

FLOODING OF THE BOG WALK GORGE – DECEMBER 30, 2004

INTRODUCTION

During the period Dec. 27th-30th, 2004 the island of Jamaica experienced intermittent showers and thunderstorms associated with a cold front that was stationary over the island. The feature resulted in four days of moderate rainfall in the Rio Cobre Basin causing flooding of the Bog Walk Gorge to an estimated 4 feet above road level on Thursday December 30. Four cars and a truck were trapped by flood waters in the Gorge and 19 persons had to be rescued by JDF helicopter.

The question of how this could have happened given the existence of the Rio Cobre Flood Warning system that was established to primarily provide early warnings to close/open the Rio Cobre Gorge, has been raised. In response this report will assess the performance of the system during this event.

Description of system

The Flood Warning System on the Rio Cobre consists of 4 real time reporting rainfall intensity gauges strategically located in the upper watershed; two real time flood level gauges at Bog Walk and at Dam head and two Community Flood Gauges at Thompson Pen and Rivoli near Spanish Town. Rainfall and flood level data are automatically transmitted to a computer base station at the WRA via a radio frequency repeater system. The data is decoded, analyzed, and the warning information submitted to ODPEM for the release of the official warning to the designated police and general public. Two back up computer base stations linked to existing system were also installed at the Meteorological Office and ODPEM. These have not been functioning for several years. The warning advice issued by the WRA to ODPEM is based on a process whereby the rainfall over the basin is constantly monitored once the Met Office has issued a watch for flooding in the area. Once the threshold values have been exceeded at the rainfall stations and the gauge at Bog Walk records a height of 8ft, the advice to close the gorge is sent to ODPEM.

Functioning Of The Rio Cobre Flood Warning System On December 30, 2004

All 4 rainfall intensity gauges over the Rio Cobre basin were reporting prior to and during the event. The table below shows the 24- hour total rainfall starting at 4 pm each day for each of the gauges.

Rainfall Data (mm) for Upper Rio Cobre-December 27-30, 2004

Date	Riversdale	Guys Hill	Ewarton	Glengoffe
27/12/2004	22	13	9	18
28/12/2004	3	10	0	5
29/12/2004	23	25	0	19
30/12/2004	86	28	18	31

Based on the analyses of previous historical data at these stations, the rainfall such as that which occurred on the 29th –30th December was not expected to lead to flooding of the gorge.

The telemetric water level gauge at Bog Walk has been out of operation prior to the flood event. The system was upgraded under the UNDP RADAR project to facilitate more reliable warnings by transmitting to the satellite from which the data could be uploaded. Although the water level data were recorded and logged, the transmission component is not yet functional.

Activities of the WRA during the Flood Event

- On the morning of the event Mr. Clive Lobban, Assistant Hydrologist and one of the officers assigned to the Flood Warning Systems operation was on his way to the office when he stopped at the manual gauge to check the levels. He reported that on his arrival at the gauge **at 0930 hrs on the 30/12/04 he observed that the gauge was recording a water level of 8.8 feet.** He made telephone calls from that location to WRA Staff members E. Douglas, C. Campbell and C. Blake to indicate that the flood level had exceeded the Critical Stage.
- Mr. Lobban proceeded to assist the Police in redirecting the traffic from Bog Walk through Sligoville and explained the meaning of the colour codes on the Flood Gauge to the Police.
- Mr. E. Douglas who was not in office at the time called the WRA Telephone Operator at 0935 hours and the ODPEM Telephone Operator at 0940 hours to advise ODPEM to issue a warning to close the Gorge.

Post Flood Review

The data retrieved from the logger after the event was reviewed and is summarized in the table below. This indicated that the **8.0 feet critical warning level occurred at 9.20 am on the 30/12/2004.**

Date	Time	Water Level (ft)	Warning levels
12/30/2004	09:20	7.92	8.0 (critical)
12/30/2004	09:40	9.57	10.0 (flooding)

At 9.40 am when the WRA contacted ODPEM the gorge was already flooded as indicated by the **warning level at 10 feet.**

The review of the system has shown that much more analysis of the rainfall to runoff is required to be able to reliably relate the flooding of the Gorge to the catchment rainfall. It also underscored the fact that the most critical instrument in the early detection of flooding in the Rio Cobre Gorge is the telemetric gauge at Bog Walk.

The review also highlighted there is not much lead time (20 minutes) between the critical stage and flooding stage in the gorge and hence the communication to ODPEM has to be more timely and directed to a designated officer. This short lead time does not auger well for the use of the satellite transmitted upgraded system if the data can only be retrieved at one hour intervals. Consideration will have to be given to acquiring the Direct Readout Ground Stations for real time access.

The gauge at Dam Head will definitely not support warning for the Bog Walk Gorge given the very short lead time. On this basis the decision was taken to temporarily relocate the telemetric gauge to the Bog Walk site until the Radar system is properly commissioned.

The colour-coded manual water level gauge at Bog Walk must not only be used for ground truthing but must be brought officially into the system as a back up gauge. This may require an increase in the incentive to the existing observer

The operational procedures are now being reviewed by Mr. Blake for approval by the WRA and stakeholders. This will include a duty roster of workers taking into consideration, Public holidays, Flash Flooding events and proper communication procedures. The post flood assessment and review is also to be included as a critical component of the procedures.

An assessment of the equipment needs for maintenance and upgrading is now being led by Mr. Clive Lobban.

Other Recommendations to Prevent a Reoccurrence of the December 30 Flooding Incident

There are several ways that the flooding of these motor vehicles could have been avoided. Although efforts were made by the police and others to divert all traffic, some motorists did not heed the warning. To prevent this from happening in the future there are some recommendations that should be implemented.

1. The installation of :
 - Two (2) gates at either end of the gorge with one at Bog Walk and the other at Dam Head to be closed when the critical level is reached. These gates can be operated by the Bog Walk Flood Gauge Reader and the NIC Irrigation Dam Operator with police presence at both sides of the Gorge.
 - Flood Warning Signs at the Bog Walk entrance to the Gorge and near the Angels Shopping Centre so that vehicles can be easily diverted without congestion.
2. The ODPEM should develop continuous public awareness programme and training at the community level with the involvement of the Parish Disaster Coordinator and the Parish Council. This should include a brochure outlining how the system works, the responsibilities of all stakeholders and specific action to be taken prior to, during and after a flooding event.
3. In short term write a letter to the Bog Walk and Spanish Town Police requesting their presence at the Bog Walk and Dam Head end of the Gorge when the critical level is reached.

Water Resources Authority
January 20, 2005