

The Great Flood: Alberta's "Biblical" Deluge of 2013

Jon Noad¹

¹Husky Energy, Calgary, AB, Canada

Abstract

On June 21 2013, more than 100,000 people were evacuated from their homes in Alberta. Over the following week, significant portions of Calgary (and other southern Albertan communities) were inundated by what was variously described as a "biblical" or 100 year flood. The result was Canada's costliest ever disaster, estimated at \$1.7 Billion in insurable damage alone. In other southern Albertan localities, such as High River, where all 13,000 residents were evacuated, hundreds of people remain in temporary accommodation.

One of the main causes of the flooding was traced back to a weather system trapped over a small catchment basin some 80 km to the west of Calgary. Four days of torrential rain poured more than 250 mm of water, in addition to snow melt, into Cougar Creek. The "creek" should more correctly be described as an alluvial fan, and demonstrated this as huge boulders and trees were mobilized across a vast gravel plain. The resulting flows destroyed all access to Canmore and Banff, washing away both the Trans Canada Highway and Highway 1A.

The mass of water flowed towards Calgary, bolstered by heavy rains along its length. It burst its banks in many areas, flooding much of downtown Calgary. The Bow River demonstrated to the city planners that rivers would be rivers, depositing tons of sediment and eroding up to 60 m into its banks. The flooding had a large impact on the city infrastructure, which is gradually being repaired. Significant crevasse splay deposits (including manmade debris and sediment) were deposited, and studied in detail in a locality downstream from the city.

The previous "100 year flood" had occurred in 2005, after a hiatus of 70 years. Studies based on earlier floods suggested that there was a potential for a flow of 2400 m³/second in peak flood conditions, which is a concern as the maximum velocities seen in 2013 were only around 1740 m³/second. Yet this was more than three times the flow seen in 2005. Reasons for this may include changes in ground conditions, weather patterns, or is it simply that the worst is yet to come? The likelihood of another flood like that of 2013, and the periodicity of flooding, will be examined.

References Cited

Neill, C.R. and Watt, W.E., 2001. Report on six case studies of flood frequency analysis. Alberta Transportation report.

Rood, S.B. et al, 1999. Influence of flow regulation on channel dynamics and riparian cottonwoods along the Bow River, Alberta. *Rivers*, vol. 7, no. 1, pp 33-48.

University of Calgary. Flood 2005: Lessons learned, 2006. University of Calgary student reports (pdf file on the internet).