

Colorado Post-Wildfire Guide

A Resource for Colorado
Communities
Developed by the Colorado
Silver Jackets Team



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National
Weather
Service



COLORADO
Resiliency & Recovery Office



FEMA

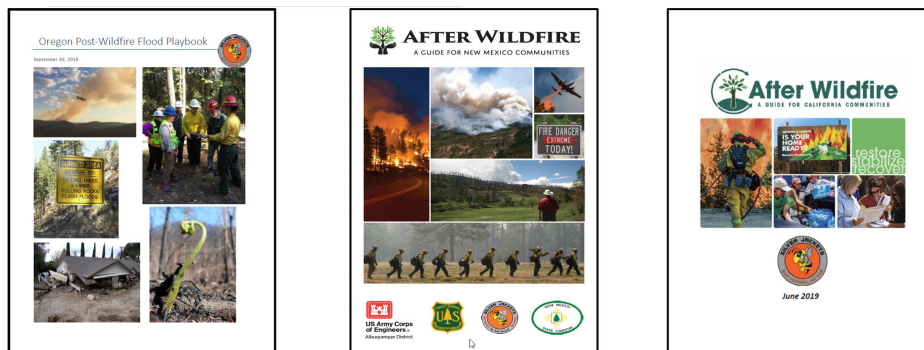


US Army Corps
of Engineers®

Acknowledgments

The Colorado Silver Jackets team would like to acknowledge and commend the previous efforts by others, which greatly contributed to content and direction of this guide. The following guides and accompanying resources were heavily referenced for the development of this guide:

- Oregon Post Wildfire Flood Playbook
https://silverjackets.nfrmp.us/Portals/0/doc/Oregon/PostFireFloodPlaybook_2018-09-30.pdf?ver=2018-10-04-203119-453
- After Wildfire: A Guide for California Communities
<https://www.readyforwildfire.org/post-wildfire/after-a-wildfire/>
- After Wildfire: A Guide for New Mexico Communities and the accompanying resources
<https://www.afterwildfirenm.org/>



Information from these references, in addition to other resources referenced in this guide, was curated and modified to develop this Colorado-specific guide. This pertinent information will assist the communities of Colorado as they organize and respond to wildfire and the accompanying increased flood risk.

The Colorado Silver Jackets team would also like to acknowledge the project partners who contributed their time, resources, and knowledge to create a comprehensive and beneficial document. Contributing partners included: United States Army Corps of Engineer (USACE), Colorado Water Conservation Board, Federal Emergency Management Agency (FEMA), the United States Geological Survey (USGS), the United States Department of Agriculture (USDA), Natural Resources Conservation Services (NRCS), Colorado Department of Local Affairs (DOLA), Colorado Department of Human Services, and Colorado Division of Homeland Security and Emergency Management (DHSEM).

For more information on the Colorado Silver Jackets, see our website:

<https://silverjackets.nfrmp.us/State-Teams/Colorado>.

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Executive Summary

The Colorado Post-Wildfire Guide is a consolidated resource intended to assist individuals, families, and communities as they prepare for and recover from a wildfire, and then determine next steps in planning for post-wildfire hazards and navigating the recovery process. The development of this guide was an interagency effort led by the Colorado Silver Jackets team with support from many partnering local, state, and Federal agencies.

This guide is timely as the State of Colorado continues to experience catastrophic wildfires, which have continued to increase in severity over the past several decades. Throughout the 1960s and the 1970s, wildfires in Colorado destroyed less than 100,000 acres per decade. Throughout the 2000s, the total increased to over 1,000,000 acres, including Colorado's largest recorded wildfire, the Cameron Peak Fire of 2020, which burned over 208,000 acres. As devastating as wildfires can be, the impacts are not over once the flames have died down. Whether a wildfire burns through a community or the watershed above a community, significant hazards and challenges may persist for years or even decades.

Working with subject-matter experts, only the most relevant information and useful resources have been included in this guide to reduce confusion and outline clear, identifiable actions individuals, families, and communities can take before, during, and after a wildfire to be safe.

The main content topics in the guide include the following:

- Know Your Risk
- Resources to Help Residents Stay Safe Before, During, and After a Wildfire
- Post-Wildfire Hazards
- Planning Ahead
- Mobilize Your Community Before and After a Wildfire
- Risk Reduction
- Recovery Programs

Welcome to the Colorado Post-Wildfire Guide

Development of the Colorado Post-Wildfire Guide was an interagency effort led by the Colorado Silver Jackets team to assist at risk and fire-affected communities and communities at risk of fire by creating a consolidated resource that can help Colorado communities prepare for and recover from a wildfire and plan for post-wildfire hazards. The Colorado Silver Jackets team is a partnership of state and Federal agencies with a role in assessing and managing flood risk across the state.

The State of Colorado has experienced numerous catastrophic wildfires. Throughout the 1960s and the 1970s, wildfires in Colorado destroyed less than 100,000 acres per decade. Throughout the 2000s the total increased to over 1,000,000 acres, including Colorado's largest recorded wildfire, the Cameron Peak Fire of 2020, which burned over 208,000 acres. As devastating as wildfires can be, the impacts are not over once the flames have died down. Whether a wildfire burns through a community or the watershed above a community, significant hazards and challenges may persist for years or even decades.

Many agencies participate in post-wildfire studies and can provide valuable information to decision-makers. However, communities may feel overwhelmed and unsure about what actions to pursue or how to access assistance from state and Federal programs following a fire. This guide was created to help Colorado communities in and near burned areas recover after wildfire and better prevent, prepare for, and respond to flooding and debris flows that could be experienced after a fire.

What Is In This Guide & Who Is It For?

This guide is a resource to communities at risk of wildfire to help them prepare for and reduce the risk of wildfires. It is also a resource for communities already affected by a wildfire that need to navigate the complex web of Federal and state programs and agencies and address concerns that can occur following a fire, including increased flood risk and debris flow.

The guide provides best practices for ways to prepare before and after a wildfire, mitigate flood risk, protect assets, and embark on the recovery process. Preparedness activities like flood warnings in burn areas, planned evacuation routes, and public education are also included.

The guide explains the roles and responsibilities of local, state, and Federal agencies in responding to wildfires and associated flooding and how they can work together. It also includes information on available Federal and state programs that can assist communities with studies and project implementation.

Know Your Fire & Flood Risk

Multiple resources are available to your community to help stay informed about your fire and flood risk.

National Significant Wildland Fire Potential Outlook

The National Interagency Fire Center produces National Significant Wildland Fire Potential Outlooks. The Outlooks' objectives are to improve information available to wildfire professionals. These assessments are designed to inform decision makers about the location of high-risk fire areas so that they can engage in proactive wildfire management, thus better protecting lives and property, reducing firefighting costs and improving firefighting efficiency. This product provides outlooks for the current month, the month following, and a seasonal look at the months beyond that. Find the portal at: <https://www.predictiveservices.nifc.gov/outlooks/outlooks.htm>

