 event was the most severe in terms of depth of inundation and damages to the town. The mechanism was also different, particularly with respect to the rate of rise of the water level.

This report provides a description of the event, outlines the data that is available to carry out further investigations, describes the response of the Water Resources Management Division (WRMD) and other agencies to the flood event and makes conclusions and recommendations. This report identifies areas where further study will be required to detail the flood mechanism. However, further analysis should be carried out only when all the data available has gone through a quality control process.

The area discussed in this report extends from Grand Falls in the east to Exploits Dam in the west as shown in Figure 1.

2. Antecedent Conditions

a Meteorological Data

The following meteorological data available for the study:

- mean daily temperatures and total daily precipitation Grand Falls,
- mean daily temperatures and total daily precipitation at Exploits Dam,
- hourly air temperatures and wind speed and direction at Exploits River below Noel Pauls Brook,
- temperature, precipitation data and wind speed and direction at Badger.

This data is necessary to analyze the conditions that caused the ice cover to develop prior to the flood and the redevelopment of the ice cover upstream of Badger after flood. The locations of these climate stations are shown in Figure 1. The relevant time period runs from December 1, 2002 to March 31, 2003. This data has been collected and is available from the Department of Environment (DOE).

Other supplementary weather data for the region can be obtained from climate stations which are somewhat removed from the study area. These stations include Buchans, Star Lake and Burgeo Road in the west, and Wooddale-Bishop's Falls, Rattling Brook and Gander in the east.

i. Air Temperature

Air temperature data were compared to the monthly normals for Exploits Dam, Exploits River below Noel Paul's Brook, Badger and Grand Falls. The locations of these stations are shown in Figure 1. The data for Badger is presented in Figure 2 and for the other stations in Appendix A. The data shows that in the week preceding the flood the temperatures were up to 12° C degrees

