

**Comments from CEWF on 2013 AECOM Gull River Flood Review
- November 10, 2013 -**

Conclusions

- The AECOM Gull River Flood Review contains useful information and helps provide an understanding of events as they unfolded following the extreme weather event of April 17-19, 2013;
- While the Review is good insofar as it goes, the Terms of Reference set by Parks Canada limited AECOM's ability to adequately document the lessons learned and propose solutions: this is regrettable because it leaves us with a document that is somewhat self-serving by failing to question the need for any changes to TSW's 'prime' purpose of canal operations and place greater emphasis on water management at the watershed level to assure public health and safety;
- There is little to disagree with in the Review and we are pleased to note the attention given to the Coalition's Flood Report, however we do question the validity of the frequency analysis that suggests this was a one in 200 year event;
- We agree in general with the two recommendations: (1) the need for a better water management tool to support decision making; and (2) the need for ongoing dam safety reviews along with emergency preparedness and response planning;
- However it is the things that are missing from the report that most concern the Coalition, these include:
 - the lack of a clear explanation as to why a number of lakes upstream of Minden were at historic high levels in early March;
 - the lack of a clear explanation as to why several lakes were at, or close to, capacity immediately prior to April 19th;
 - the lack of a clear explanation as to why multiple logs were removed (e.g. Kennisis and Hawk) on the 19th and left out for 2-6 days – presumably to protect the dam infrastructure;
 - no consideration of the appropriate public communications responsibility of the 'water management' agency during an extreme weather event (as opposed to flood communications by MNR);
 - the lack of specific comment as to the impact of flood levels on Horseshoe/Mountain lakes where there were public safety issues and significant property damage, just as there were in Minden, and where flood line mapping and flood level/damage curves are needed as decision support tools in future;
 - no concrete proposals for studies that might mitigate the risk of a repeat of the 2013 flooding e.g. by increasing the discharge capacity of the Gull system.
- We look forward to an ongoing dialogue with Parks Canada and their Water Management Advisory Council to resolve outstanding issues raised by the extreme weather event - with a strong emphasis on preparing for both future high and low water situations.

Strengths of the Review

Based on the Coalition's own review of the extreme weather event (available at www.cewf.ca), we agree with the overall conclusion that a rare heavy rainfall onto a normal snowpack with saturated ground created an event that could not have been predicted in advance.

We concur that Parks Canada staff managed the situation as well as might be expected under the circumstances and are to be commended for their actions.

We also agree that Parks Canada needs to act on one of the key recommendations in the AECOM 2011 Water Management Study, and repeated in the AECOM Gull River Flood Review, namely the need for better water management tools.

The water level charts in Section 3.3 of the Review, as well as the maps and charts in the Appendices are most helpful. Some of this comes from AECOM's own Dam Safety Review (DSR) document of May 2011, which has yet to be made public by Parks Canada, and highlights the value of the DSR documentation.

Appendices C & D, which detail the stop-log settings and water-levels from January to May 2013, provide exactly the sort of information that stakeholders have been requesting on an on-going basis but which are especially informative with regard to the complexities of the water management decisions taken in April and May this year. For example Figure D1 demonstrates the dramatic switch from taking logs out immediately after the rains to putting logs back in the upstream dams as of April 20th.

In Section 5.1.2 AECOM notes the Coalition's comments on hydraulic capacity and rightly point out that you cannot just increase the flood handling capability of one structure (like Gull Lake) without considering structures downstream. However, the Review fails to draw the same conclusion as that reached by the Coalition, namely that a hydraulic evaluation is exactly what needs to be done, possibly in conjunction with the Dam Safety Review of the Gull Lake dam.

Weaknesses

It is not the Coalition's intent to downplay the value of the Review by commenting on some apparent weaknesses in the approach and conclusions. Rather, the following comments are intended to inform further discussion of what needs to be done to ensure that lessons are learned from the experiences of 2013.

The Review was not written for a general audience and some clarification of the technicalities of water management would have been helpful. For example a clarification of the difference between frozen ground and water-saturated ground as they affect runoff would have helped those who knew the ground to still be frozen in some places when the rains came.