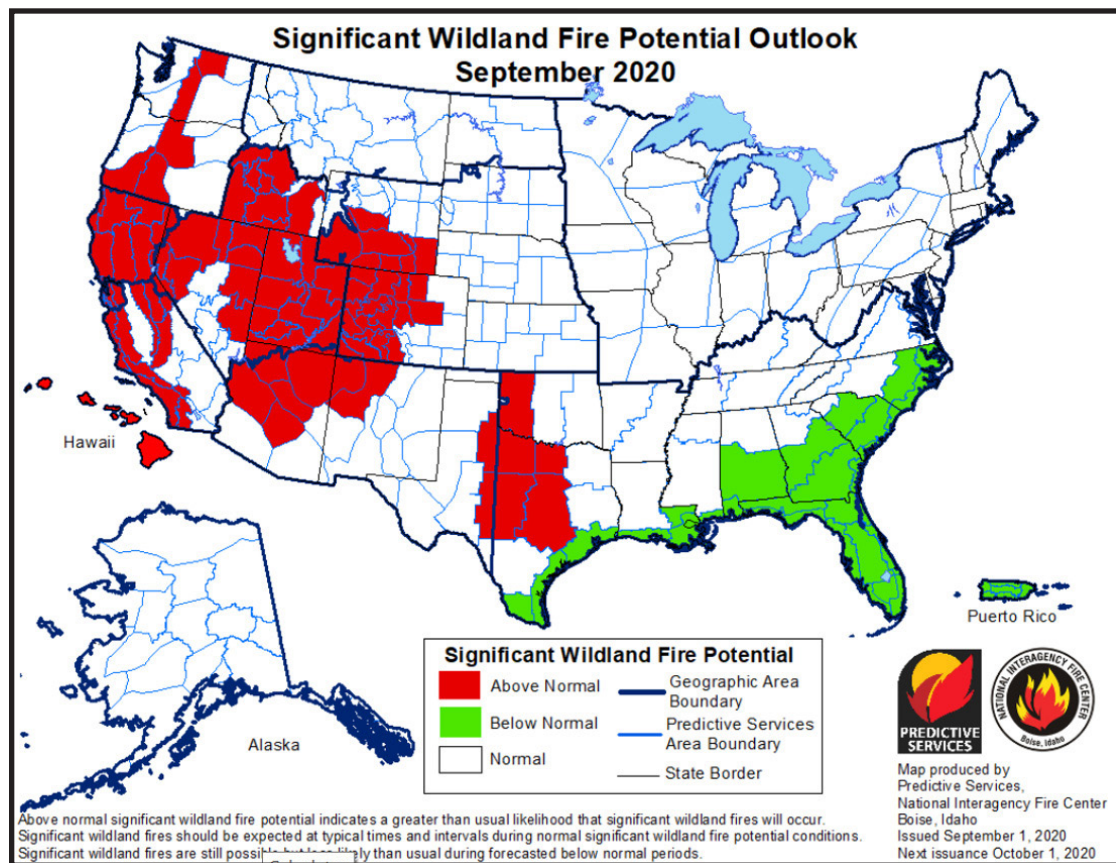


Figure 1. Output Map Depicting Wildfire Potential for September 2020

Colorado Wildfire Risk Assessment Portal

The Colorado Wildfire Risk Assessment Portal provides access to information that describes wildfire risk statewide. The web-based portal contains both public and professional viewers, which both display burn probability and burn intensity estimates based on wildfire modeling completed in 2018. This tool will be continually updated based on updated wildfire risk modeling when it is available.

The **Wildfire Risk Professional Viewer** is a web-mapping application designed to support the community wildfire protection planning needs of government officials, hazard-mitigation planners, and wildfire professionals. This application contains advanced functionality and additional map themes as compared to the Public Viewer. The key features of this application include the capability to define a project area, generate a detailed risk summary report, and export and download wildfire risk geographic information system (GIS) data. Access to the Professional Viewer requires a valid user account from the Colorado State Forest Service including a login and password, which is easy to acquire upon request.

The **Wildfire Risk Public Viewer** is designed to increase wildfire awareness, provide a comprehensive view of wildfire risk, probability, and local fire history (Figure 2.), and educate users about wildfire prevention and mitigation resources available from the Colorado State Forest Service. This viewer is intended to support homeowners and community leaders. For more information on this viewer and additional available maps, visit the portal at <https://co-pub.coloradoforestatlas.org/#/>.

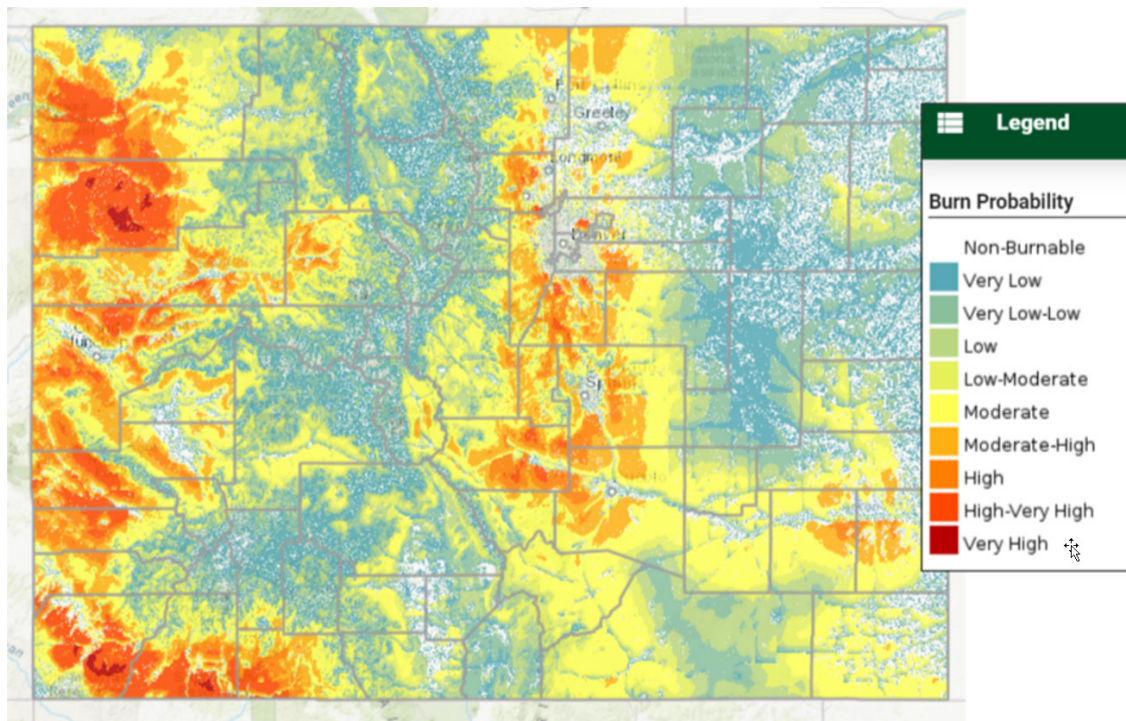


Figure 2. Colorado Wildfire Risk Assessment Public Viewer

Drought Map

The U.S. Drought Monitor is a map that shows the location and intensity of drought across the country. New maps are released every Thursday (Figure 3). Knowing the level of drought in your community is an important component of potential fire risk, as well as water management concerns, especially concerning firefighting capacity. Visit

<https://www.drought.gov/drought/states/colorado> to learn more.

