



MARCH 2012

Floodstage

Watershed & Flood Protection Section

Colorado Water Conservation Board

NATIONAL FLOOD SAFETY AWARENESS WEEK, March 12-16, 2012, is intended to highlight some of the many ways floods can occur, the hazards associated with floods, and what you can do to save life and property.

FLOODING

is the most frequent severe weather threat and the costliest natural disaster facing the nation. Ninety percent of all natural disasters in the U.S. involve flooding. And high-risk flood areas are not the only ones at risk: about 25% of flood insurance claims come from moderate-to low-risk areas.

Causes of Flooding

Spring Thaw

During the spring, frozen land prevents melting snow or rainfall from seeping into the ground.

When the snow does melt, it can overflow streams, rivers and lakes.

Add spring storms, and the result is often severe spring flooding.

Just last spring, Steamboat Springs experienced flooding after record snowpack began to melt.

Heavy Rains

All areas of the country are at heightened risk for flooding due to heavy rains. This excessive rainfall can happen during any season, putting property at risk year round.

In July 2011, a thunderstorm dropped as much as 3 inches in 90 minutes in parts of Denver. Dozens of people were rescued from cars stranded in the flooded streets.

Levees & Dams

The U.S. has thousands of miles of levees and dams that are designed to protect against a certain level of flooding. These structures can erode and weaken over time, and they can also be overtopped—or even fail—during large flood events. In 1982, Lawn Lake Dam in Estes Park broke sending a 30-foot wall of water down Roaring River, destroying bridges and leaving 5 feet of water in the town's streets.

Flash Floods

Flash flooding is the #1 weather-related killer in the U.S. A flash flood is a phenomenon that occurs within 6 hours of an event that generates significant flood waters, such as a thunderstorm, the collapse of a man made structure or an ice break. In July 2011, after 2 inches of rain fell in less than an hour in the Fourmile Fire burn area, a 4-foot surge of water rushed down Boulder Creek. At least one home was damaged and debris was deposited on many roads.

Visit www.floodsmart.gov/noaa to learn more about flood history and causes, safety precautions, flood risks, and flood insurance policy options.

Are You Ready For Spring Flooding?

After getting flood insurance, there are several things you can do to minimize losses in your home and ensure your family's safety.

1. Safeguard your possessions.

Create a personal flood file containing information about all your possessions and keep it in a secure place, such as a safe deposit box or waterproof container. This file should have:

- A copy of your insurance policies with your agent's contact information.
- Conduct a household inventory: For insurance purposes, be sure to keep a written and visual (i.e., videotaped or photographed) record of all major household items and valuables, even those stored in basements, attics or garages. Create files that include serial numbers and store receipts for major appliances and electronics. Have jewelry and artwork appraised. These documents are critically important when filing insurance claims.
- Copies of all other critical documents, including finance records or receipts of major purchases.

2. Prepare your house.

- First make sure your sump pump is working and then install a battery-operated backup, in case of a power failure. Installing a water alarm will also let you know if water is accumulating in your basement.
- Clear debris from gutters and downspouts.
- Anchor any fuel tanks. <http://www.fema.gov/plan/prevent/howto/index.shtm>
- Raise your electrical components (switches, sockets, circuit breakers, and wiring) at least 12 inches above your home's projected flood elevation.
- Place the furnace, water heater, washer, and dryer on cement blocks at least 12 inches above the projected flood elevation.
- Move furniture, valuables, and important documents to a safe place.

3. Develop a family emergency plan.

- Create a safety kit with drinking water, canned food, first aid, blankets, a radio, and a flashlight.
- Post emergency telephone numbers by the phone and teach your children how to dial 911.
- Plan and practice a flood evacuation route with your family. Know safe routes from home, work, and school that are on higher ground.
- Ask an out-of-state relative or friend to be your emergency family contact.
- Have a plan to protect your pets.

For more information on emergency preparation, talk to your insurance agent or visit www.Ready.gov.

—Excerpted from *FEMA Weekly*, January 26, 2012



*Big Thompson River, July 1976
144 deaths*

Colorado Flood History

In recent years, Colorado has experienced relatively few major floods. However, many major floods have occurred causing loss of life and damage to public and private property. Floodplain management programs have been implemented to reduce these losses, but the dangers from flooding are still significant. To get a clearer picture of our risk, it can be informative to look back at the history of flooding in Colorado. The following is a summary of some of the notable flooding events that have occurred throughout the state.