There is no explanation for the number of reservoirs that were above their historic maximums on March 1st, presumably due to the low snowpack causing the TSW to install logs earlier than usual to retain what run-off there was. Similarly there is no comment as to why several reservoirs, such as Hawk Lake, were unusually full immediately before the April 17th rains. Some commentary should have been included.

In Section 3.3 the graphs of reservoir levels against date are interesting but the TSW does

not manage the spring freshet by calendar date so much as according to the snow on the ground. A more relevant and instructive plot would have been the aggregate volume of water in the reservoirs upstream of Minden (y-axis) plotted against the volume of the snowpack from the snow course (x-axis). There would be one line for each year with a number of points on the line, one for each snow course date. The line would be descending to the right. Plotting a number of years would show whether TSW were running the reservoirs too high in 2013 relative to snowpack. Such a set of plots could provide decision support in future years – both dry and wet.

In Section 4.2 under the entry for April 21 there are a couple of questionable statements. First, while we agree that the efforts to hold water in Horseshoe (and Mountain) Lakes were successful in reducing flood flows in Minden, what should also be stated is that, as a result, there was additional flooding on these two lakes. This incremental flooding caused additional properties to be damaged – the report should have indicated the incremental rise in water level and the number of properties affected. This omission is most blatant in the summary to Section 4.2 where it states "Furthermore management succeeded in avoiding additional flooding on April 25th by retaining water in the upstream reservoir lakes." The fact that this imposed a penalty to those on the upstream lakes should be mentioned. A key recommendation that should come out of this is that flood line mapping should be developed for both Minden and Mountain/Horseshoe Lakes. Flood damage - level curves should be prepared from the result so that more intelligent tradeoffs can be made in the future.

Second, the residents of Shuyler's Island who might have needed an ambulance would probably not agree that storing water in Horseshoe/Mountain lakes was done without endangering public safety. The same would be true for those whose septic systems were inundated.

The Coalition believes that Parks Canada made trade-offs, for understandable but, at the time, unexplained reasons, resulting in flooding on some reservoir lakes, most of which is not covered by insurance or other compensation. The issue here is that these trade-off decisions were made in the absence of information to assess the relative impacts because Parks Canada lacks the data and tools to predict the upstream damage risks.

In Section 7, we believe that the statistical analysis on the Gull River at Norland (Figure 7.3), which is used to come up with the "1 in 200 year event" estimate, is invalid and leads to an incorrect conclusion. The Gull River system is heavily regulated and the flows at Norland are more a result of water management decisions than natural events. The fact is that a frequency analysis at Norland cannot be completed from available data. What we can more readily accept is the rainfall may have been close to a 1 in 100 year event. Coupling this with the snowpack remaining on April 17th, which had a return frequency of less than two years, leads the Coalition to believe that the frequency of the actual rain on snow event of April 17 to 19 was possibly only in the 50 to 80 year range. Thus although this was an unusual event it would appear that it could easily recur in the lifetime of many of us.

The Review failed to address the long-term result of erosion and silting caused by the high water levels and flow rates and any remedial action that may be required.

Proposed Action by Parks Canada

While the AECOM Flood Review may close a chapter in the history of water management of the Gull River watershed, there remains work to be done,

The Coalition accepts that while the TSW staff at Parks Canada did a good job of managing the flood once it was on us, there needs to be a more comprehensive evaluation of the overall water management strategy in 2013. This should lead to definition of the parameters required in a decision support tool. In addition it could support the need for a hydraulic study of the Gull River system between Minden and Balsam Lake.

It is increasingly clear that a “one size fits all” approach to water management of the reservoirs needs to change. The complexity of multiple constraints in the Gull system demands better balancing of risks given the urban communities downstream and the numerous flow constrictions. In their 2011 Water Management Study of the Trent watershed, AECOM proposed a water management model for the TSW that would accommodate lake-specific constraints and their 2013 Flood Review provides clear evidence of the need for such an approach.

In addition Parks Canada has to ensure that whatever changes are made take into account the likely variation in climatic conditions that results in both wet and dry years, each with its unique set of water management challenges.