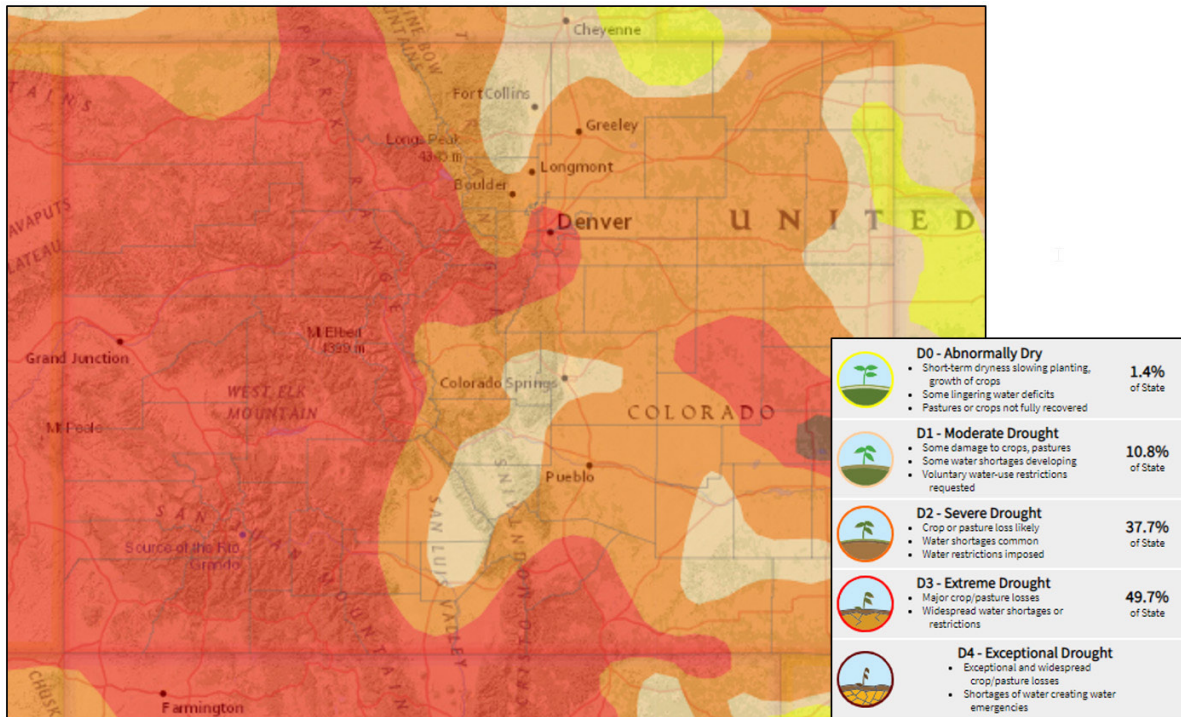


Figure 3. Colorado Drought Conditions April 28, 2020

Emergency Assessment of Post-Fire Debris Flow Hazards

USGS conducts post-fire debris flow hazard assessments for select fires in the Western U.S. using geospatial data related to basin morphometry, burn severity, soil properties, and rainfall characteristics. The models used predict the likelihood of a debris flow (in %), potential volume of debris flow (in m³), and combined relative debris flow hazard (Figure 4). The models, however, do not predict downstream impacts, potential debris flow runout paths, and the areal extent of the flow or flood inundation. Visit https://landslides.usgs.gov/hazards/postfire_debrisflow/ to learn more.

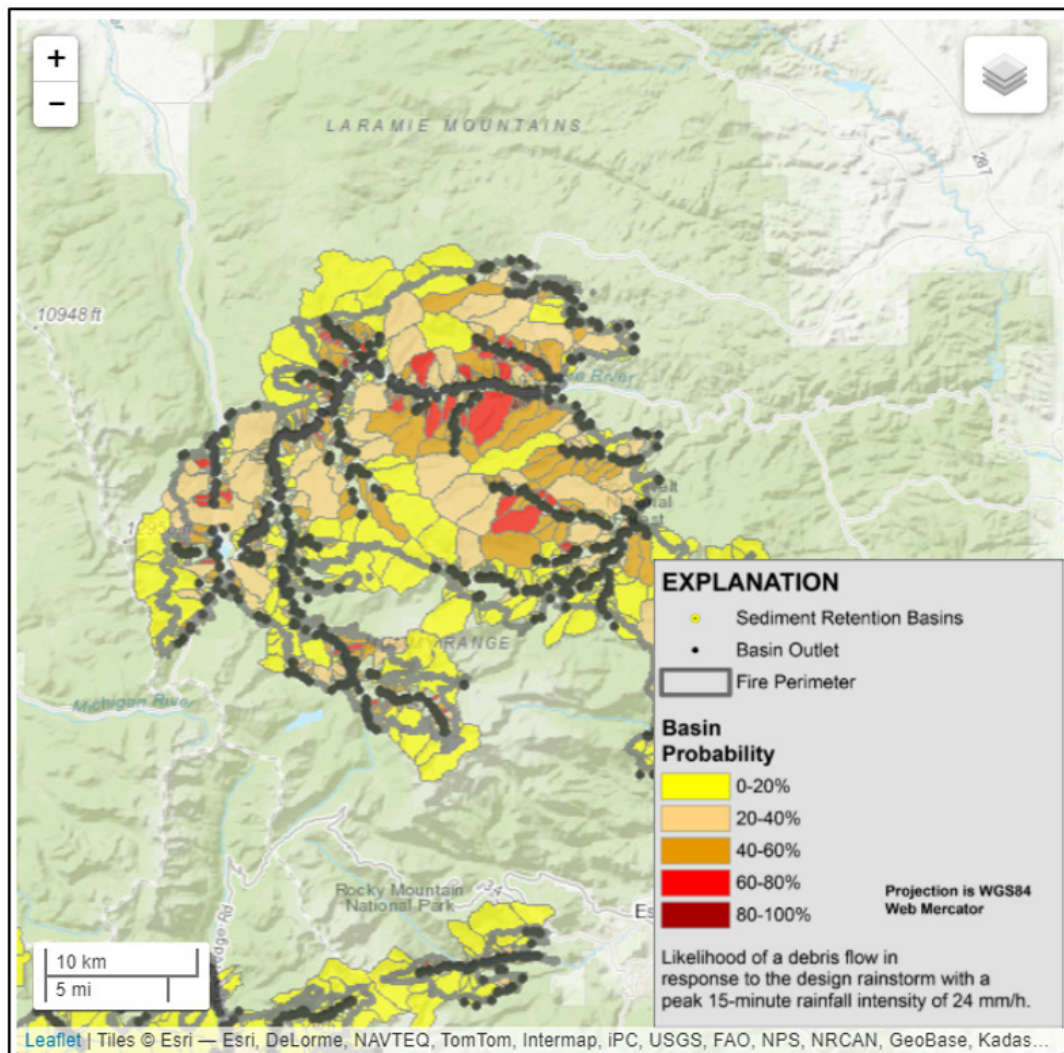


Figure 4. USGS Post-Fire Debris Flow Hazard Assessment of the Cameron Peak Fire in August 2020 (Arapaho and Roosevelt National Forests, CO)

Incident Information System - InciWeb

InciWeb is an interagency all-risk incident information management system developed to provide the public with a single source of incident related information and provide a standardized reporting tool for the Public Affairs community. It provides the most current information pertaining to wildfires, prescribed burns, floods, hurricanes, and other incidents (Figure 5). The type of information available can be incident and contact information, news releases, closure information, photos, maps, and videos for incidents that occur on Federal, state, tribal, and local jurisdictions. Visit <https://inciweb.nwcg.gov/> to learn more.