Year	Location	What happened?
October 1911	Rio Grande and San Juan River basins	Heavy downpours caused bridges and miles of rail to be washed away. Hundreds of livestock drowned and hundreds of thousands of dollars in damage was reported.
June 1921	North Platte, Yampa, White, Roaring Fork, East, Uncompahgre, and Arkansas River basins	Heavy rainfall and severe weather coupled with excessive snowmelt caused widespread damage and loss of life.
August 1933	Cherry Creek basin	Heavy rainfall caused the failure of Castlewood Dam, sending a wall of water through Denver.
May 1935	Kiowa, Bijou, Fountain, and Monument Creek basins, and South Fork Republican River basin.	Intense thunderstorms caused extensive damage in Colorado Springs and Pueblo.
May 1955	Purgatoire and Arkansas Rivers	Heavy rainfall caused severe flood damage in Rocky Ford, La Junta and Las Animas, resulting in a presidential disaster declaration.
June 1965	South Platte and Arkansas River basins	Intense rainfall for several days caused the loss of many bridges and roadways and flooded thousands of homes statewide, triggering a presidential disaster declaration. A dam failure in Prowers County caused millions of dollars in damage in Holly, Granada and Lamar and several deaths.
September 1970	Animas River	Heavy rains caused severe flooding in Silverton, including the overflow of sewage treatment ponds, resulting in a presidential disaster declaration.
May 1973	South Platte River	Heavy rains of up to 6 inches and snowmelt caused millions of dollars in damage to the Denver metro area and significant agricultural damages north of the city, resulting in a presidential disaster declaration.
July 1976	Big Thompson River, Larimer County	Intense rainfall caused flash flooding in Big Thompson Canyon. It was the most costly flood in Colorado history in terms of lives lost, with 144 deaths. Many homes and roadways were also destroyed and a presidential disaster declaration was issued.

Colorado Flood History

Heavy rainfall and severe weather coupled with excessive snowmelt caused widespread damage and loss of life in Pueblo, June 1921.



Year	Location	What happened?
May – June 1984	Western and Northwestern Colorado	Heavy snowmelt runoff caused millions of dollars in damage along the Yampa, White, Colorado, Roaring Fork, Gunnison and Uncompahgre Rivers and a presidential disaster declaration.
July 1997	Spring Creek	Torrential rains over two days caused extensive damage to Colorado State University and flooded a nearby trailer park, resulting in five deaths and a presidential disaster declaration.
May 1999	Arkansas River	Heavy rains caused flooding and forced evacuations in Colorado Springs and La Junta and resulted in a presidential disaster declaration.
July 2006	West Creek	Heavy rainfall caused a flash flood in West Creek within the burn area of the 2002 Hayman Fire.
Summer 2011	Mountain rivers in Western Colorado and Front Range	Unusually high snowpack caused snowmelt flooding throughout the State, particularly in Steamboat Springs, Vail and the Fourmile Fire burn area.

Heavy rainfall caused the failure of Castlewood Dam, sending a wall of water through Denver.



How Do We Prepare For Flood Threats?

Actions should be taken at many levels of government to address potential flood threats. The following includes a summary of actions that may be taken at the Federal, State and Local levels in preparation for the flood season.

Federal Level

FEMA administers the National Flood Insurance Program (NFIP), a program that has existed for more than 40 years. This program allows anyone in a participating community to purchase federally-backed flood insurance, including subsidized insurance for older properties in place since before the hazards were identified. Special note should be made of the 30-day waiting period before the insurance becomes effective.

If significant flooding does occur and a federal disaster is declared, FEMA will set up a Joint Field Office, and will make available financial assistance for recovery efforts. The CWCB would be actively involved with the management of this process if it does occur.