Exploits River - Grand Falls to Exploits Dam

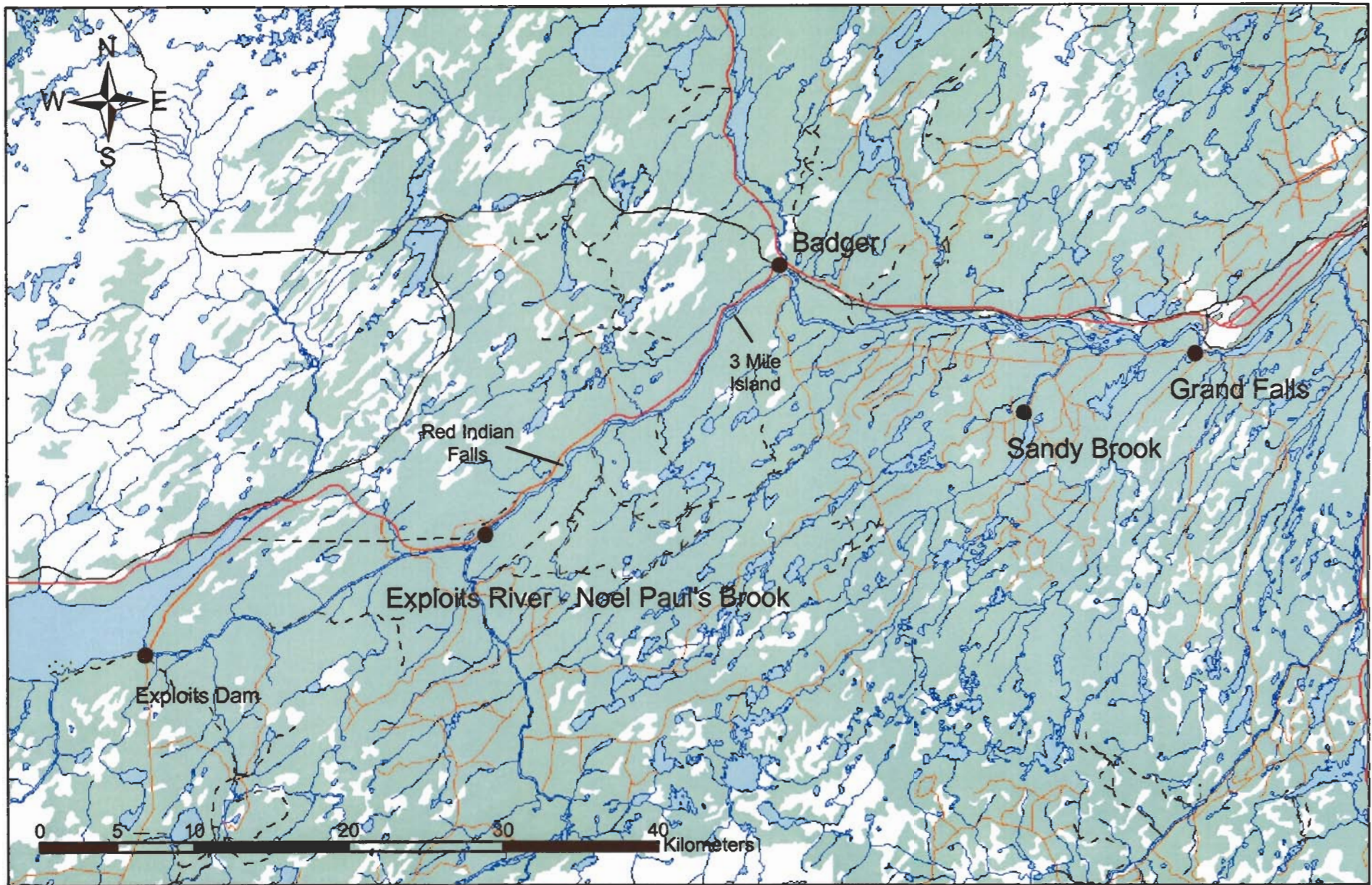


Figure 1 - Location Map



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Legend

● Hydrometric Stations

below the normal for that period while in the week before that the temperatures were up to 10° C degrees above the normal.

ii. Wind Speed and Direction

Mean daily wind speed is shown in Figure 3 for the Badger climate station and in Appendix A, Figure A-1 for the Exploits River below Noel Pauls Brook site. Wind direction is available for the Badger station. Normals of wind speed and direction are not available for Badger or Noel Paul's Brook. The closest climate station with wind normals is at Gander. The wind speeds do not appear to be unusually high in the week preceding the flood.

iii. Precipitation

Precipitation data was available at the Grand Falls, Badger and Exploits Dam locations. All daily data are plotted in Figure 4. Monthly totals for the Badger climate station are compared to the normals in Figure 5. The total was about 30 mm higher than the normal for February.

b Streamflows / Discharges

Streamflows in the Exploits River Basin at Badger include regulated and unregulated flows. The portion of the basin upstream of the outlet of Red Indian Lake, which represents 70 per cent of the drainage area above Badger, is controlled at Exploits Dam by Abitibi Consolidated Company of Canada (Abitibi).

Further downstream, the Exploits River is gauged for flow below the confluence with Noel Pauls Brook. Flows at Grand Falls are calculated by Abitibi based on power generation. For the two weeks preceding the flood event the flows at the Noel Paul gauge fluctuated from initially being below the normal, then going above the normal to fall back below the normal just prior to the flood. These flows are shown in Figure 6.

Sandy Brook at Sandy Brook Powerhouse makes a small (about 5-10%) contribution to the flow of the Exploits River just upstream of Grand Falls. Streamflows at these gauges are compared to their averages in Figures B-1 to B-4 in Appendix B. All streamflows are plotted concurrently in Figure B-5.

There are a number of other active and discontinued streamflow gauges in and around the region. Data from these stations may be useful in analyzing this flood and its relationship to previous floods in Badger.

c Water Levels

The relevant water level stations for analyzing the Badger flood are near the arena in the Town of Badger and Exploits River below Noel Pauls Brook which is situated about 20 km upstream of Badger. The daily average water levels for these two stations are plotted concurrently in Figure 7.

