



Colorado Flood

Middle School Hazard Lesson

Setting the Stage



Aerial scene of Big Thompson Flood of 2013 along Hwy.34. Photo Credit: U.S. Air National Guard, Capt. Darin Overstreet

Driving Question:

What can we learn from past flooding events to help us prepare for future floods?

Learning Goals:

- Analyze flood data to identify patterns of flood history and risk in Colorado.
- Communicate information about historic causes and effects of floods in your community. Explain what community members should do to be safe in the event of a flood.

Part 1

What do you know about floods in Colorado?

KWL Chart	
What I K now	
What I W onder	
What I L earned (Activity 3)	

What do you know about floods in Colorado?



Watch: [1976: Deadly Big Thompson flood devastates Colorado](#)

What do you know about floods in Colorado?



Watch: [Dramatic images show devastating flooding in Colorado](#)

What do you know about floods in Colorado?

KWL Chart	
What I K now	
What I W onder	
What I L earned (Activity 3)	

Part 2

Jigsaw Station 1: Colorado Flood Fast Facts

Description

Flooding is the most frequent and costly natural hazard in the United States—a hazard that causes more fatalities than any other natural hazard and averages nearly \$10 billion in losses per year. Nearly 85 percent of federal disaster declarations result from natural events where flooding was a major factor (*Implementing a Federal*, 2015, p. 2).

Technically, a flood is a general and temporary condition of partial or complete inundation of normally dry land areas from: (1) the overflow of stream banks; (2) the unusual and rapid accumulation of runoff of surface waters from any source; or (3) mudflows or the sudden collapse of shoreline land. Flooding results when the flow of water is greater than the normal carrying capacity of the stream channel or accumulates faster than surface absorbency allows (*Colorado Natural Hazards Mitigation Plan*, 2013, p. 3-47). The severity of a flood event is typically determined by a combination of several factors, including but not limited to precipitation and weather patterns, stream and river basin topography and physiography, stormwater conveyance capacities, recent soil moisture conditions, and the degree of vegetative clearing and/or impervious surface coverage.

Floods in Colorado generally result from the accumulation of water from excessive precipitation and/or rapid snowmelt. They can be classified under two categories: general floods, resulting from heavy precipitation or snowmelt in a given watershed over an extended period of time; and flash floods, the product of heavy localized precipitation in a short time period.

General floods are typically long-term events that may last for multiple days, and over widespread areas. The primary type of general flooding in Colorado is associated with lands adjacent to riverine and lake areas, and is a function of excessive precipitation levels and the inability of natural systems to adequately absorb or convey the resulting volume of runoff. Urban/stormwater flooding occurs where development has obstructed the natural flow of water and decreased the ability of natural groundcover to absorb and retain surface water runoff.

More frequent in Colorado is **flash flooding**, most of which is caused by slow-moving thunderstorms with intense but isolated rainfall. Such events develop rapidly and are intensified by major elevation changes, steep slopes, and base alluvial fans that characterize mountain river canyons. Flash flooding events may also be caused by a sudden failure or release by a dam, levee, retention basin, or other stormwater control facility, or by the obstruction of natural flows by ice jams or other blockages that cause backflow and overtopping. Although flash flooding occurs most often along Colorado's mountain streams, it is also common in urbanized areas where much of the natural landscape is covered by impervious surfaces.



The Big Thompson flood of 1976 was the deadliest flash flood in Colorado's recorded history. Source - Denver Post. The Archive, July 31, 2012. Photo by Steve Larson.

The periodic flooding of lands adjacent to rivers, streams, lakes, and other water bodies (land commonly known as "floodplain") is a natural and inevitable occurrence that can be expected to take place based upon established recurrence intervals. The recurrence interval of a flood is typically defined as the average projected time (in years) between a particular magnitude flood event or annual percent chance of that flood occurring. For example, the "100-year" flood has a one percent chance of occurring in

any given year, and the "500-year" flood has a 0.2 percent chance of occurring in any given year—and these two distinct magnitudes are the basis for the special flood hazard areas identified in FEMA Flood Insurance Rate Maps (FIRMs). The recurrence interval is an *average*; it does not necessarily mean that a flood of such a magnitude will happen exactly every 100 years or 500 years, and in some cases only a few years may pass between major flood events.

It is important to note that flooding is not always confined to special flood hazard areas identified by FEMA. Therefore, even homes that are not in the mapped floodplain should exercise caution and diligence during flood events and should prepare themselves before flooding occurs. Some jurisdictions regulate based on their own, more stringent floodplain maps.

Read: [Colorado Planning for Hazards - Flood](https://cires.colorado.edu/outreach/)

Jigsaw Station 1: Colorado Flood Fast Facts

Flooding in Colorado

Colorado communities are impacted by flooding on an annual basis, and nearly every community in the state is subject to special flood hazard areas as mapped by FEMA and as made available through the Colorado Water Conservation Board. In addition, there are approximately 677 state-regulated dams that, in the event of a failure, could cause loss of life and/or significant property damage in communities located within downstream flood hazard areas.



The September 2013 flood disaster caused major damage to private property and public infrastructure across the Front Range of Colorado. Source - Federal Emergency Management Agency. Colorado Town Isolated. May 1, 2014. Photo by Steve Sumwalt.

The most flash-flood prone regions of Colorado are found along the base of the lower foothills east of the mountains. Several extreme floods such as the infamous Big Thompson Canyon flood of July 31, 1976, have occurred in this vulnerable area. Flash floods occur on the Western Slope as well, but with typically lower frequency and intensity due to a reduced supply of moisture to fuel such storms (Colorado Climate Center, 2015).

Flood hazards pose major risks to property and human life and have caused some of the largest disasters in Colorado history in terms of financial costs and casualties. Between 20 to 30 large-magnitude floods occur somewhere in the state every year, and major flood disasters (warranting a federal disaster declaration) have occurred on average every five years since 1959. The South Platte River floods of 1965 and the 2013 floods in the Front Range and northeast counties caused multiple deaths and nearly \$3 billion and \$4 billion in total estimated damage in current terms, respectively. The Big Thompson River flood of 1976 caused 144 deaths. Floods can cause billions of dollars of property and infrastructure damage, resulting in significant economic impacts for directly affected communities and for the state as a whole (Colorado Resiliency Framework, 2015, p. 3-4).

Related Hazards

While floods are most frequently caused by heavy precipitation associated with sustained wet weather and/or severe thunderstorms, they may also be caused or exacerbated by other hazards including ice jams or rapid melting and runoff following severe winter storms. In the 2013 Colorado floods, a major cause of flood damage was debris that clogged up bridges and culverts. Another major issue in 2013 was waterways carving entirely new channels, meaning risk had not been conveyed on existing maps. The state is currently developing a new methodology to identify potential risk associated with channel migration, erosion zones, and alluvial fans.

