

The Big Thompson Canyon Flood

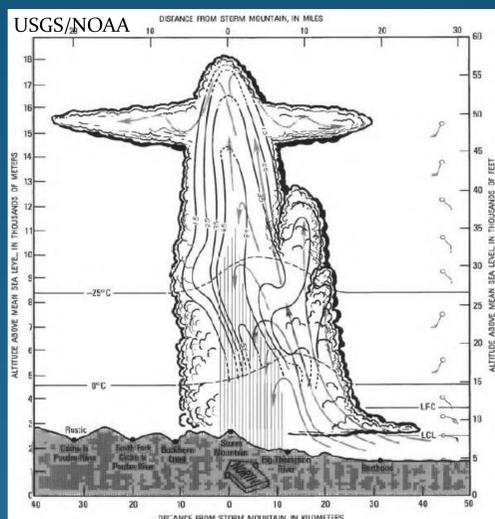
A wall of water

The Storm

On the evening of July 31, 1976 a large thunderstorm complex formed west of Loveland, Colorado. Focused on the foot hills of Colorado's Front Range, strong convection formed due to a cold front that carried deep moist flow from the boundary layer, which was then lifted "upslope." Weak south to southeasterly winds allowed the storm to remain nearly stationary. As the storm stalled for nearly 3 hours over the Big Thompson Canyon, heavy rains were released within a corridor of only 5 kilometers wide.

Studies of radar data and other measurements indicated a slightly tilted storm that was highly efficient in converting available moisture to precipitation.

The storm reached torrential rainfall rates. In about 1 hour, as much as 7.5 inches of rain fell, with as much as 12 inches in 2 hours.



Physical model of one of the initial Big Thompson storm cells.

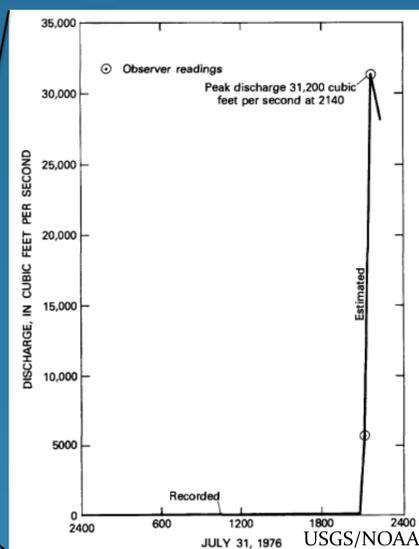
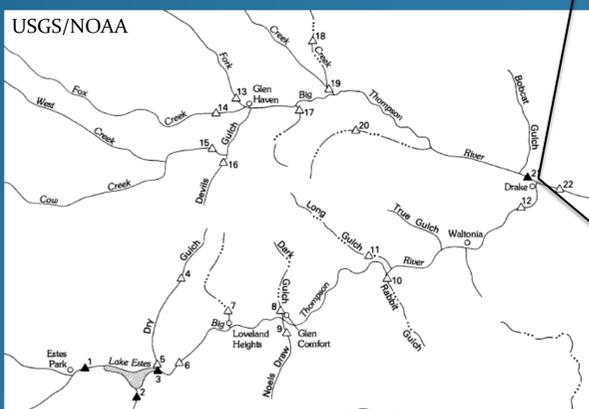


Photograph at 1830 MDT, July 31, 1976 of a storm cell from the same storm system and to the south of the Big Thompson storm.

The Flood

As much of the rain fell on steep canyon walls with thin soil, runoff collected and was dumped into the river at dramatic rates, causing a surging flood wave. Near the town of Drake, a stream gage on the Big Thompson River was destroyed by the flood wave, with estimates indicating that discharge rose from virtually no flow to 31,200 cubic feet per second (cfs) in only 50 minutes. This shattered the previous recorded high of 8,000 cfs from the prior 89 years of gage measurements.

Map of stream system and key locations in vicinity of Big Thompson Canyon.



Estimated discharge at Drake.



The Aftermath

The Big Thompson flood left incredible damage behind – an estimated \$35 million dollars in 1977 dollars. Direct human impacts included the loss of over 140 lives, 250 reported injuries, and the helicopter evacuation of over 800 individuals. In addition, 418 homes and businesses were damaged along with 408 automobiles.



"...I still see the debris and bodies tumbling down."

-Survivor Karen Samson, 30 years after the flood

Lessons Learned

Because of the Big Thompson flood and other similar events, much has been done in the past 30 to 35 years to better warn citizens of the danger of flash flooding. There are now 9 "real-time" stream gages installed in the upper Big Thompson River Basin that are maintained by the U.S. Geological Survey and the Colorado Department of Water Resources. Cities such as Denver, Fort Collins, and Colorado Springs have installed flood warning systems as a means of issuing timely warnings of flash flood potential to residents.

- Trevor Timberlake, University of Louisville, Louisville, Kentucky -