State Level

The CWCB is the state agency in charge of managing flood threats - before, during, and after flood events. The CWCB actively monitors potential flooding, with special attention paid to available snowpack data and seasonal climate forecasts. Specific activities already underway that are being performed by the CWCB include:

- Development of GIS-based maps portraying snowpack and potential threats to various watersheds where potential flood threats exist. These maps show both snow-water equivalent in absolute terms (i.e. SWE in inches) on a gridded basis, and a percentage of normal portrayal of measurements from SNOTEL sites. These maps are very useful for zeroing in on specific watersheds and communities that have the highest flood potential from snowmelt.
- The CWCB continues to operate the CAP-SSSE partnership with FEMA. This partnership program encourages responsible development in floodprone communities, encourages the purchase of flood insurance, and is a mechanism for the State (and FEMA through proxy) to maintain contact with communities regarding flood threats and other relevant issues.
- The CWCB Watershed and Flood Protection Section will be in contact with identified floodprone communities if elevated flooding potential exists. For many communities, this will involve a phone call to either town or county managers/administrators or floodplain administrators. For those at the highest identified risk, or those who specifically request it, an actual visit to the community will be made by CWCB staff.
- Contact lists can be updated by self-subscribing to the CWCB Insider found on the CWCB's website for those who wish to receive email updates.
- The CWCB is working with the Colorado Division of Emergency Management (CDEM) to make sure that emergency management officials are aware of potential flooding situations and prepared to react.
- The CWCB is chairing the Colorado Flood Task Force, which

works proactively to identify flood threats, assist affected jurisdictions, and cooperate with relevant agencies.

Local Level

It is not entirely possible to make general statements regarding all local actions since the stages of risk and preparedness vary throughout the State every year. However, local communities should generally consider the following:

- Participate in the National Flood Insurance Program. Participation in this program makes federally-backed flood insurance available to residents.
 - Promote the purchase of flood insurance for those at risk. It is critical to convey the fact that a 30-day waiting period is required for flood insurance. It is impossible to time or fully predict the occurrence of a flood, so the purchase of flood insurance policies is recommended as soon as possible.
 - Be aware of the flood threats. The most basic level of awareness is familiarity with the floodplain maps supplied by FEMA, the CWCB, or other sources. However, communities should be aware that just



because a stream is not shown on a floodplain map does not mean that a flood threat does not exist. Flood threats should be evaluated based on all known local conditions, whether or not they correspond precisely with a regulatory flood map. Communities are also encouraged to remind their residents that floodplain maps general portray a 1% chance flood (commonly referred to as a 100-year flood), but flooding can and does exceed this on occasion.

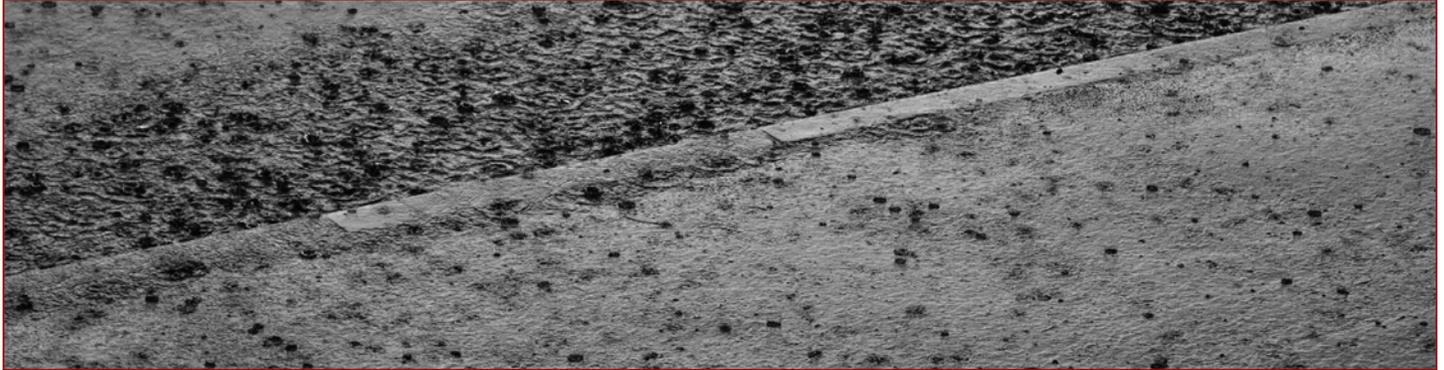
- Develop an emergency action plan. Fortunately, snowmelt flooding (as opposed to rain-induced flash flooding) allows for some amount of warning time that is usually available. This allows for some level of preparation activities to take place. It should be clearly stated in this emergency plan what the specific roles and responsibilities are, and what protocol is used for communications. It is also recommended that activities identified in this emergency action plan be exercised and practiced prior to the actual event. If supplies are needed, such as sandbags, these should be stockpiled well before the event occurs.
- Maintain contact with the CWCB, FEMA, USGS, CDEM, and other agencies that are monitoring the flood threat so that current information can be obtained.
- Evaluate the effectiveness of infrastructure that is specifically designed to enhance flood conveyance and/or to protect lives and property. For example, a maintenance plan for clearing debris from bridges and culverts should be identified. Other possible actions include thinning heavy vegetation from waterways and evaluating the condition of levees, flumes, and other facilities. Be aware of the level of protection that is theoretically provided by flood protection infrastructure in your community, and keep in mind that there is always the potential for overtopping or failure of those structures as has been demonstrated in the past throughout the nation.□