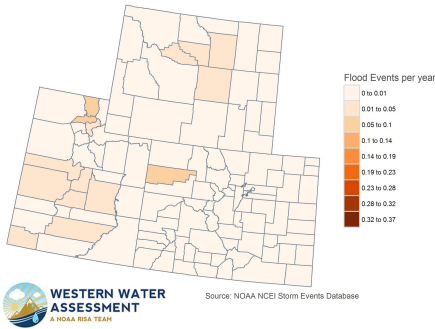
Flooding is one of the three central components (along with drought and wildfire) of a complex system of interrelated natural hazards that are fundamentally tied to Colorado's continental semi-arid climate. Drought conditions may lead to soil compaction, and wildfires may leave slopes denuded and hydrophobic (unable to absorb water). In these cases a single heavy rain event can lead to higher volumes of runoff and a correspondingly higher risk for flash flooding, erosion, and particularly mud/debris flows (described below in this guide).

In addition to the direct impacts a flood event hazard may cause, it can also trigger multiple cascading hazard events. Rising floodwaters may cause the failure of a dam, levee, or other impoundment structure resulting in the rapid inundation of locations outside of mapped special flood hazard areas. Major flood events may also increase the risks of geologic hazard events (landslide, mud/debris flow, and rockfall), soil hazards, and hazardous material releases.

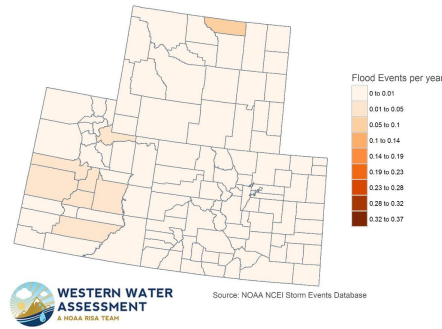
Read: [Colorado Planning for Hazards - Flood](#)

Jigsaw Station 2: Seasonality and Location of Floods in Colorado

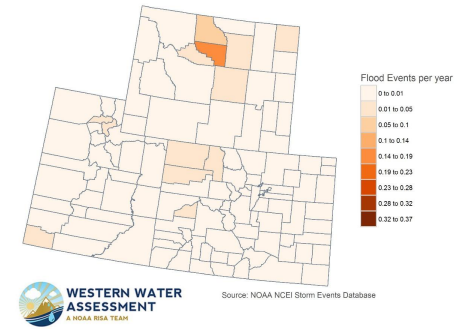
January Flood Events in Utah, Wyoming, and Colorado, 1996-2014



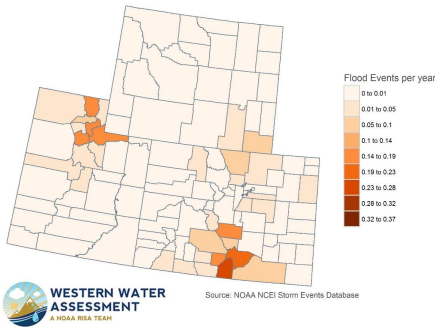
February Flood Events in Utah, Wyoming, and Colorado, 1996-2014



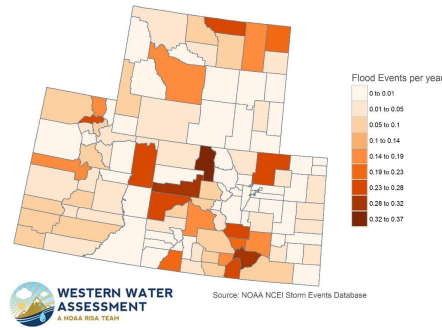
March Flood Events in Utah, Wyoming, and Colorado, 1996-2014



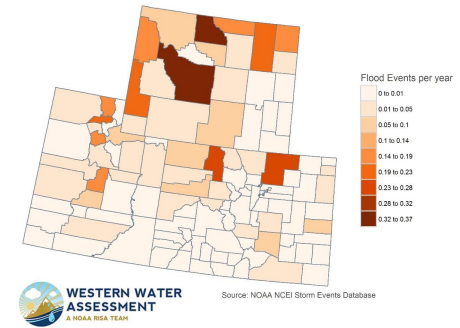
April Flood Events in Utah, Wyoming, and Colorado, 1996-2014



May Flood Events in Utah, Wyoming, and Colorado, 1996-2014



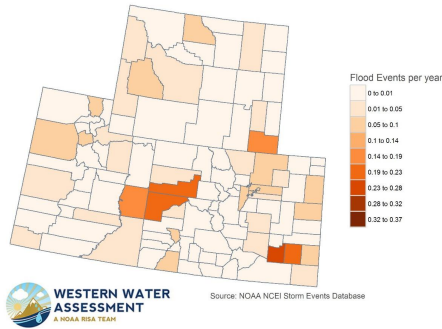
June Flood Events in Utah, Wyoming, and Colorado, 1996-2014



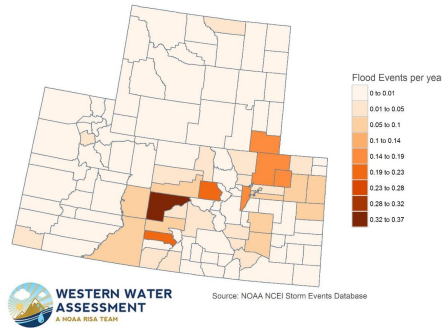
Explore: [Flood](#) maps (look at each month)

Jigsaw Station 2: Seasonality and Location of Floods in Colorado

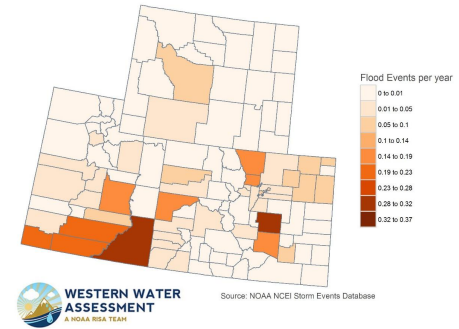
July Flood Events in Utah, Wyoming, and Colorado, 1996-2014



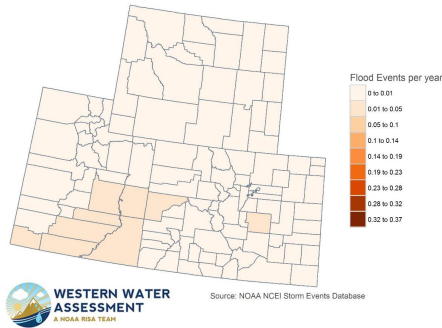
August Flood Events in Utah, Wyoming, and Colorado, 1996-2014



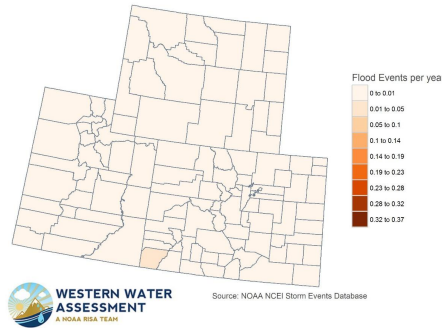
September Flood Events in Utah, Wyoming, and Colorado, 1996-2014