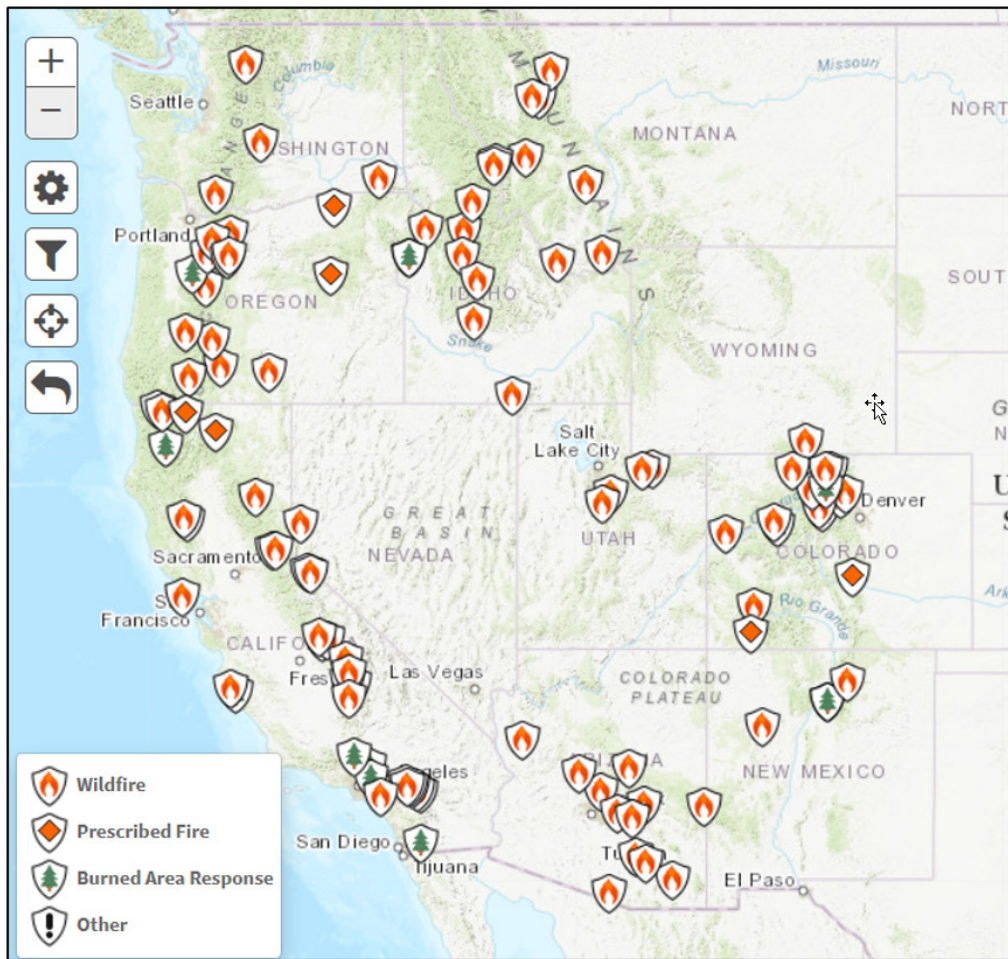


Figure 5. Inciweb Viewer

Flood Warning: USGS Stream Gauge Alerts

USGS has an extensive network of stream and rainfall gages across the State of Colorado. The WaterAlert service can send e-mail or text (SMS) messages when certain parameters, as measured by a USGS real-time data-collection station, exceed user-definable thresholds. Real-time data from USGS gages are transmitted via satellite or other telemetry to USGS offices at various intervals; in most cases, once every hour. Emergency transmissions, such as during floods, may be more frequent. Notifications are based on the data received at these site-dependent intervals. Users can view current conditions of these sites and subscribe for alerts at: <https://maps.waterdata.usgs.gov/mapper/wateralert>. Defined flood action levels and projected river levels for some of the river gages can be found at: www.water.weather.gov.

Flood Warning: Real-Time Storm and Flood Data Viewer– Denver

For communities in the Denver Metropolitan Area, the Real-Time Storm and Flood Data Viewer is a tool which provides a map of warning information from the National Weather Service (NWS), live radar and lightning strike data, 1-hour storm track projections, and rainfall and stream level measurements from the ALERT System (Figure 6). Wildfire burn scar locations are also provided, which can be viewed in concert with watershed or drainage area boundaries to identify areas that are downstream of burned areas and may be at higher risk of storm damage due to flash flooding and debris flows. The tool is provided by Mile High Flood District (MHFD) and focuses on their service area. The tool can be accessed at the following link:

<http://udfcd.maps.arcgis.com/apps/webappviewer/index.html?id=71552f4e3d71492c8b39efabe1e505eb>

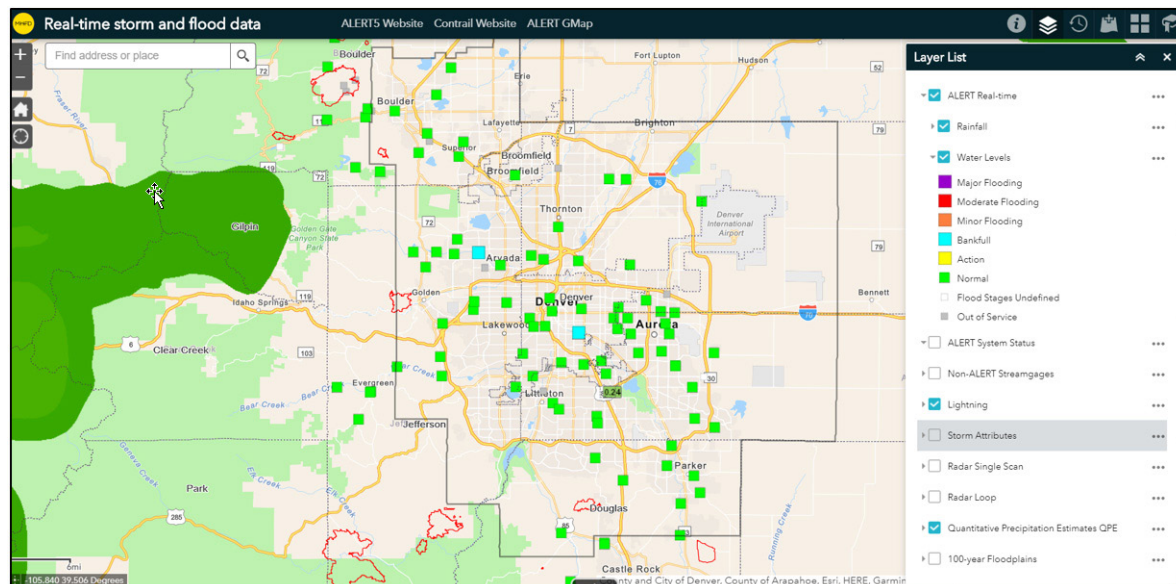


Figure 6. Mile High Flood District Real-Time Storm and Flood Data Viewer

Resources for Weather and Emergency Alerts

- ✓ **Wireless Emergency Alerts:** These alerts are sent by authorized government agencies through your mobile carrier. Pay attention to local emergency response messaging and heed evacuation notifications. Mobile users are not charged for receiving these text-like alerts and are automatically enrolled to receive them. These alerts may be used to notify mobile users of Presidential Alerts during a national emergency, AMBER alerts, or extreme weather alerts.
- ✓ **National Oceanic and Atmospheric Administration (NOAA) Weather Radio All Hazards:** Nationwide network of radio stations that broadcast continuous weather information 24 hours a day, seven days a week. See the Post-Wildfire Hazards - Watches and Warnings section for more information on types of broadcasts. For a list of radio stations in Colorado, visit: <https://www.weather.gov/nwr/stations?State=CO>.
- ✓ **Emergency Alert System:** Broadcasts flash flood warnings on commercial radio and TV. For more information, visit: www.fcc.gov/general/emergency-alert-system-eas.

- ✓ **FEMA:** Provides email alerts and text messages to the general public. For more information, visit: www.fema.gov/mobile-app.
- ✓ **Nixle:** Provides free text and email alerts for anywhere in the nation. Alerts include severe weather, criminal activity, severe traffic, and local events. For more information, visit: www.nixle.com.
- ✓ **Reverse 9-1-1:** Some parts of Colorado have reverse 9-1-1 systems in place that provide NWS watch and warning communications for extreme storm events. Check your local county's website for more information on alert systems specific to and available in your area.