Floodplain Managers and Emergency Managers: Different Duties, Shared Responsibilities

The Question: *What do floodplain managers and emergency managers have in common?*

The Answer: *Water...too much of it, and the responsibility to keep the community safe from its impacts.*

The Message: *It is beneficial for floodplain managers and emergency managers to know, understand, and support each other.*



Flood prone areas have been identified in most of the 270 cities and towns and in all of the 64 counties in Colorado. Between 20 and 30 large magnitude floods (in terms of peak discharge) occur somewhere in Colorado every year. In fact, 40 percent of Colorado's presidentially declared disasters and emergencies stem from flood-related events. Too often, floods negatively impact people, property, infrastructure and critical facilities, economic and cultural assets, and the natural environment.

Enhancing coordination between floodplain managers and emergency managers will strengthen the community's preparation, response, and resilience to flooding, as many of their responsibilities run parallel with one another. Regular communication and a better understanding of each other's roles may improve the sharing of information and insight, create partnerships and efficiencies, and reduce the amount of unnecessary overlap in activities. Collaboration between these professions will result in partnerships and increase the whole community's ability to manage a flood event.

Who are Floodplain Managers?

The objective of floodplain management or flood mitigation planning is to provide a program of activities that will best tackle a community's vulnerability to flooding and meet other community needs. Beyond protecting people and property, these needs may include sustainable future development; parks and open space; wildlife habitat preservation; preservation or restoration of the natural and beneficial functions of floodplains; promotion of recreational activities; and enhancing community linkages through bike paths and trails.

The responsibility of a floodplain manager is fundamental to the effective management of floodplain resources and flood mitigation. The floodplain manager is the principal community administrator for the implementation of flood loss reduction activities, including community participation in the National Flood Insurance Program, enforcing floodplain regulations, maintaining flood maps and studies, coordinating flood hazard mitigation projects, and educating the public and local officials about flood hazards and the value of the floodplain as a resource.

Organizationally, floodplain management responsibilities often

are housed in public works, engineering, building and zoning, or planning agencies. In some state and local government structures, floodplain management programs fall within the emergency management organization.

Who are Emergency Managers?

Emergency management is the umbrella term used to describe the culmination of activities necessary to develop, sustain, and improve upon the capability to prepare for, protect against, respond to, recover from, or mitigate against harmful events. These harmful events, known as hazards, may be naturally occurring, such as floods and tornadoes, or human caused, such as hazardous materials spills or terrorism.

An emergency manager has the day-to-day responsibility for emergency management programs and activities. The role is one of coordinating all aspects of a community's mitigation, preparedness, response, and recovery capabilities. The emergency manager takes an all-hazards approach to protecting the community, and typically some hazards are of higher priority than others. Flood events are often one of the emergency manager's greatest concerns for the community.

Emergency management functions within a community are likely to be housed in a stand-alone office, division, department or fall under fire and/or law enforcement authorities. Some communities have full-time emergency management positions, where in others the role may be part-time and just one of many hats the emergency manager wears.

How Can Floodplain Managers and Emergency Managers Help Each Other?

There are many ways floodplain managers and emergency managers can help each other out. Serving on the other's boards or committees as active participants or advisors, providing expert review on plans, reports, or public information materials, and watching each other's backs during an incident are just a few ways these professions can team up to achieve a safer community. The following are a number of other complements floodplain and emergency managers may bring one another.