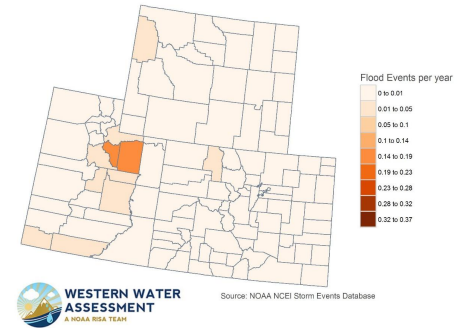
October Flood Events in Utah, Wyoming, and Colorado, 1996-2014



November Flood Events in Utah, Wyoming, and Colorado, 1996-2014



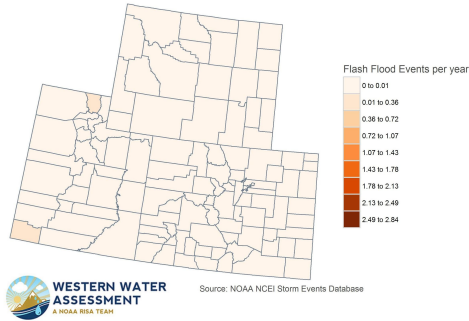
December Flood Events in Utah, Wyoming, and Colorado, 1996-2014



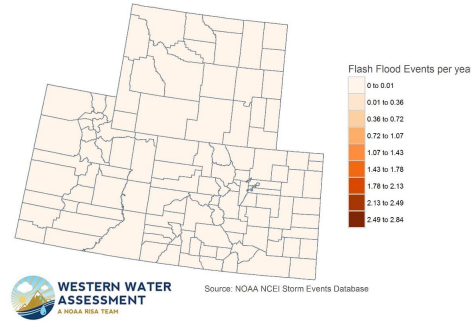
Explore: [Flood](#) maps (look at each month)

Jigsaw Station 2: Seasonality and Location of Flash Floods in Colorado

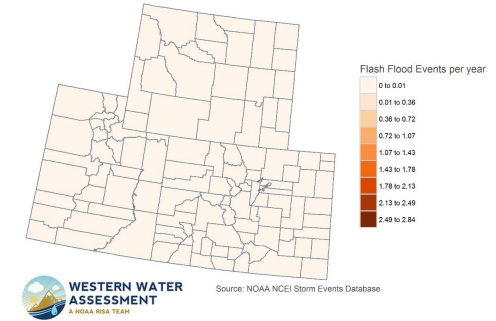
January Flash Flood Events in Utah, Wyoming, and Colorado, 1996-2014



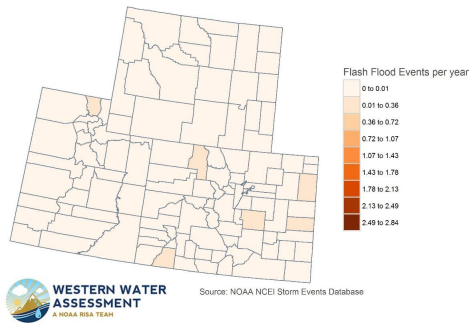
February Flash Flood Events in Utah, Wyoming, and Colorado, 1996-2014



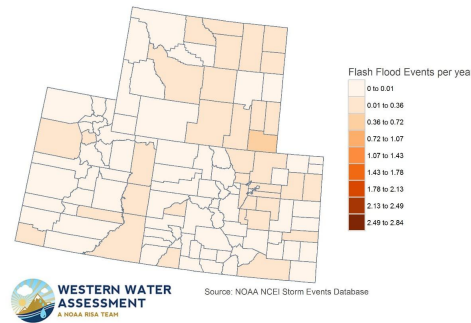
March Flash Flood Events in Utah, Wyoming, and Colorado, 1996-2014



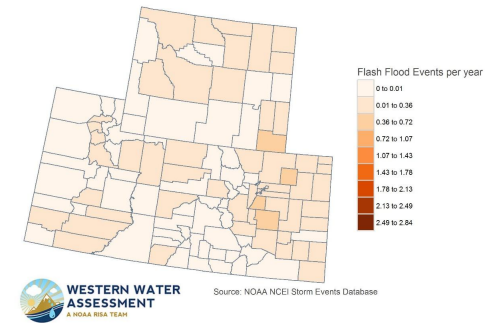
April Flash Flood Events in Utah, Wyoming, and Colorado, 1996-2014



May Flash Flood Events in Utah, Wyoming, and Colorado, 1996-2014



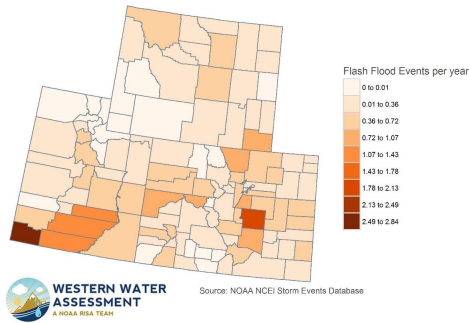
June Flash Flood Events in Utah, Wyoming, and Colorado, 1996-2014



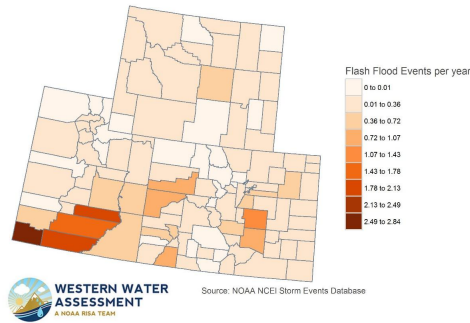
Explore: [Flash Flood](#) maps (look at each month)

Jigsaw Station 2: Seasonality and Location of Flash Floods in Colorado

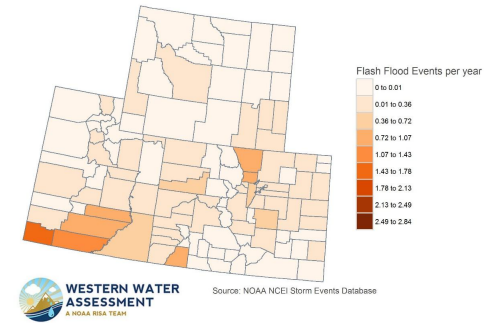
July Flash Flood Events in Utah, Wyoming, and Colorado, 1996-2014



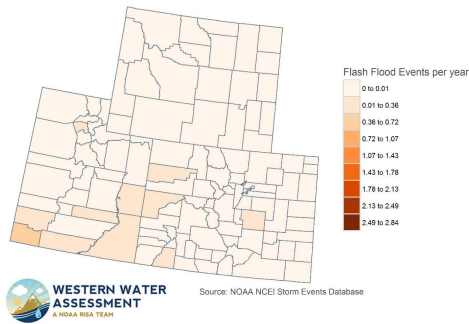
August Flash Flood Events in Utah, Wyoming, and Colorado, 1996-2014



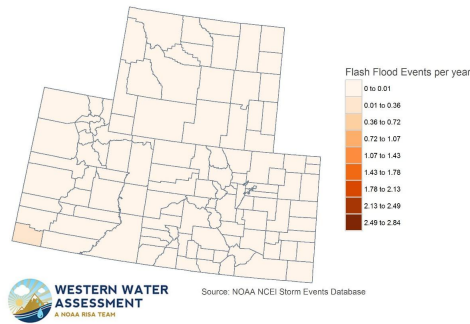
September Flash Flood Events in Utah, Wyoming, and Colorado, 1996-2014