Mobile Apps

Consider downloading the following apps for additional resources and tools you can use after a wildfire or other disaster.

- ✓ **Wildfire:** Developed by the American Red Cross, this app provides checklists for what to do right before, during, and after a wildfire. The app also contains the latest wildfire news: www.redcross.org/get-help/how-to-prepare-for-emergencies/mobile-apps.
- ✓ **CodeRED:** Utilized across many counties throughout Colorado, this high-speed mobile app provides several types of notifications, including fire, flooding, and evacuation notices. For more information, call your local emergency management office to see if your area is registered.
- ✓ **FEMA Mobile App:** Helps plan for and respond to natural disasters: www.fema.gov/mobile-app.
- ✓ **First Aid App:** Developed by the American Red Cross, this comprehensive app includes a checklist of how to prepare for an emergency, how to identify and perform first aid for various conditions (including how to treat burns), and a feature for locating the hospital closest to you: <https://www.redcross.org/get-help/how-to-prepare-for-emergencies/mobile-apps.html>.
- ✓ **ReUnite:** This post-disaster reunification tool helps connect lost family members and friends: <https://itunes.apple.com/us/app/reunite/id368052994?mt=8>.
- ✓ **Weather Underground:** Provides weather updates with data points from 200,000 personal weather stations across the globe: www.wunderground.com/download/index.asp.



Figure 7. Various Methods to Receive Warning Notifications (National Weather Service)

Resources to Help Residents Stay Safe Before, During, and After a Wildfire

While this guide's focus is mainly for activities after a fire has occurred, a focus on preparedness before, during, and following a fire is also critical, so it is briefly discussed in this section.

READYColorado is Colorado's official source for homeland security and all-hazards preparedness information. READYColorado's website provides information and preparedness tips on all hazards, including wildfire. Ways you can prepare before, during, and after a wildfire are listed below and are presented on the website: <https://www.colorado.gov/pacific/dhsem/wildfire>.

Before a Wildfire

- ✓ Build an emergency kit and make a family communications plan. Make sure respirator masks (rated N95 or P100 specifically designed for fine particle filtration) are included to protect from air pollutants.
- ✓ Know more than one exit route in case you have to evacuate.
- ✓ Plant fire-resistant shrubs and trees.
- ✓ Remove leaves and other debris from around the house, roof, and gutters.
- ✓ Inspect chimneys at least twice a year and clean them at least once a year.
- ✓ Use 1/8-inch mesh screen beneath porches, decks, floor areas, and the home itself to help keep embers out.
- ✓ Install a dual-sensor smoke alarm on each level of your home, especially near bedrooms. Be sure to test the alarms monthly and change the batteries at least once each year.
- ✓ Teach each family member how to use a fire extinguisher and show them where it's located.
- ✓ Keep a ladder that will reach the roof.
- ✓ Consider installing protective shutters or heavy fire-resistant drapes.
- ✓ Clear items that will burn from around the house, including wood piles, wooden lawn furniture, barbecue grills, tarp coverings, etc. Move them outside of your defensible space.

Preparing a Safety Zone for Your Home

Create a 30 to 100-foot safety zone around your home. Within this area, you can take steps to reduce potential exposure to flames and radiant heat. Homes built in pine forests should have a minimum safety zone of 100 feet. If your home sits on a steep slope, standard protective measures may not be enough – contact your local fire department or forestry office for specific information.

Within the zone, you will want to take the following steps:

- ✓ Thin a 15-foot space between treetops and remove limbs within 15 feet of the ground.
- ✓ Prune tree branches and shrubs within 15 feet of a stovepipe or chimney outlet.
- ✓ Ask the power company to clear branches from power lines.
- ✓ Remove vines from the walls of the home.
- ✓ Mow grass regularly.
- ✓ Clear a 10-foot area around propane tanks and the barbecue. Place a screen over the grill – use nonflammable material with mesh no coarser than one-quarter inch.
- ✓ Regularly dispose of newspapers and rubbish at an approved site.
- ✓ Place stove, fireplace, and grill ashes in a metal bucket, soak in water for 2 days, then bury the cold ashes in mineral soil.
- ✓ Store gasoline, oily rags, and other flammable materials in approved safety cans. Place cans in a safe location away from the base of buildings.
- ✓ Stack firewood at least 100 feet away and uphill from your home. Clear combustible material within 20 feet of the wood pile.
- ✓ Review your homeowner's insurance policy and also prepare or update an inventory of your home's contents.
- ✓ Follow local burning regulations. You can find fire restriction information here:
<http://www.coemergency.com/p/fire-bans-danger.html>.

During a Wildfire

Pre-evacuation

- ✓ Be ready to leave at a moment's notice.
- ✓ If you haven't received an evacuation notice, but your instincts are telling you that you should evacuate, do so immediately.
- ✓ Listen to local radio and television stations for updated emergency information.
- ✓ Always back your car into the garage or park it in an open space facing the direction of escape.
- ✓ Confine pets to one room so that you can find them if you need to evacuate quickly.
- ✓ Arrange temporary housing at a friend or relative's home outside the threatened area in case you need to evacuate.
- ✓ Wear protective clothing when outside – sturdy shoes, cotton or wool clothes, long pants, a long-sleeved shirt, gloves, and a handkerchief to protect your face.
- ✓ Place valuable papers, mementos, and anything "you can't live without" inside the car, ready for quick departure. Any pets still with you should also be put in the car.

- ✓ Close outside attic, eaves and basement vents, windows, doors, pet doors, etc. Remove flammable drapes and curtains. Close all shutters, blinds, or heavy non-combustible window coverings to reduce radiant heat.
- ✓ Close all doors inside the house to prevent draft. Open the damper on your fireplace, but close the fireplace screen.
- ✓ Shut off any natural gas, propane, or fuel oil supplies at the source.
- ✓ Connect garden hoses to an outdoor water faucet and fill any pools, hot tubs, garbage cans, tubs or other large containers with water.
- ✓ Place valuables that will not be damaged by water in a pool or pond.
- ✓ Place lawn sprinklers on the roof and near above-ground fuel tanks. Leave sprinklers on to wet these structures as long as possible.
- ✓ If you have gas-powered pumps for water, make sure they are fueled and ready.
- ✓ Disconnect any automatic garage door openers so that doors can still be opened by hand if the power goes out, but keep the door closed.
- ✓ Move flammable furniture into the center of the residence away from the windows and sliding-glass doors.

Immediate Evacuation Required

- ✓ If advised to evacuate, do so immediately. Take your emergency kit, lock your home and choose a route away from the fire hazard. Watch for changes in the speed and direction of the fire and smoke. Inform someone of when you left and where you are going.
- ✓ If you see a wildfire and haven't received evacuation orders yet, call 9-1-1. Don't assume that someone else has already called. Describe the location of the fire, speak slowly and clearly, and answer any questions asked by the dispatcher.
- ✓ Go to a designated public shelter if you have been told to evacuate or you feel it is unsafe to remain in your home. Check COEmergency.com for shelter information or go to your local emergency management website.
- ✓ If you are with burn victims, or are a burn victim yourself, call 9-1-1 or seek help immediately; cool and cover burns to reduce chance of further injury or infection.

After a Wildfire

- ✓ Do not return to your home until fire officials say it is safe to do so.
- ✓ Use caution when entering burned areas as hazards may still exist, including hot spots, which can flare up without warning.
- ✓ For several hours after the fire, maintain a "fire watch." Re-check for smoke and sparks throughout the house, including the attic.
- ✓ If you detect heat or smoke when entering a damaged building, evacuate immediately.
- ✓ Avoid damaged or fallen power lines, poles, and downed wires.