Floodplain Manager

- Serve as a subject matter expert in the area of flood hazards during planning, training, and exercise.
- Provide flood hazard information for emergency and evacuation planning.
- Establish coordination procedures to conduct post-flood damage assessments.
- Review flood maps and studies to determine evacuation routes, critical facilities and infrastructure vulnerabilities.
- Cooperate on the identification of hazard mitigation opportunities.
- Provide information to general public and serve as point of contact on flood hazards.
- Support the Emergency Operations Center by interpreting event related flood data and associated risk.
- Recommend the placement of flood-response equipment and materials at locations around the state.
- Provide support for flood related preparedness, response, recovery, and mitigation planning.
- Offer technical support for flood related grant applications.
- Provide expertise in developing benefit-cost ratios for flood mitigation actions.

Emergency Managers

- Initiate and maintain a local hazard mitigation plan that may be used for Community Rating System (CRS) planning points.
- Participate in floodplain management planning.
- Develop and maintain an inventory of critical facilities and infrastructure along with their locations.
- Coordinate incident information and resources during flood related events.
- Develop flood related exercises (drills, workshops, table-tops, functional, or full-scale).
- Sponsor or share information on flood-related training opportunities.
- Provide insight on interdependent or secondary hazards related to floods.
- Advise on grant programs where flood related projects may be eligible to receive funding.
- Disperse public information to elected officials, community groups, and the general population.
- Develop, test, and train flood response and recovery plans.

What Actions Should **YOU** Take?

If you are a floodplain manager or emergency manager, do you know your counterpart? If so, please continue working together and strengthen your relationship to safeguard your community. If you do not know your colleague, or feel you should know them more, please make it a priority to visit with them and share how each of you are responsible for keeping your community safe from floods and explore partnership opportunities. Also, if you have any best practices or success stories related to partnerships or coordination between floodplain managers and emergency managers, please let us know. We are interested in learning more about your accomplishments and in sharing your story with others.

To find contact information for your local emergency manager, please visit coemergency.com and click Local Info Sources tab. For local floodplain manager contact information, please contact Jamie Prochno with the Colorado Water Conservation Board.

Please feel free to contact the following personnel for questions, comments, or additional information:

Floodplain Management and National Flood Insurance Program Contacts:

- Jamie Prochno, Community Assistance Program Coordinator, Colorado Water Conservation Board, (303) 866-4474 x3215, jamie.prochno@state.co.us
- Michael Gease, Natural Hazards Specialist, FEMA, (303) 235-4814, michael.gease@fema.dhs.gov

Emergency Management Contacts:

- Ken Brink, Mitigation Team Supervisor (Denver Metro), Colorado Division of Emergency Management, 720-852-6695, kenneth.brink@state.co.us
- Iain Hyde, Mitigation Specialist (Southern Colorado), Colorado Division of Emergency Management, (720) 852-6698, iain.hyde@state.co.us
- Deanna Butterbaugh, Mitigation Specialist (Northern Colorado), Colorado Division of Emergency Management, (720) 852-6697, deanna.butterbaugh@state.co.us



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Section Chief, Oversees all program areas including: flood risk identification, designation of floodplains, flood risk reduction and mitigation, response and recovery, watershed restoration, and weather modification.

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Weather Modification: Permitting, Compliance, and Grants South Platte Flood Channel Management, Snow Science and Applied Research Projects



Patton



Sturm

Thuy Patton—(303) 866-3441 ext 3230

Floodplain Mapping Coordinator, manages the FEMA Floodplain Map Modernization and the Risk Map Program for the State, development of scopes of work, acts as liaison between FEMA and local governments.

Chris Sturm—(303)866-3441 ext 3236

Stream Restoration Coordinator, responsible for implementing the goals and objectives of the stream restoration/multi-objective stream management work in the state. Chris's duties include managing the CWCB Stream Restoration Program, implementing the Colorado Healthy Rivers Fund and the Fish and Wildlife Resources Fund Planning strategies to support water supply needs in Colorado, GIS analysis and cartographic design, and community outreach, education and general technical assistance.



Prochno

Jamie Prochno—(303) 866-3441 ext 3215

Community Assistance Program Coordinator for the NFIP, performs community assistance visits, conducts public outreach and training, coordinates with FEMA and other State Programs, and provides technical assistance to communities.

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