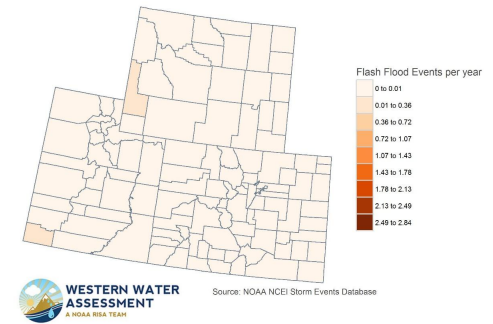
October Flash Flood Events in Utah, Wyoming, and Colorado, 1996-2014



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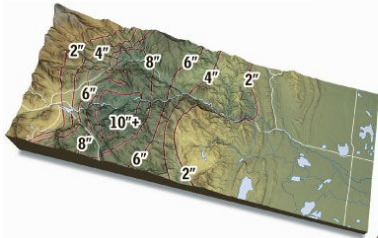
Explore: [Flash Flood](#) maps (look at each month)

Jigsaw Station 3: Big Thompson River Topography

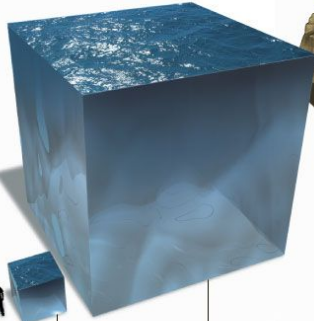
A deadly downpour

In the early evening of July 31, 1976, warm, moist air pushing up the Front Range collided with cold air from Canada, creating a storm system that stalled over the upper reaches of the Big Thompson Canyon. Between 6:30 and 10:30 p.m., up to 12 inches of rain fell in the canyon before the storm system moved into Wyoming. The sequence of events that followed resulted in the worst natural disaster in Colorado's history.

How much rain fell



It is estimated that, during its peak, nearly 150 times the normal amount of water was flowing at the mouth of the canyon.



6-foot man
Normal flow for July 31: 210 cubic feet per second
Peak flow during flood: 31,200 cubic feet per second

7 p.m. Water levels begin rising in the Big Thompson River.

Throughout the storm, on the canyon's steep, rocky hillsides, the heavy rain dislodged rocks and uprooted small trees. The debris dammed up gullies but then broke free, adding power and destruction before the choked waters even reached the Big Thompson.

8 p.m. Water levels reach their peak at Glen Comfort.

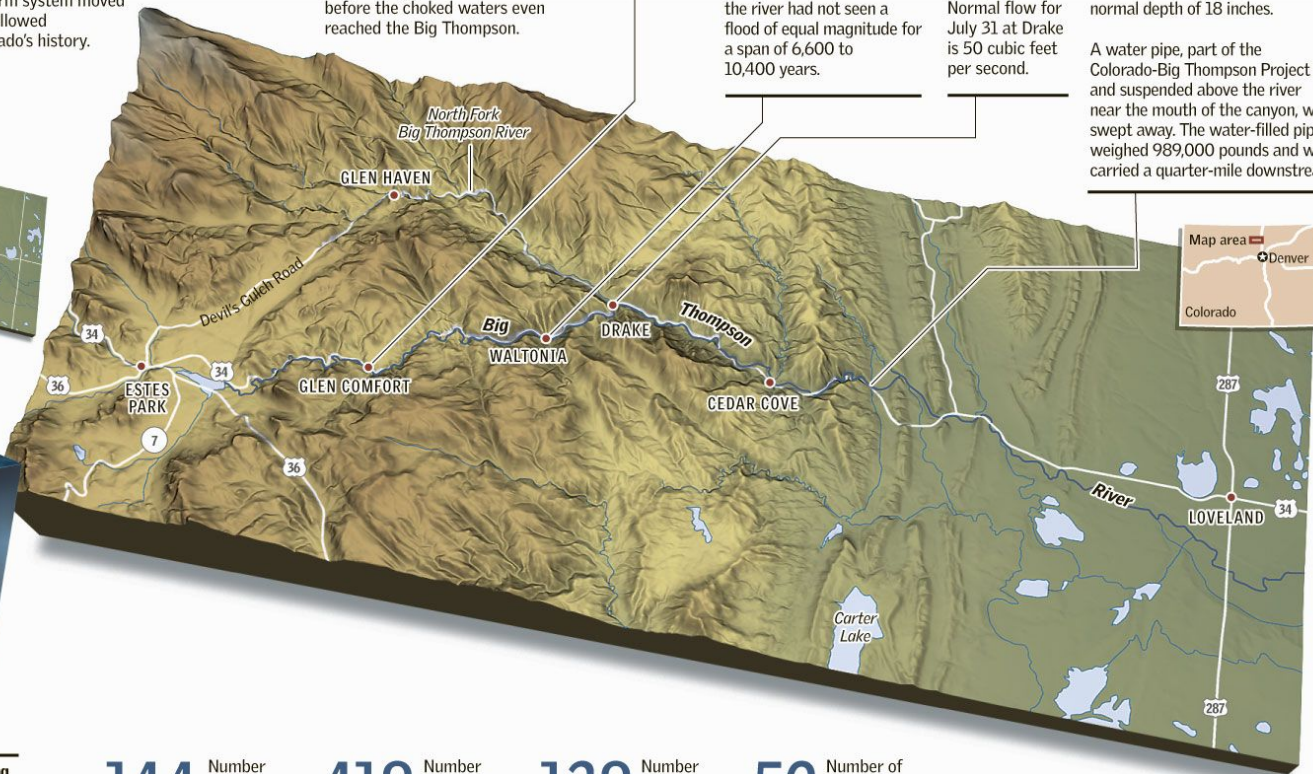
8:30 p.m. Water levels reach their peak at Waltonia. Nearby, radiocarbon dating of the eroded riverbank after the 1976 flood showed that the river had not seen a flood of equal magnitude for a span of 6,600 to 10,400 years.

9 p.m. Water levels reach their peak at Drake, with flows of 30,100 cubic feet per second. Normal flow for July 31 at Drake is 50 cubic feet per second.

11 p.m. Water levels reach their peak at the mouth of the canyon. Peak flows continued there until after midnight.

Water levels rose 19 feet above the normal depth of 18 inches.

A water pipe, part of the Colorado-Big Thompson Project and suspended above the river near the mouth of the canyon, was swept away. The water-filled pipe weighed 989,000 pounds and was carried a quarter-mile downstream.

