

The Weather and Climate Impact Assessment Science Program

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» Home » Current Projects » *Climate Variability and Uncertainty in Flood Hazard Planning in Colorado*

About the Program

- ♦ Overview
- ♦ People
- ♦ Contact Information
- ♦ Program Documents
- ♦ 2004 Review Documents

Research

- ♦ Current Projects
- ♦ Publications
- ♦ Presentations

Links of Interest

- ♦ Supporting Institutions
- ♦ Other NCAR Initiatives

For Program Staff

- ♦ Upcoming Events
- ♦ Mailing List
- ♦ Website Statistics 

Search This Website

[...more search features](#)

Fort Collins

July 28, 1997



To view the summary as a pdf document (printer friendly) [click here](#)

Rainfall Data: [click here](#)

Damage

Estimate:

Deaths: 5

The City of Fort Collins has spent an estimated \$5,000,000 on flood recovery. Damages at Colorado State University were \$140,000,000.

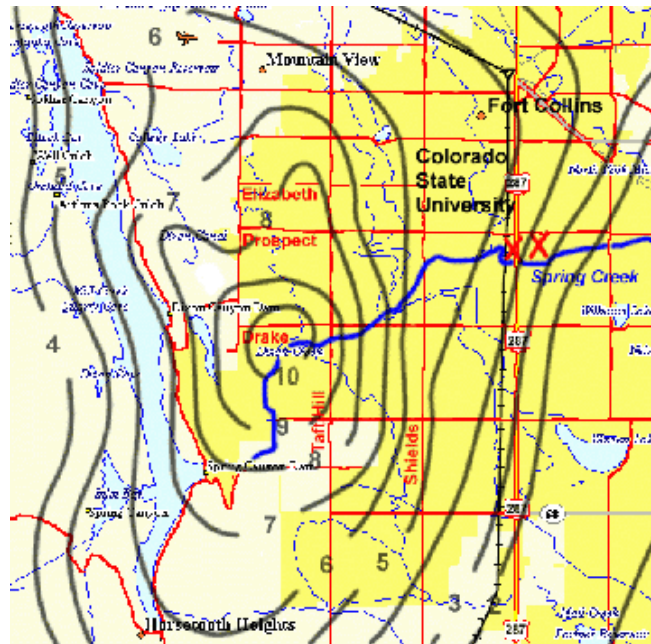
Meteorology

In the weeks leading up to the flash flood at Fort Collins, the Colorado Front Range region had experienced six weeks of predominantly hot and very dry weather. However, in the last week of July the humidity increased as moist tropical air drifted into the state from the south. On July 27, a strong cold front moved into the region from the north, triggering numerous storms over northern Colorado in the late afternoon. Many meteorologists reportedly noticed that this weather pattern had strong similarities to the weather conditions associated with the Big Thompson Flood of 1976.

Storms on July 27 were small and localized, but brought torrents of rain to areas in the lower foothills just west and northwest of Fort Collins. The city of Fort Collins itself only got a light shower of rain. After dark, the moist southeasterly winds strengthened and rain continued steadily into the next morning.

Along the base of the foothills it poured all morning on July 28, yet the city of Fort Collins was merely cloudy and cool morning. From the north end of Horsetooth Reservoir to the northwest of Laporte, 6-10 inches had fallen by midday on July 28. In addition, areas west and southwest of Fort Collins received 2-4 inches of rain.

The rains abated during the afternoon, however high-humidity air continued in place. Around 6 p.m., heavy showers concentrated at the base of the foothills began again. Just as the rains began to diminish east and southeast of the city, the rain began to increase in intensity over the western portions of Fort Collins. Between 8:30 and 10 p.m., Fort Collins experienced the heaviest sustained rainfall on record over a urbanized area in Colorado. The rainfall set records for the largest 1-day, 3-hour, and 6-hour precipitation totals for the gage located on the Colorado State University campus, even though the storm was not centered over the campus. Rainfall rates occasionally reached 6 inches per hour over southwest Fort Collins. Thankfully the rains ended abruptly between 10 and 10:30 p.m. "Overall, 10 to 14.5 inches of rain fell over an approximately 30-hour period in a band extending along the base of the foothills from southwest Fort Collins northward to northwest of Laporte" (Grigg et al. 1999).