Badger (AUT) Environment Canada ID # 8400301
Mean Daily Air Temperatures

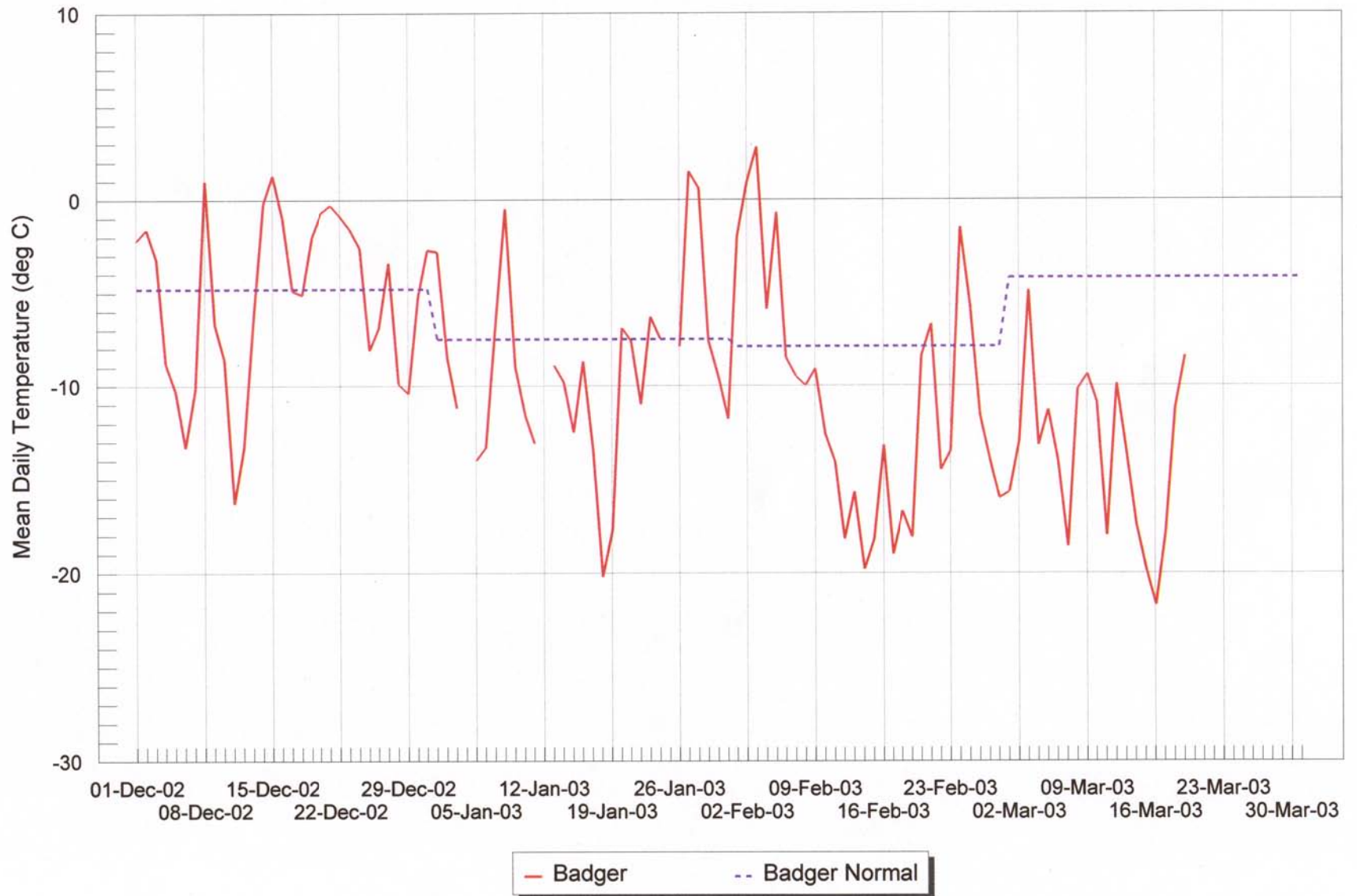


Figure 2 - Badger Air Temperature Data