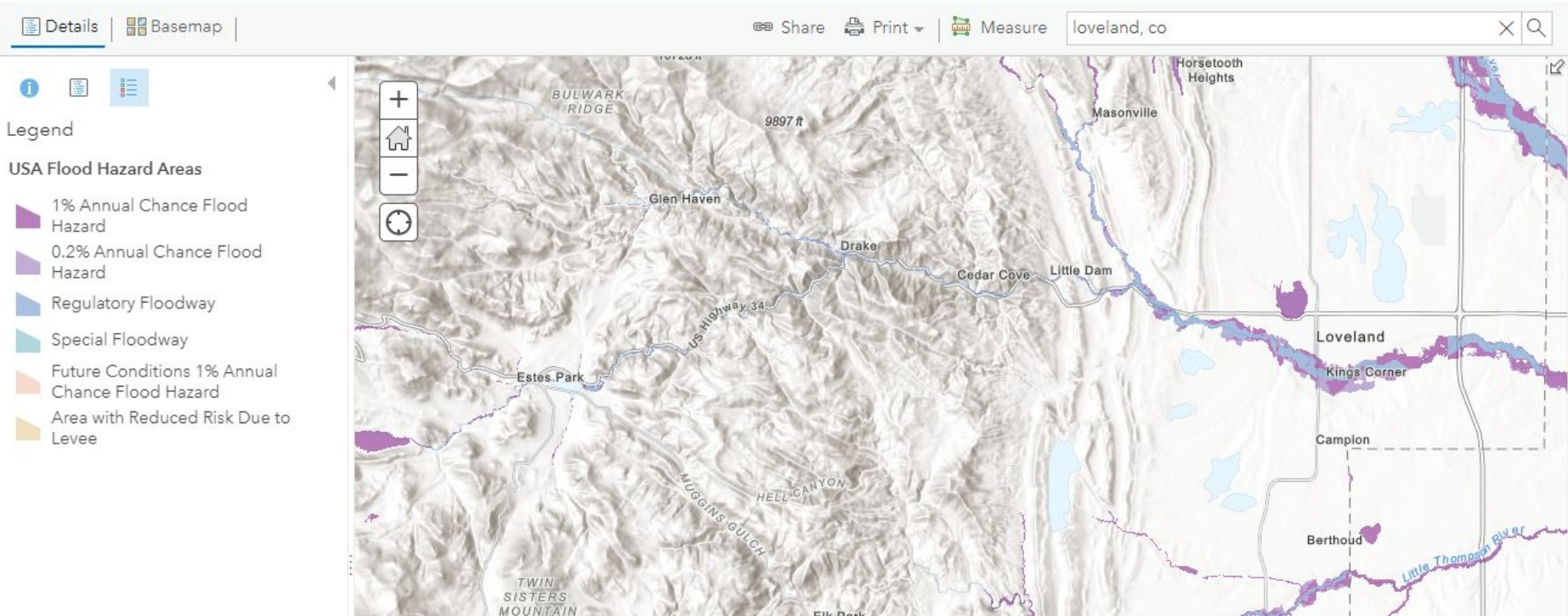


144 Number of people killed
418 Number of homes destroyed
138 Number of homes damaged
52 Number of businesses destroyed

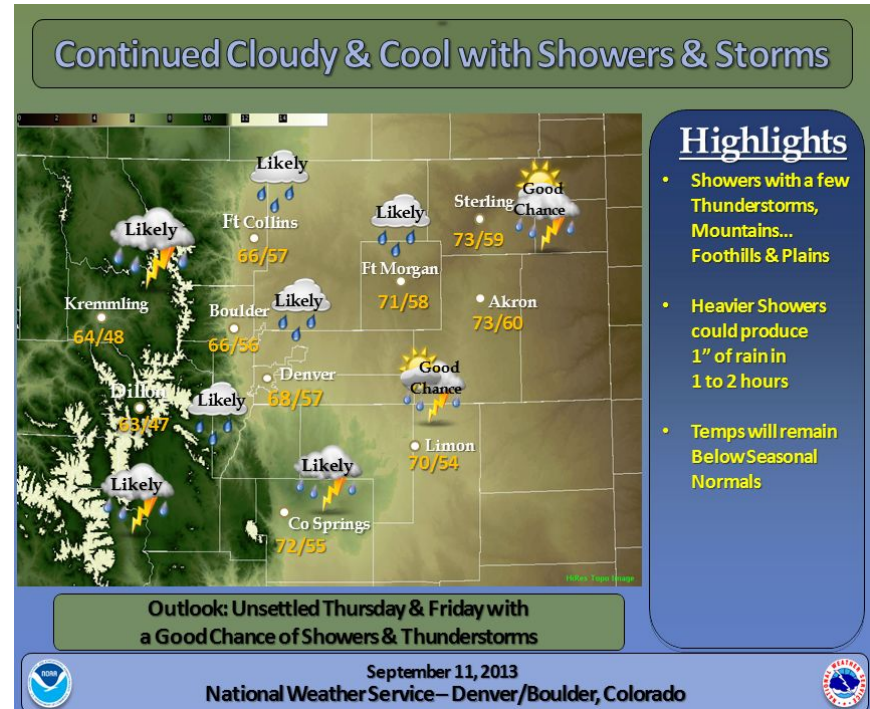
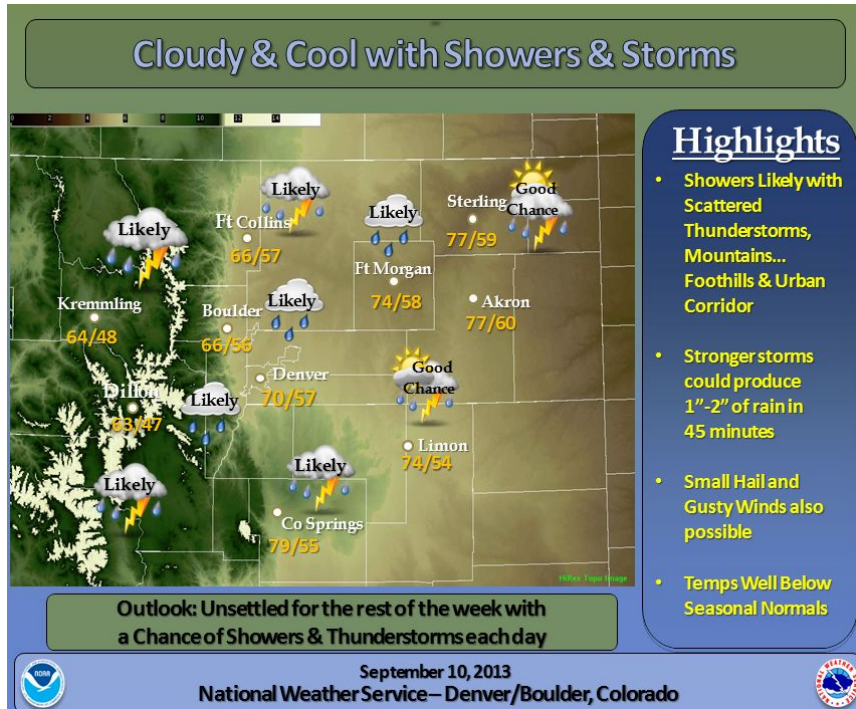
Sources: Colorado Division of Water Resources; "Big Thompson: Profile of a Natural Disaster"; U.S. Geological Survey