Isohyet analysis from http://www.comet.ucar.edu/resources/cases/c11_28jul97/gif/fclflood.htm. Visit link to see larger map.

Flooding and Damage

During the day of July 28, the rains caused severe flooding in and near the town of Laporte. However, the deadly and very destructive flooding occurred in the late evening in Fort Collins.



John Weaver

The rains caused overland flooding, rainwater flooding, and stream flooding within the city of Fort Collins. In some locales, the runoff exceeded estimated 100-year and 500-year flows. The greatest flooding occurred along Spring Creek and through the Colorado State University Campus. Spring Creek is usually a calm brook, but the stormwater transformed the creek into a "raging river". Elizabeth and Shields Streets acted like rivers with water flowing west to east and ultimately emptying thousands of cubic feet of water into the lower lying campus. Within the city, the storm greatly exceeded the capacity of the storm-water facilities, which are designed for 2-100 years frequency. More than 3 inches of rain had fallen by 8:30 p.m. filling detention ponds to capacity leaving no storage for the additional 6 inches of rain that fell in the next hour and a half.

A moving freight train was derailed near Prospect Road and College Avenue after water ponded behind a railroad embankment, which was designed for a 500-year flow, and overtopped the tracks. In the derailment, the train was also responsible for rupturing a natural gas line which sparked an explosion that destroyed several businesses near the intersection. The water from the embankment flooded down into a pair of trailer parks just to the east. Residents of these parks were caught by complete surprise. The College Avenue Bridge downstream from the park became blocked by trailers, and debris from homes and cars floated all over the town.



John Weaver

Rescue efforts in the city were further complicated when the Colorado State Police Department had to relocate city facilities because their emergency center was flooded. Most likely due to the remarkable rainfall gradients across the city, many citizens, including the city manager, were unaware of the severity of the flooding

that was occurring along College Avenue and elsewhere in the city. "When the city manager arrived at the Police Department's Command Center, everything was in turmoil" (Grigg et al. 1999).



On the Colorado State Campus, damages were surprisingly high. The basement of the Morgan Library was inundated and about 425,000 books were damaged. An entire semester's textbooks were also damaged at the bookstore in the Lory Student Center. Research documents, journals, and historical records were lost. Over 40 buildings were damaged and some graduate students were displaced from student housing.

In Fort Collins, five women lost their lives, 54 people were reported injured and 200 homes were destroyed. Four of the five deaths were at the trailer park. The fifth death was a resident downstream, near the park. On the above isohyet map, two red "X's" show the location of the fatalities.

Rainfall Data:

Date	Location	Peak Rainfall
7/27	Fort Collins 9 NW	2.30"/1 hr., 2.50"/3 hrs., 2.50"/24 hrs.
7/28	Fort Collins 9 NW	4.20" in 24 hrs.
7/28	Fort Collins (Official Station)	1.47"/1 hr. (7-8 p.m.); 2.31"/1hr. (8-9 p.m.); 4.42"/ 3 hrs. (7-10 p.m.), 6.18"/24 hrs.
7/28	SW Fort Collins	Rainfall rates of 6"/hr. between 8:30-10 p.m.
7/28	Western Portions of Fort Collins	5"-8" in less than 6 hrs.
7/28	CSU Campus	5.3" from 6:30-10 p.m.
7/28	Horsetooth Reservoir to NW of Laporte	6"-10" in 4 hrs.
7/28	Areas W and SW of Fort Collins	2"-4" in 4 hrs.
7/28	Spring Creek Basin	More than 10" in less than 6 hrs.

Sources

- <http://www.fcgov.com/oem/historical-flooding.php>

- Neil S. Grigg, Nolan J. Doesken, David M. Frick, Mike Grimm, Marsha Hilmes, Thomas B. McKee, and Kevin A. Oltjenbruns. (1999, September/October, Vol. 125, Num. 5). Fort Collins Flood 1997: Comprehensive View of an Extreme Event. Journal of Water Resources Planning and Management, 255-263.

- Fort Collins Coloradoan, July 28, 2003

-Storm Data July 1997



[Return to Top](#)



[Return to Flood Summaries by Date](#)



[Return to Flood Summaries by Location](#)

Project Home	Research	Data	Contacts	Links
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