- ✓ Watch for ash pits and mark them for safety – warn family and neighbors to keep clear of the pits also.
- ✓ Watch animals closely and keep them under your direct control. Hidden embers and hot spots could burn your pets' paws or hooves.
- ✓ Remain calm, pace yourself, and listen carefully to what people are telling you, and deal with urgent situations first.
- ✓ Contact your insurance company if there is any damage.

Tips and Programs for Individuals, Families, and Businesses

Experiencing a destructive wildfire can be financially stressful, and, in some cases, devastating. Having good records and photos stored in another location (e.g., digitally stored and accessible via the cloud) can assist with insurance and other claims.

Below are some financial tips to assist individuals, families, and businesses at this difficult time.

- **Document, document, document.** Take pictures of your property (and provide 'before' images if they are available). Photograph all damage from multiple angles to help with insurance claims and applications for assistance programs. Taking pictures is one of the single most important things you can do to help yourself. **Keep all of your receipts** from restoration and recovery projects.
- **If you have insurance, contact your insurance agent as soon as possible.** The Insurance Information Institute provides answers to Frequently Asked Questions about wildfire and insurance at www.iii.org.
- **Contact your lenders as soon as possible if your financial obligations cannot be met due to wildfire.** For example, if you cannot pay your mortgage, you have more options if you work with your lenders sooner rather than later.
- **Do not assume FEMA is all you need.** FEMA assistance, when provided, is not a substitute for insurance but rather is minimum assistance to get people on their feet after a disaster.
- **Look into tax relief programs.** If a major disaster is declared, individuals who suffer losses may complete a retroactive tax return and take the loss out of the previous year's return. This may provide some immediate funding for you in a post-wildfire situation. An accountant or your local Internal Revenue Service (IRS) office (<https://www.irs.gov/help/contact-your-local-irs-office>) can help you navigate this process.
- **Contact your County Emergency Manager.** Your local Emergency Manager needs to track damages and impacts to help determine whether your community qualifies for disaster assistance.
- **If you have irreplaceable and invaluable items, get them out of harm's way, if it is possible to do so safely.** Even if the wildfire is over, flooding may be a very real risk.

Tips and Programs for Communities

After a wildfire, one of the most important tasks in community response is identifying and applying for disaster assistance. Be aware that financial assistance processes often take more time than anticipated.

- **Fund immediate threats.** After your community has experienced a wildfire, you need to immediately assess the post-fire flood threat. There may only be days to weeks between when the fire is controlled and when the rains start. The first task is to identify what funds are available in the community for immediate use, and then prioritize projects that will provide the most expedient protection with those funds.
- **Do not assume that FEMA assistance is all you need.** A Presidential Disaster Declaration must be established in order for a community to be eligible for FEMA funding. Additional funding will likely be needed to match or supplement what FEMA provides.
- **Document, document, document.** It is important for communities to document damage. Take pictures of your community to document damage, particularly of infrastructure such as bridges, and provide 'before' images if they are available. Document all damage from multiple angles. Documentation is critical for grant applications, and for most grants, documenting mitigation practices and results and saving receipts is mandatory.
- **Follow procurement guidelines and follow funding requirements.** Procurement is the acquisition of goods, services, or works from an outside source. If you receive government funding, you must follow Federal and state procurement guidelines. If you do not follow the guidelines, your funding may be taken back. Ensure you know and comply with the requirements of each grant.
- **Permitting is often required for on-the-ground work.** For information, contact your county's permitting department. Additional information about USACE Emergency Permitting can be found in the USACE Emergency Permitting Post-Wildfire section.
- **Identify leadership roles.** Make sure local government leaders understand that their role extends beyond applying for assistance. As the community's official representative, they are responsible for tracking applications and pressing for action when necessary.
- **Organize a funding team.** Putting together a grant application under a tight deadline after a disaster is difficult. You will be more effective if you take time up front to organize qualified staff and volunteers and to partner with other stakeholders in the planning stage. Delegate tasks to those who have the required skills and are committed to meeting the time constraints.

Post-Wildfire Hazards

Wildfires can devastate the lives and property of community members. But the danger is not over after the flames are put out. Flash flooding, mudflows, debris flows, rockfalls, structural damage, road instability, and damaged trees are just some of the dangers that can follow a wildfire and persist for weeks or months thereafter. The Colorado Geological Survey has updated their website with a number of hazard resources to help fire impacted communities and individuals, including rockfall, landslide, and debris flow susceptibility maps, reports, and other publications. To learn more, visit ColoradoGeologicalSurvey.org.

Why is there a higher risk of flooding after a fire?

Wildfires dramatically change the landscape and ground conditions, which can lead to a higher risk of flash flooding (Figure 8). **When a wildfire burns a portion of a watershed, the resulting burn scar increases the potential for flooding and debris flows until vegetation is re-established.**

Natural, unburned vegetation and soil normally act as a sponge during a rainfall event. However, the heat from a fire can bake the ground, creating a surface that will not absorb water and can increase the speed with which water flows off the slope. When a wildfire compromises or eliminates these normal protective functions, the potential for significant flash flooding and debris flows increases.