Badger (AUT) Environment Canada ID # 8400301
Mean Daily Wind Speed

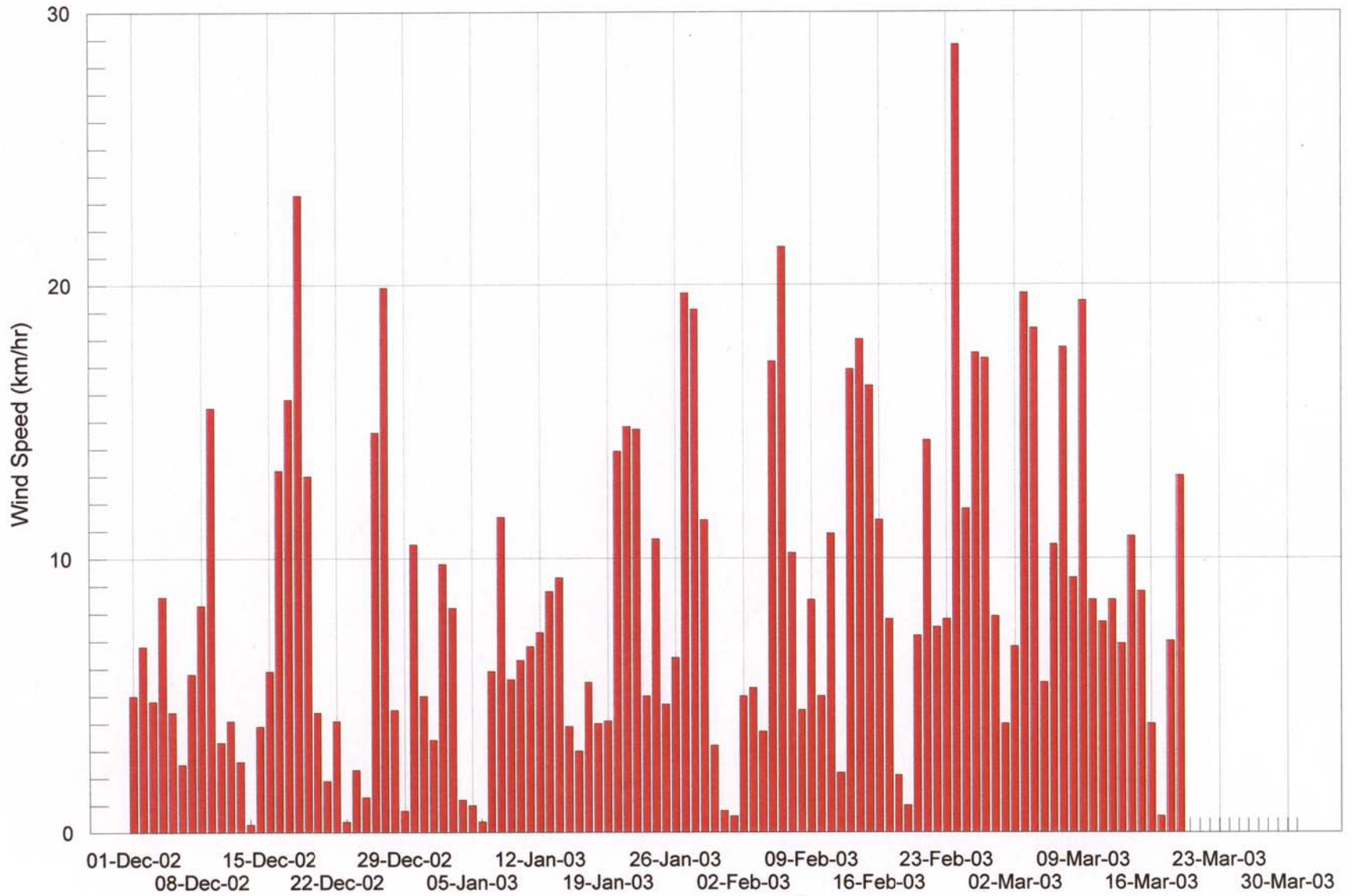


Figure 3 - Badger Wind Speed Data