Joe Watt and Thomas McKay | The Denver Post

Jigsaw Station 3: Big Thompson River Topography



Jigsaw Station 4: The 2013 Flood Weather Story



Jigsaw Station 4: The 2013 Flood Weather Story

Heavy Rain/Flash Flooding Possible Today

Highlights

- Moderate to heavy rain over and along Northern CO Front Range through the evening
- Stronger storms could produce 1"-2" of rain in 30 minutes
- Small Hail and Gusty Winds also possible
- Temps Well Below Seasonal Normals

Outlook: Unsettled for the rest of the week with a Chance of Showers & Thunderstorms each day

September 12, 2013
National Weather Service—Denver/Boulder, Colorado

Flooding Threat Continues through this evening

Highlights

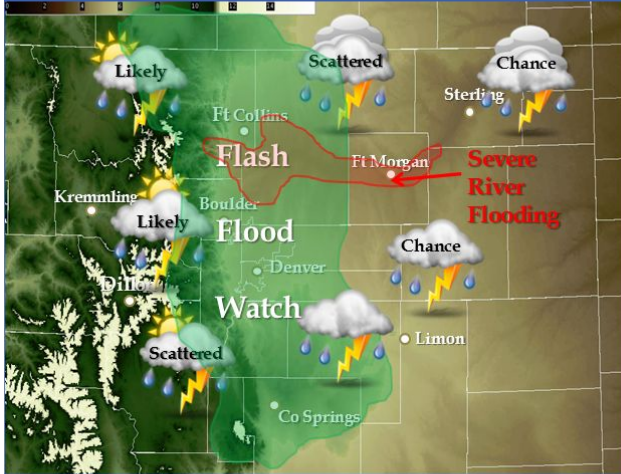
- Flash Flood Watch until 900 pm
- Additional showers and a few thunderstorms will develop later this afternoon/evening
- Stronger storms could produce 1"-2" of rain in 30 minutes
- Due to saturated soils and swollen rivers flooding still possible

Late day thunderstorms likely over the mountains Saturday and Sunday. Better Chance for rain over Metro Sunday.

September 13, 2013
National Weather Service—Denver/Boulder, Colorado

Jigsaw Station 4: The 2013 Flood Weather Story

Flash Flood Threat This Afternoon thru Sunday Afternoon



Highlights

- Flash Flood Watch Mountains, Foothills, Nearby Plains thru 6 PM Sunday
- Additional showers and thunderstorms will develop this afternoon.
- Stronger storms could produce 1" of rain in 45 minutes
- Due to very saturated soils... Flash Flooding still possible

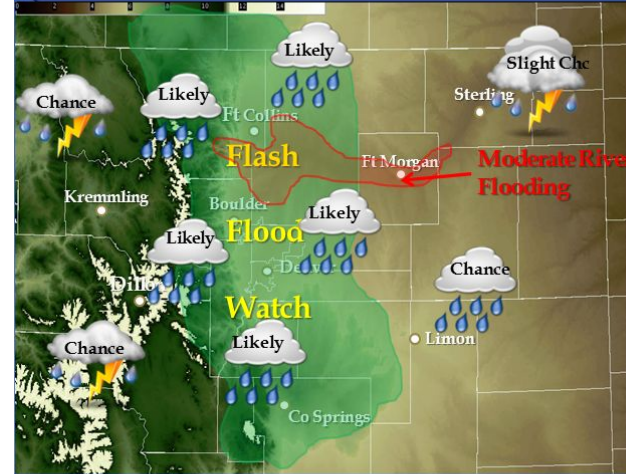
Rain increasing later tonight thru Sunday Mtns...and in and near the Foothills. Additional Rain Amounts from 1" to 3" possible.



September 14, 2013
National Weather Service—Denver/Boulder, Colorado



Flooding Continues along Big Thompson, Cache La Poudre, South Platte Rivers Flash Flood Threat thru the Afternoon



Highlights

- Flash Flood Watch Mountains, Foothills, Nearby Plains thru 6 PM this evening
- Showers and a few thunderstorms will develop thru the day.
- Rainfall Amounts from 1" to 2"
- Due to very saturated soils... Flash Flooding still possible

Mud and Rock Slides may increase today over the higher terrain




September 15, 2013
National Weather Service—Denver/Boulder, Colorado



Jigsaw Station 4: The 2013 Flood Weather Story

Flooding Continues along Big Thompson, Cache La Poudre, South Platte Rivers
Still a potential for Flash Flooding this Afternoon in and near the Foothills




Highlights

- Flash Flood Watch Foothills & Nearby Plains...Noon to 7 PM this Evening
- Scattered Thunderstorms will develop in the afternoon...Mtns and Foothills.
- Rainfall Amounts up to 1" in 30 minutes
- Due to very saturated soils... Flash Flooding still possible

Mud and Rock Slides will continue over the higher terrain

September 16, 2013
National Weather Service—Denver/Boulder, Colorado

Flooding Continues along Big Thompson, Cache La Poudre, South Platte Rivers
Still a potential for Flash Flooding this Afternoon in and near the Foothills



Highlights

- Isolated afternoon thunderstorms will develop in the mountains...with a few storms spreading into the foothills.
- The airmass will be drier today leading to weaker storms.
- Moderate to possibly brief heavy rain possible with the strongest storms.

Mud and Rock Slides will continue over the higher terrain

September 17, 2013
National Weather Service—Denver/Boulder, Colorado

Jigsaw Station 4: The 2013 Flood Weather Story

Flooding Continues along Big Thompson, Cache La Poudre, South Platte Rivers
Still a potential for Flash Flooding this Afternoon in and near the Foothills

Highlights

- Isolated morning thunderstorms across the Front Range...with brief light to moderate rain.
- Isolated showers and thunderstorms this afternoon and overnight across north central and northeastern Colorado.
- Brief moderate to heavy rain along with strong gusty winds possible with the stronger storms.

Mud and Rock Slides will continue over the higher terrain

September 18, 2013
National Weather Service— Denver/Boulder, Colorado

Flooding Continues along South Platte River

Highlights


- Isolated late morning thunderstorms across northeastern Colorado...with brief light to moderate rain.
- Few afternoon thunderstorms south of Interstate 70...mainly over higher terrain.
- Lows tonight falling into the 40's across the plains...with some locations in the mountain valleys below freezing.

River Levels will continue to slowly decrease

September 19, 2013
National Weather Service— Denver/Boulder, Colorado

Jigsaw Station 4: The 2013 Flood Weather Story

Flooding Continues along South Platte River



The map displays the South Platte River basin in Colorado, with a blue line representing the river. Flood warnings are indicated by a large blue text box with arrows pointing to the river between Ft Morgan and Sterling. Weather icons include suns for dry conditions and clouds for rain. Cities labeled include Julesburg, Sterling, Ft Morgan, Ft Collins, Kremmling, Boulder, Denver, Limon, Co Springs, and Lilloo. A scale bar at the top shows distances from 0 to 24 miles.

Highlights

- Dry and mild today.
- Next chance for rain will be Sunday.