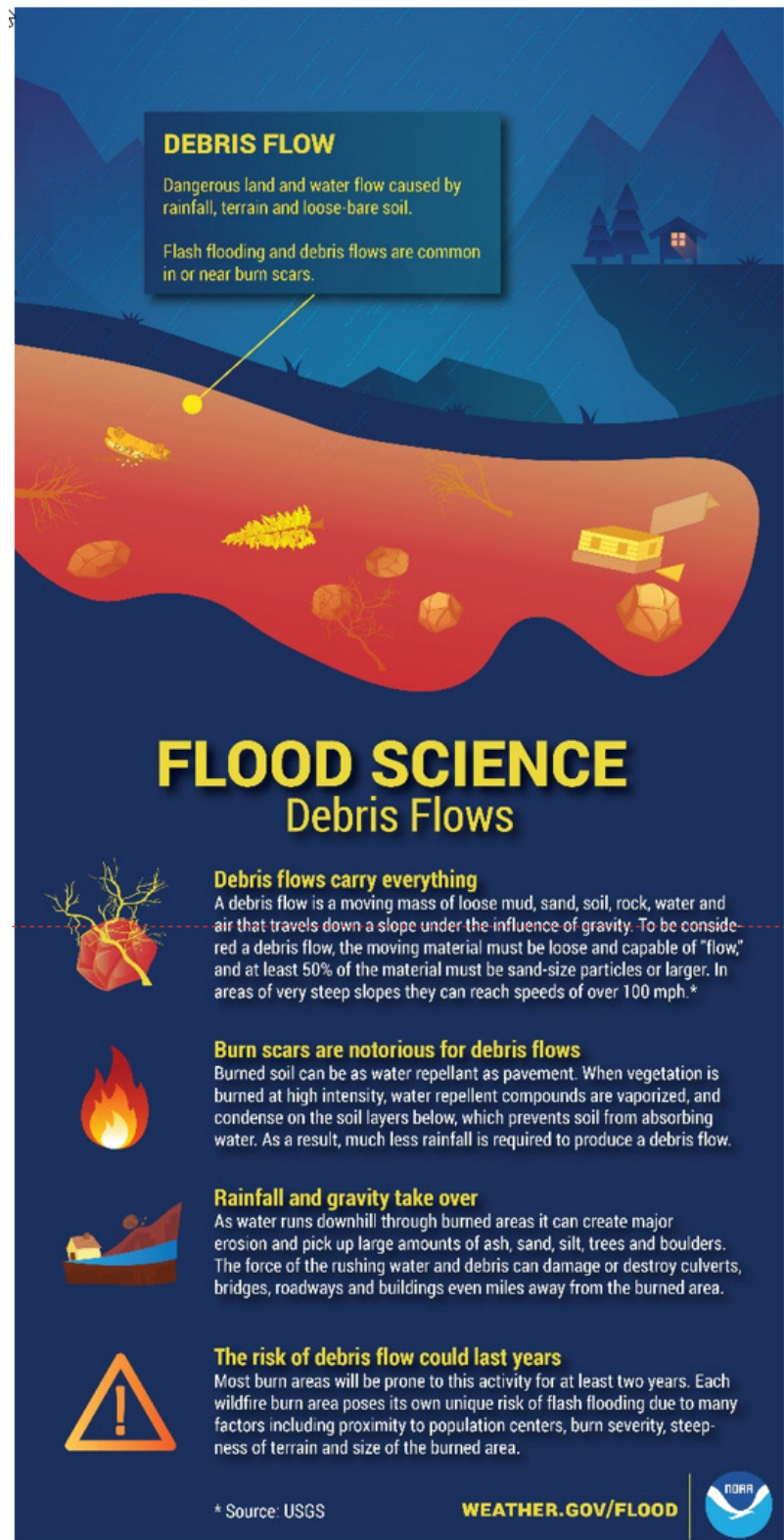


Figure 8. Debris Flows (NOAA)

In areas that have been severely burned, post-wildfire risks of floods or debris flows may last for two to five years. After two or three years, the regrowth of vegetation and reduced water repellency of the soil should lower the risk considerably, depending on the severity of the fire and impact on the soil.

Flash Flooding and Debris Flows

Flooding

Flooding occurs when water accumulates and submerges land that is normally dry, and flash floods are exactly what the name suggests: floods that happen in a flash! **The odds of a flash flood increase dramatically when a fire has burned the area upstream.** For any burn area, it takes much less rainfall to result in flash flooding than before the wildfire because the soil properties, which contribute to water absorption, are compromised. Even modest rainstorms or heavy rain for a short time over a burned area can cause flash flooding many miles downstream. Thunderstorms that develop quickly over burn areas can produce flash flooding and debris flows nearly as fast as the NWS radar can detect the rainfall, providing only a short time for warnings. These floods are typically much larger for a given sized storm than they were before the wildfire, so flooding is likely to be much more extensive following a wildfire, endangering properties previously considered safe from flooding.



Figure 9. Flash Flood in Spring Creek Following a Wildfire (USDA)

A general rule of thumb is that half an inch of rainfall in less than an hour is sufficient to cause flash flooding in a burn area (NOAA). The likelihood of flooding can depend on the terrain, how much time the ground has had to heal, vegetation regrowth, and the severity of the fire on the landscape. These floodwaters typically transport surface debris such as downed trees and gravel, but still behave like water. Figure 9 depicts the flash flood conditions that occurred following the Spring Creek, CO wildfire.

Debris Flows

Debris flows are a common hazard following a wildfire. When heavy rainfall runs downhill through a burned area, it can trigger flash floods, which pick up all types of material in their path potentially resulting in a flow composed of more solids than liquid. Materials can include loose ash, rocks, sand, soil, boulders, and burned trees that travel down a slope under the influence of gravity creating a moving mass, or a debris flow. To be considered a debris flow, the moving material must be loose and capable of 'flow', and more than half of the solids in the mass must be larger than sand grains, including gravel-, pebble-, cobble-, and boulder-sized material (Colorado Geological Survey).

Fast-moving, highly destructive debris flows are one of the most dangerous post-fire hazards, since they occur with little warning. High rainfall intensity, rather than the total amount of rain, is the trigger for debris flows. Their mass and speed make them particularly destructive. Debris flows can strip vegetation, block drainages, damage structures, and endanger human life. The force of the rushing water and debris can threaten life and property miles away from the burned area. Survivors of debris flows describe sounds of cracking, breaking, or the roaring of a freight train.

Watches and Warnings

Post-fire flooding and debris flows are a significant threat after wildfires, both in terms of life-safety and property damage. As mentioned above, changes in land cover due to wildfire can cause upstream areas and streams to produce extremely large amounts of fast-moving runoff and sediment.

When a threat or potential threat of flash flooding or debris flows appears, the NWS may issue Flood Advisories, Flash Flood Watches, or Flash Flood Warnings. Understanding NWS watches, warnings, and advisories can help you keep your family and community safe when it rains after a wildfire.

Be aware and continue monitoring conditions when the NWS issues a Flood Advisory.

A **Flood Advisory** is issued when a forecasted weather event may cause trouble and require action. You should continue monitoring local news outlets and your local NWS office for updates as conditions develop. A Flood Advisory is issued when flooding is not expected to be bad enough to issue a warning. Take appropriate actions to safeguard your family and property, and consider modifying travel plans.

Be prepared for a flash flood when the NWS issues a Flash Flood Watch.

A **Flash Flood Watch** is issued to indicate that current or developing conditions may result in flash flooding. However, flash flooding or debris flows are not imminent, and there may be some uncertainty about the location or timing. In areas where ground conditions have been changed by wildfire, a watch is typically issued within several hours to days ahead of forecasted thunderstorms and rain events that could possibly generate flash flooding or debris flows.

Take action to keep your family and community safe when the NWS issues a Flash Flood Warning.

A **Flash Flood Warning** is issued when a flash flood or debris flow is imminent or occurring. If you are in the warning area, act immediately, as these conditions are often life-threatening. Flash flooding and debris flows result from short duration, high intensity rain events over ground that has been altered by a wildfire. Impacts from flash flooding and debris flows can occur many miles away from the burn area.

Even if you were not directly affected by the wildfire, it does not mean you are safe from the possibility of flash flooding or debris flows after it.

How to Stay Safe Around a Flood and Debris Flow

Take the following precautions to help protect yourself and your property from the risks associated with flooding (Figure 10):

- ✓ Do not walk through moving water – just six inches of water can sweep an adult off their feet. If you have to walk in water, walk where the water is not moving and use a stick to check the firmness of the ground in front of you (flooding can buckle and tear out sidewalks and roads).
- ✓ Do not attempt to drive through a flood or debris flow, or into flooded areas. You and the vehicle can be quickly swept away. It takes only a foot of water to float or sweep away most vehicles. Remember: “Turn Around, Don’t Drown.” For more information, visit: <https://www.weather.gov/safety/flood-turn-around-dont-drown>.