Daily Precipitation

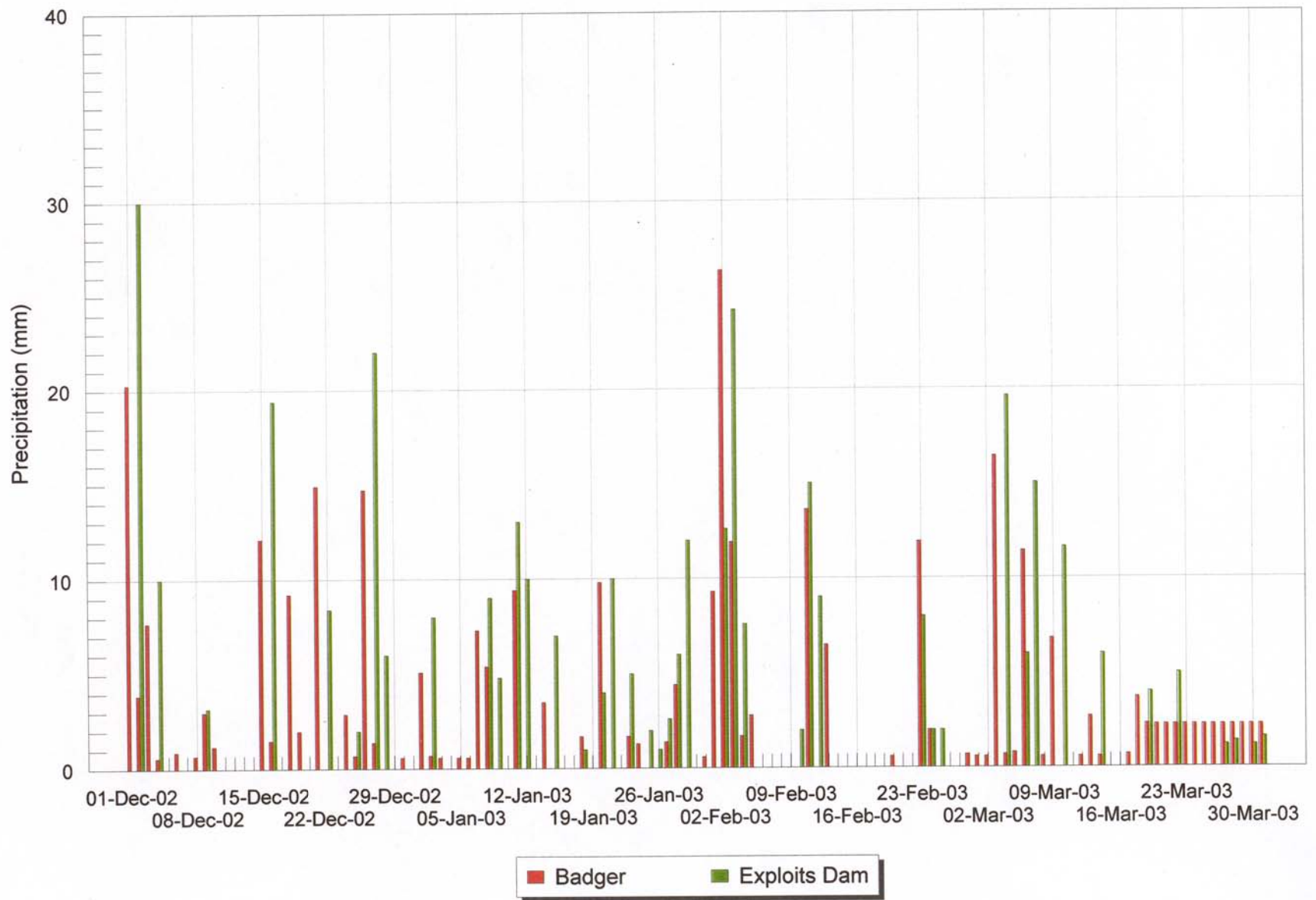


Figure 4 - Daily Precipitation Data

Badger (AUT) Environment Canada ID # 8400301