For more **Information**
www.weather.gov/BOU

Twitter
[@NWSBoulder](https://twitter.com/NWSBoulder)

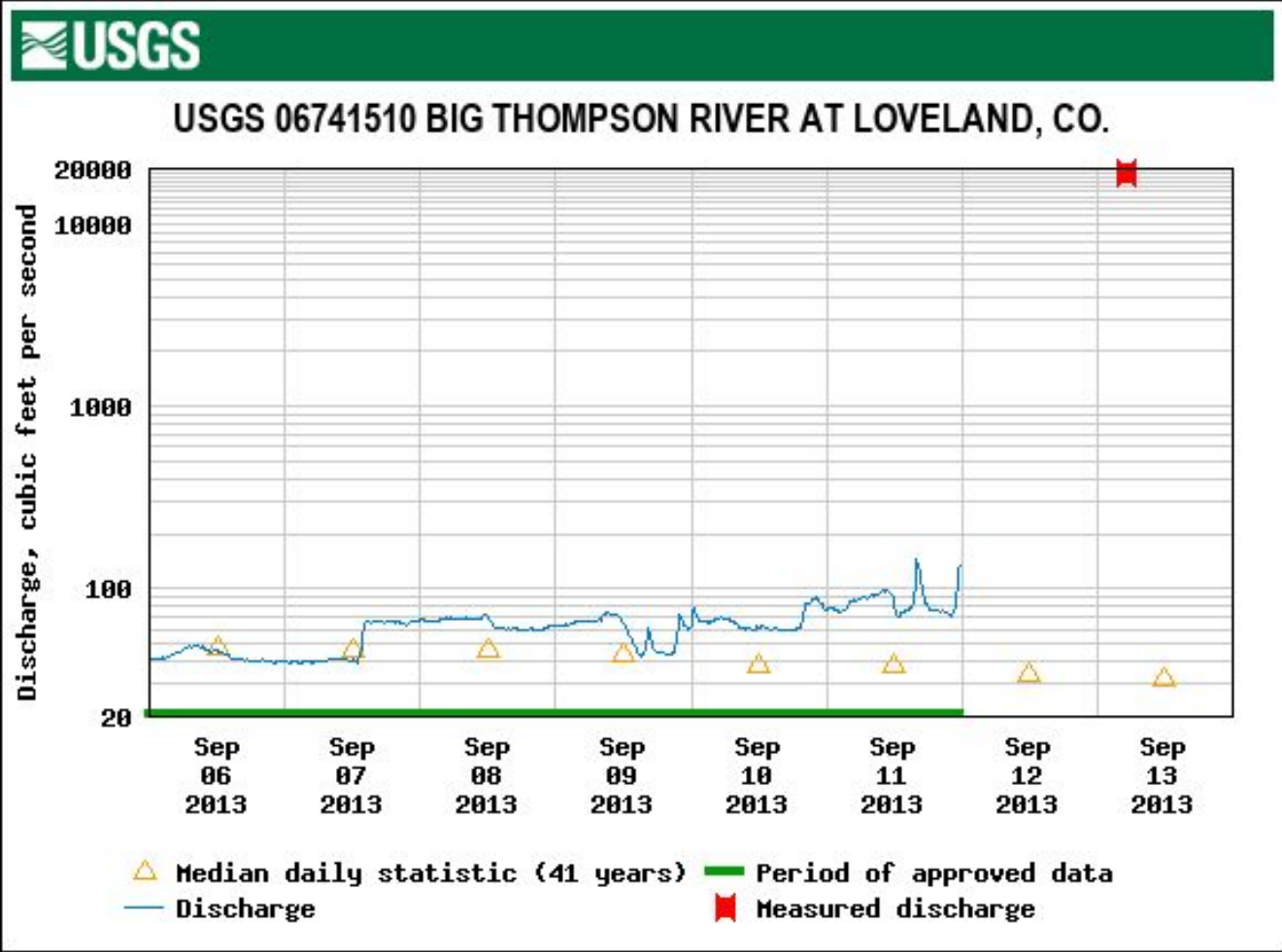
Facebook
www.facebook.com/US.NationalWeatherService.DenverBoulder.gov

River Levels will continue to slowly recede.

September 20, 2013
National Weather Service— Denver/Boulder, Colorado



Station 5: The 2013 Big Thompson Flood Hydrograph



Station 5: The 2013 Big Thompson Flood Hydrograph



Watch (STOP @ 1 minute): [Drew in a Canoe: Cubic feet per second](#)

Station 6: Flood Safety

Flood Safety Tips and Resources

[Weather.gov](#) > [Safety](#) > Flood Safety Tips and Resources

Safety
National Program

Flood Safety	Flood Warning vs. Watch	Before a Flood	During a Flood	After a Flood
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For the latest on Tropical Cyclone Zeta, please visit noaa.gov/zeta



Rescuers search for people stranded by flooding in downtown Kingfisher, Oklahoma. (photo credit: FEMA)

Flooding is a coast-to-coast threat to some part of the United States and its territories nearly every day of the year. This site is designed to teach you how to stay safe in a flood event. If you know what to do [before](#), [during](#), and [after](#) a flood you can increase your chances of survival and better protect your property. For instance, it is vital to know what to do if you are [driving and hit a flooded road](#). Here you will find an interactive [flood map](#), information describing the different [types of flooding](#) and [educational material](#). You will also learn how the National Weather Service keeps you aware of potentially dangerous flooding situations through [alerts and warnings](#).

Share Your Story

Learn how to better protect yourself and your family by reading our [flood survivor stories](#). If you, or someone you know, have been a victim of a flood, please [share your story](#) so we can prevent others from becoming a victim. When you write, please note that NWS has permission to use your story and, if possible, let us know the town and state you were in and the year the event took place.

Read: National Weather Service [Flood Safety Tips and Resources](#)



Flooding Resources
Flood Safety
Turn Around Don't Drown
State Flood Information
Flood Hazards
NWS Flood Related Products
Forecasts and Observations
National Water Center
Education and Outreach Materials
Partner Agencies

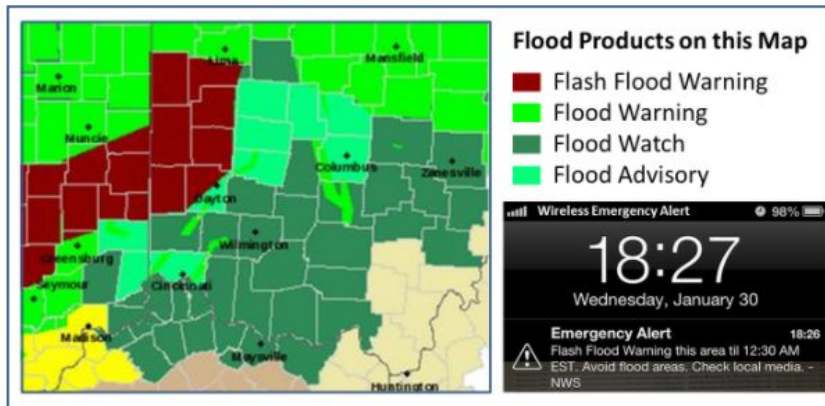
Station 6: Flood Safety

Flood Warning VS. Watch

[Weather.gov](#) > [Safety](#) > Flood Warning VS. Watch

Safety
National Program

Flood Safety	Flood Warning vs. Watch	Before a Flood	During a Flood	After a Flood
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Flooding Resources
Flood Safety
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State Flood Information
Flood Hazards
NWS Flood Related Products
Forecasts and Observations
National Water Center
Education and Outreach Materials
Partner Agencies

What is the difference between a Flood Watch and a Flood Warning issued by the National Weather Service?

