Historic Colorado Flooding: September 11–17, 2013

Presentation to the White House Subcommittee on Disaster Reduction

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Image: NOAA – W. von Dauster
• Heavy rain fell across portions of the foothills of Colorado on the night of September 11–12.

• Catastrophic flash flooding occurred across large portions of the Colorado front range, from Fort Collins to Colorado Springs, including Boulder.

• Runoff transitioned into longer-term river flooding affecting locations well east of the foothills into northeast Colorado and even Nebraska.
Overview
Prior Conditions

• Burn scars existed from past wildfires creating a surface conducive to runoff

• Atmosphere was abnormally wet with a plume of subtropical moisture flowing north through Colorado.

• Low-level winds flowed upslope behind a cold front and also tapped Gulf moisture, which converged on the Front Range.
Radar estimates show areas near Boulder and Colorado Springs experienced 12+ inches of rain.
Rainfall observations from cooperative observers and the Urban Drainage and Flood Control District depicted amounts of 13-18 inches in the hardest hit areas.
Flooding Impacts: The Human Toll

People

- Fatalities: 8
  - Boulder Co. 4
  - El Paso Co. 2
  - Clear Creek 1
  - Larimer Co. 1
- Unaccounted for: 1
- In Shelter: 98 in 4 shelters
- Total people evacuated during the event: 18,097

Source: FEMA 9/27/13
Damages and FEMA disaster declaration

- 20 counties affected statewide
- 1,533 square miles affected by flooding
- Total operations costs to date (state): $19,493,840
- FEMA disaster assistance
  - Approved Individual Assistance (IA) - $43.2 million
  - SBA disaster loans approved - $23.2 million
- Homes destroyed: 1,882  damaged: 16,101

Impacts to transportation

- 200 miles of roads (state highway and roads) damaged
- 50 bridges damaged
- $475 million projected to repair roads and bridges

Source: FEMA
How Historic was the Rainfall?

Boulder

- 24-hour Daily Record set: **9.08"**
  - Previous record: **4.80"** on July 31, 1919

- Monthly Record for September set: **18.16"**
  - Previous record: **5.50"** in September 1940
  - Average rainfall in September: **1.63"**

- Monthly Record (any month) set: **18.16"**
  - Previous record: **9.60"** in May 1995

- Annual record of 30.14" set (thru Sept. 30): **31.12"**
  - Previous record: **29.47"** in 1995

Denver International Airport

- 24-hour Daily Record set: **2.01"**
  - Previous record: **1.48"** on September 26, 2012
How Historic was the Rainfall?

Annual Exceedence Probabilities for Worst Case 7-Day Rainfall suggest this was a 1 in 1000+ year event for some locales.

More information can be found at:
http://www.nws.noaa.gov/oh/hdsc/aep_storm_analysis/index.html
WFO Boulder

- Coordination with Boulder EOC and OEM, Larimer communications, and Fort Collins Water quality officials

- Created a DSS page including burn scar perimeter maps

- Provided briefings to State of Colorado EOC
NWS Response

National Service Assessment Team Representation

• Chartered a 9-member service assessment team on October 24; team currently in Colorado gathering information and conducting interviews

• Team co-led by USGS Associate Director of Colorado Water Science Center and NWS Hydrologist in Charge of the Northeast River Forecast Center

• Includes membership and consultants from a variety of fields including hydrology, meteorology, social science, emergency management, hydrometeorological forecast modeling, program management, warning coordination, and scientific research
Questions?