Monthly Total Precipitation

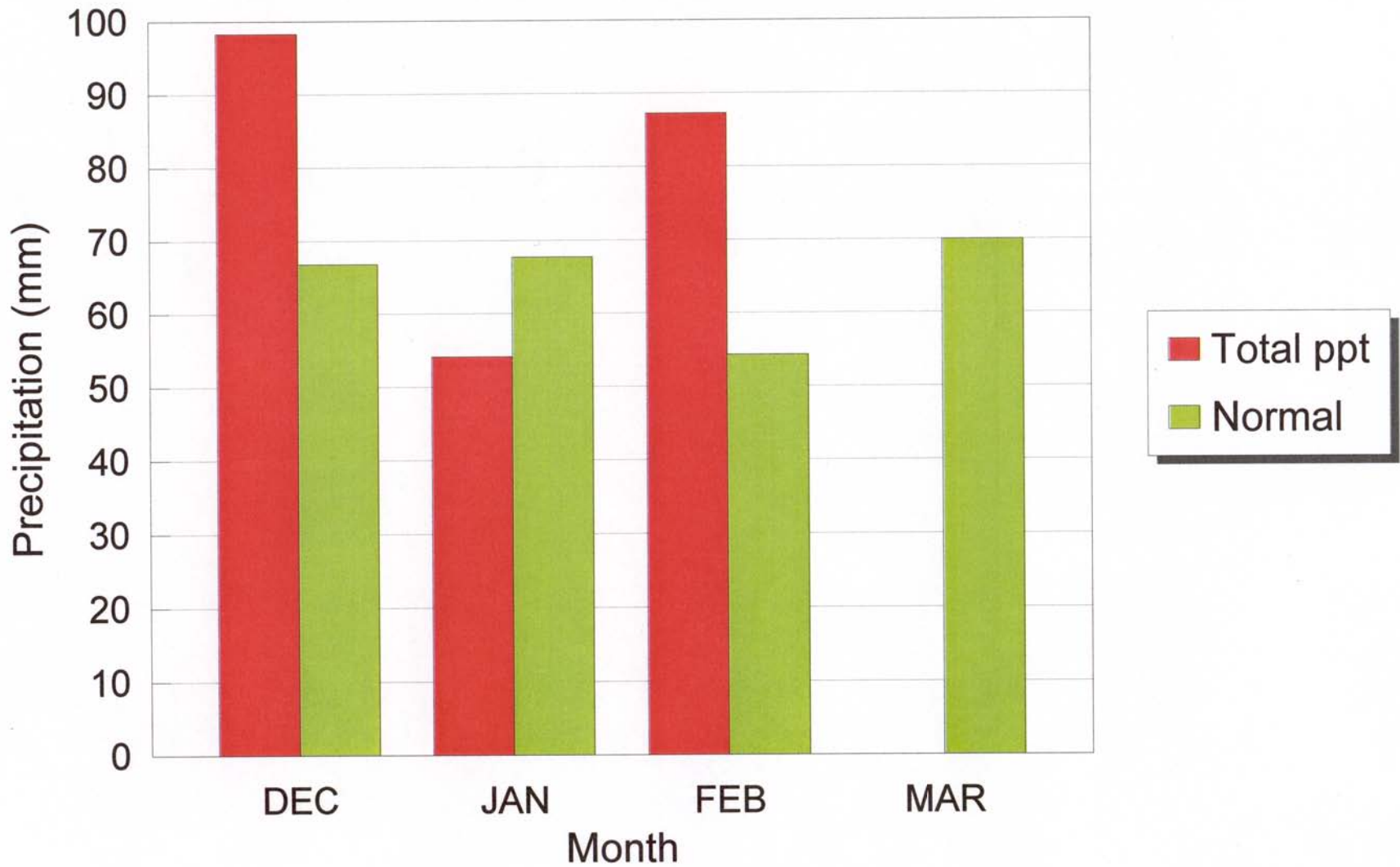


Figure 5 - Badger Precipitation Data

Daily Flow Comparison