- **Flash Flood Warning: Take Action!** A Flash Flood Warning is issued when a flash flood is imminent or occurring. If you are in a flood prone area move immediately to high ground. A flash flood is a sudden violent flood that can take from minutes to hours to develop. It is even possible to experience a flash flood in areas not immediately receiving rain.
Flash Flood Warnings are changing to an Impact-Based format to improve public response. [Read the factsheet.](#)
- **Flood Warning: Take Action!** A Flood Warning is issued when the hazardous weather event is imminent or already happening. A Flood Warning is issued when flooding is imminent or occurring.
- **Flood Watch: Be Prepared:** A Flood Watch is issued when conditions are favorable for a specific hazardous weather event to occur. A Flood Watch is issued when conditions are favorable for flooding. It does not mean flooding will occur, but it is possible.
- **Flood Advisory: Be Aware:** An Flood Advisory is issued when a specific weather event that is forecast to occur may become a nuisance. A Flood Advisory is issued when flooding is not expected to be bad enough to issue a warning. However, it may cause significant inconvenience, and if caution is not exercised, it could lead to situations that may threaten life and/or property.

Read: National Weather Service [Flood Safety Tips and Resources](#)

Station 6: Flood Safety

Before a Flood

[Weather.gov](#) > [Safety](#) > Before a Flood

Safety
National Program

Flood Safety	Flood Warning vs. Watch	Before a Flood	During a Flood	After a Flood
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Volunteers prepping sandbags ahead of expected flooding along the Chariton River in Iowa. (photo credit: FEMA)

Sometimes floods develop slowly and forecasters can anticipate where a flood will happen days or weeks before it occurs. Oftentimes flash floods can occur within minutes and sometimes without any sign of rain. Being prepared can save your life and give you peace of mind.

- + [Create a Communications Plan](#)
- + [Assemble an Emergency Kit](#)
- + [Know Your Risk](#)
- + [Sign Up for Notifications](#)
- + [Prepare Your Home](#)
- + [Prepare your Family/Pets](#)
- + [Charge Your Essential Electronics](#)
- + [Leave](#)



Flooding Resources
Flood Safety
Turn Around Don't Drown
State Flood Information
Flood Hazards
NWS Flood Related Products
Forecasts and Observations
National Water Center
Education and Outreach Materials
Partner Agencies

Read: National Weather Service [Flood Safety Tips and Resources](#)

Station 6: Flood Safety

During a Flood

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Safety
National Program

Flood Safety	Flood Warning vs. Watch	Before a Flood	During a Flood	After a Flood
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Flood waters rush around a house in Long Island, New York. (photo credit: USGS).

During a flood, water levels and the rate the water is flowing can quickly change. Remain aware and monitor local radio and television outlets. Avoid flood waters at all costs and evacuate immediately when water starts to rise. Don't wait until it's too late!

- **Stay Informed:** Listen to radio and television, including NOAA Weather Radio if possible, check the Internet and social media for information and updates.
- **Get to Higher Ground:** If you live in a flood prone area or are camping in a low lying area, get to higher ground immediately.
- **Obey Evacuation Orders:** If told to evacuate, do so immediately. Lock your home when you leave. If you have time, disconnect utilities and appliances.
- **Practice Electrical Safety:** Don't go into a basement, or any room, if water covers the electrical outlets or if cords are submerged. If you see sparks or hear buzzing, crackling, snapping or popping noises--get out! Stay out of water that may have electricity in it!
- **Avoid Flood Waters:** Don't walk through flood waters. It only takes 6 inches of moving water to knock you off your feet. If you are trapped by moving water, move to the highest possible point and call 911 if possible. Do NOT drive into flooded roadways or around a barricade; Turn Around, Don't Drown! Water may be deeper than it appears and can hide hazards such as sharp objects, washed out road surfaces, electrical wires, chemicals, etc. A vehicle caught in swiftly moving water can be swept away in seconds 12 inches of water can float a car or small SUV, 18 inches of water can carry away large vehicles.



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Station 6: Flood Safety

After a Flood

[Weather.gov](#) > [Safety](#) > After a Flood

Safety
National Program

Flood Safety	Flood Warning vs. Watch	Before a Flood	During a Flood	After a Flood
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When flood waters recede, the damage left behind can be devastating and present many dangers. Images of flood destruction depict destroyed homes and buildings, damaged possessions, and decimated roadways. However, what you can't see can be just as dangerous. Floodwaters often become contaminated with sewage or chemicals. Gas leaks and live power lines can be deadly, but are not obvious at first glance.

- **Stay Informed:** Stay tuned to your local news for updated information on road conditions. Ensure water is safe to drink, cook or clean with after a flood. Authorities may ask you to boil water for a while after a flood. Utility companies often have apps to update you on getting service back. Carbon monoxide poisoning is one of the leading causes of death after storms when areas are dealing with power outages. Never use a portable generator inside your home or garage. [Review generator safety.](#)
- **Avoid Flood Waters:** Standing water hides many dangers including toxins and chemicals. There may be sharp objects under the water or the road could have collapsed. If it is likely your home will flood, don't wait for evacuation order, get out! Talk to friends and family about emergency visits. If you have pets, take them with you or get them somewhere safe.
- **Avoid Disaster Areas:** Do not visit disaster areas. Your presence may hamper rescue and other emergency operations.
- **Heed Road Closed and Cautionary Signs:** Road closure and other cautionary signs are put in place for your safety. Pay attention to them!
- **Wait for the All Clear:** Do not enter a flood damaged home or building until you're given the All Clear by authorities. If you enter a flood damaged building, be extremely careful. Water can cause floors to collapse, ceiling to fall, etc. Make sure the electrical system has been turned off. Have the power company or a qualified electrician fix wires. Contact your insurance agent to discuss property damage. If you have a generator, follow proper [safety procedures.](#)
- **Contact Your Family and Loved Ones:** Let your family and close friends know that you're okay so they can help spread the word. Register with or search the [American Red Cross's](#) Safe and Well listing.



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Part 3

Flood Expert Interview



Watch: [Flood Expert Video](#)

Big Thompson Case Study

- Video: [Looking Back at the 2013 Floods \(2:12\)](#)
- Reading (select one):
 - [Big Thompson Canyon struck again by tragic flooding](#)
 - [Lesson Learned: better notifications, monitoring article and photos](#)
 - [The 2013 Flood: A timeline article and photos](#)
 - [A deadly flood that helped improve weather forecasting](#)
 - [Recovering after rivers rage](#)

Local Flood News Story

Prompt: Create a local news story in a format of your choice (see options below), that summarizes important information for people in your community to prepare for and understand flood risk.

The format choices for the local flood news story include:

- Newspaper article with one picture and one graph or map (one page)
- Radio story (2-3 minutes in length)
- Video newscast (2-3 minutes in length)

Use the outline in your worksheet to compile information for your news story.