Exploits River below Noel Paul's Brook ID # 02YO011

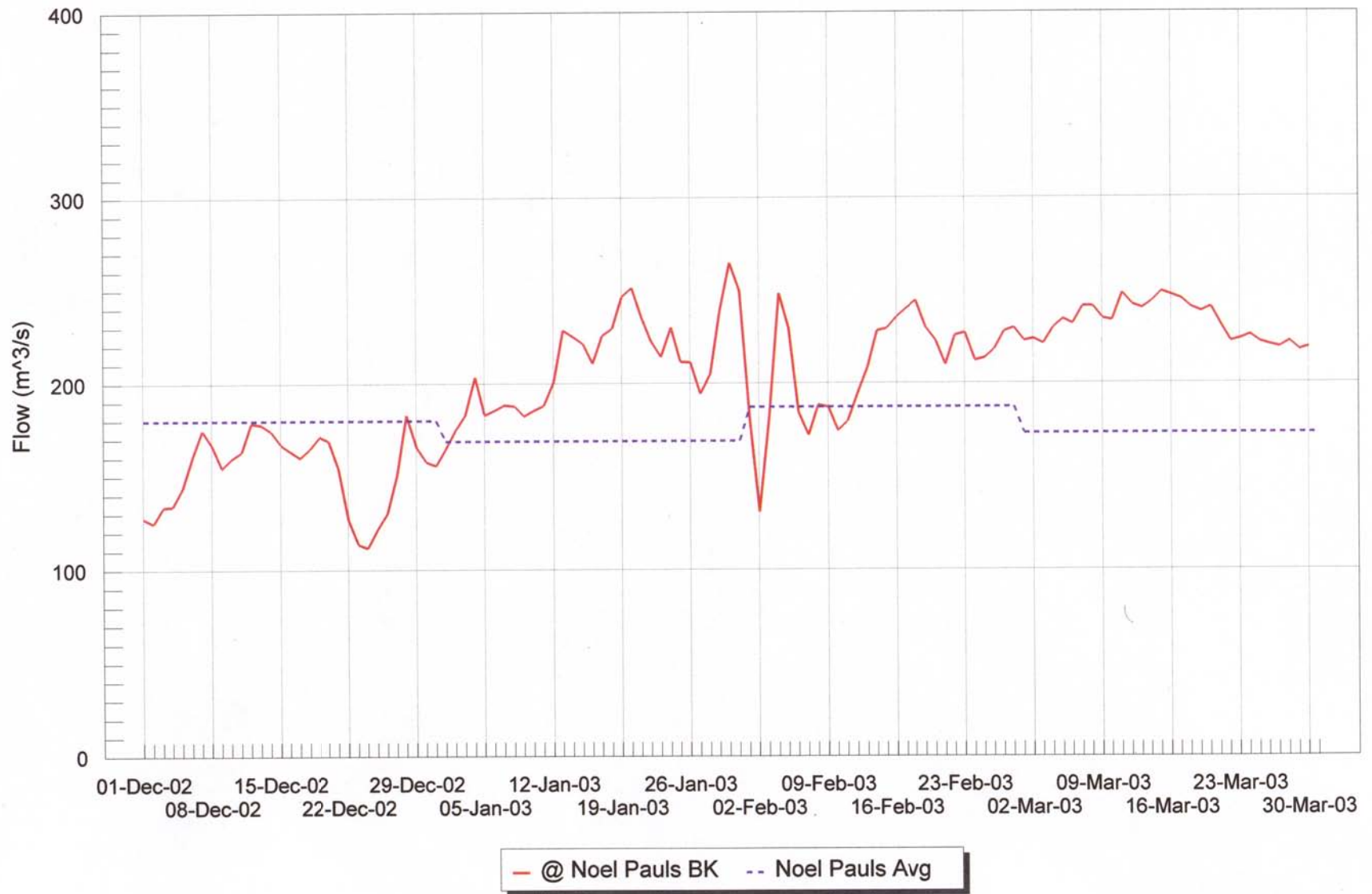


Figure 6 - Exploits River below Noel Pauls Brook Flows