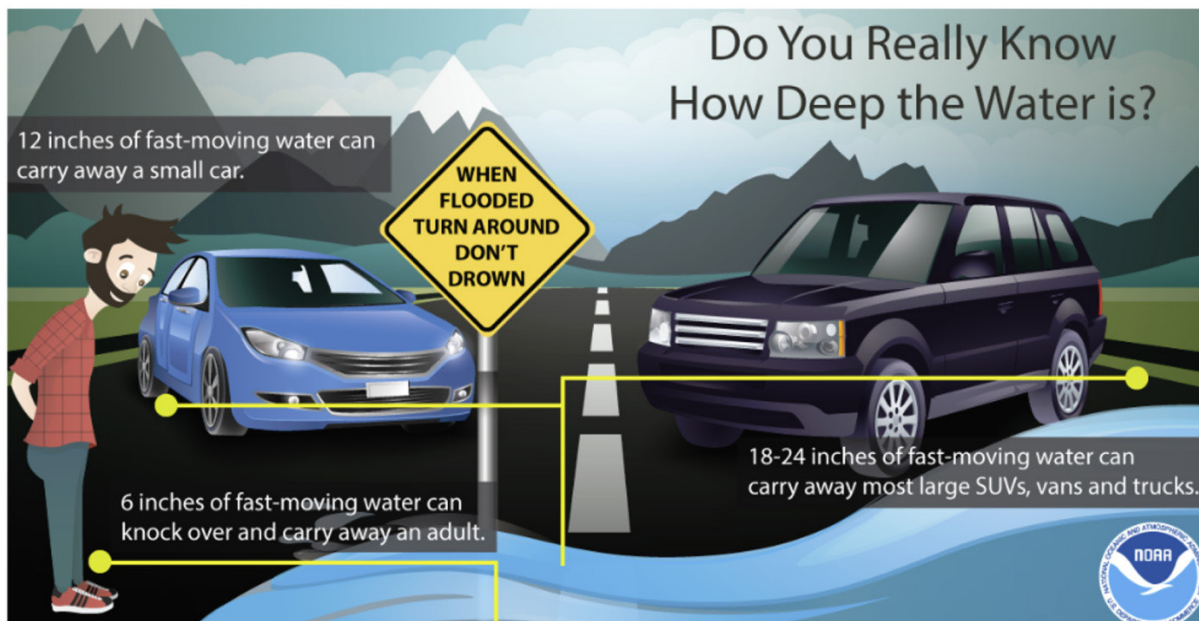


Figure 10. Turn Around, Don’t Drown- Depths of Water (NOAA)

- ✓ Listen to NOAA Weather Radio via the following smartphone applications for more information and alerts:
 - Android: play.google.com/store/apps/details?id=com.coudriet.weatherradio&hl=en
 - Apple: itunes.apple.com/us/app/noaa-weather-radio/id410148139?mt=8
- ✓ Be aware of streams, drainage channels, canyons, and other low-lying areas that can flood suddenly. **Remember: Flash floods can occur miles downstream/downslope from where rain is falling; they can appear in low-lying areas with or without typical warnings (e.g., clouds, rain).**
- ✓ Pay attention to local emergency response messaging and heed evacuation notifications. Local authorities may indicate it is safer for you and your family to shelter in place if flash flooding is not impacting your neighborhood. When local authorities indicate it is necessary to evacuate, leave your home immediately.
- ✓ Move yourself and your family to a safe evacuation location if you believe there is a possibility of flash flooding hitting your home or property.
- ✓ Go to the top floor, attic, or roof if water rises in your home before you evacuate.
- ✓ Wash your hands with soap and disinfected water if they come in contact with floodwaters.
- ✓ Turn off all utilities at the main switches or valves if instructed to do so. Disconnect electrical appliances, but do not touch electrical equipment if you are wet or standing in water.

Mudflows

The definition of a mudflow is in fact a little ‘muddy’ depending on the source. According to the National Flood Insurance Program (NFIP), a mudflow is defined as “a river of liquid and flowing mud on the surfaces of normally dry lands, as when earth is carried by a current of water. Other earth movements, such as landslide, slope failure, or a saturates soil mass moving by liquidity down a slope are not mudflows.” According to the Colorado Geological Survey, to be considered a mudflow more than half of the solids in the mass must be sand sized or smaller (Colorado Geologic Survey). It is important to be aware of these slight differences because insurance providers have their own definitions of what would be eligible for coverage.

Rockfall

Rockfall is a natural process where rock fragments on steep slopes fall, bounce, or roll downhill. After a fire, this process may become more frequent because wildfires can burn hot enough to crack rocks (making them less stable and more likely to fall) and destroy trees, stumps, logs, woody debris, and roots that normally hold loose rocks in place. Rockfalls can be especially hazardous to life and property along roads, trails, and steep slopes near residential, industrial, and farm buildings.

Avalanche Risk with Debris Loading

A large amount of debris from a fall may make an avalanche more likely or more dangerous. In addition, the debris after an avalanche could add additional fuel for a potential fire. For more information, visit the Colorado Avalanche Information Center at:

<https://www.avalanche.state.co.us/>.

Roadway Erosion

Increased runoff from rain in a burn area may cause sediment buildup on and erosion of roadways. Thick cones and piles of sediment can build up on roadways and in drainage ditches. The latter may clog culverts, block flows beneath bridges, and cause erosion of embankments supporting roads. In heavy storms, this may lead to partially or completely collapsed roadways. These hazards make traveling in burn areas or in areas downslope of burn areas especially dangerous at night.

Burned and Distressed Trees

It is also important for homeowners to check and monitor trees after a wildfire, because burned and distressed trees may fall at any time, with or without wind. Fallen trees may also get hung up in the branches of other trees and break away later. Remain alert and monitor the trees on your property.

Additionally, burned and downed trees can contribute to the litter that can be mobilized during a flood event and carried into area waterways around your home. Large tree pieces can block waterways and culverts, leading to waterway backups and breaching of roadways.

Planning Ahead

You don't have to start planning from scratch. In conjunction with this guide, other resources listed in this section are available that can aid your community in planning ahead and preparing for post-wildfire impacts before they happen.

Disaster Resilience Framework

A resiliency framework provides a community or a region with a path to address the shocks and stresses they face, empowering action to reduce vulnerability, improve adaptability, and build social capital in the face of hazards and changing conditions. The framework is not a standalone plan like a hazard mitigation plan or a comprehensive plan. Rather, a resiliency framework provides a collaborative forum to assess current risks, plans, and practices, and to build resiliency into policies, actions, and investments across multiple sectors. Most importantly, it provides an opportunity to engage deeply with the community during a 6-12 month process in order to establish a collaborative, long-term roadmap for action.

Benefits of Developing a Resiliency Framework

Developed by the Colorado Resiliency Office, the Colorado Resiliency Framework identifies strategies to strengthen and increase resiliency to hazards throughout Colorado, providing guiding principles and tools for community stakeholders. Developing a resiliency framework can provide a path to building a common understanding of what resiliency is, establishing a community's baseline existing conditions; analyzing shocks and stresses a community may face; and a vision for what a more-resilient community can look like, with goal and strategies to achieve this vision (Colorado Resiliency and Recovery Office, 2015).



For communities interested in developing a resiliency framework, resources including guidance, sample documents and materials can be found here: <https://www.coresiliency.com/developing-a-resiliency-framework#developing-a-resiliency-framework>.

Pre-Disaster Recovery Planning

Sadly, disasters are inevitable. While reducing their likelihood and impacts is important, communities must also prepare for recovery after a disaster. The ability of a community to successfully manage the recovery process begins with its efforts in pre-disaster preparedness, mitigation, and recovery capacity-building. These efforts result in resilient communities with an improved ability to withstand, respond to, and recover from disasters. Pre-disaster recovery planning promotes a process in which the whole community fully engages with and considers the needs and resources of all its members. The community will provide leadership in developing recovery priorities and activities that are realistic, well planned, and clearly communicated. FEMA has developed a Pre-Disaster Recovery Planning Guide for Local Governments, available here: <https://www.fema.gov/sites/default/files/2020-07/pre-disaster-recovery-planning-guide-local-governments.pdf>.

Enhanced State Hazard Mitigation Plan (E-SHMP)

On April 8, 2020, FEMA approved an Enhanced State Hazard Mitigation Plan (E-SHMP) for Colorado as adopted by the Governor for all state agencies to document a sustained, proven commitment to hazard mitigation. The plan acknowledges the coordinated efforts the state is currently taking to reduce losses, protect life and property, and create safer communities. Hazard mitigation helps to reduce or eliminate potential losses from future disasters.

Hazard mitigation planning helps to establish and maintain a process that leads to the implementation of hazard mitigation actions. The planning process began with the identification of a broad-reaching State Hazard Mitigation Team, which helped to guide the development of the State Plan. The next steps involved a detailed identification of all-natural, technological, and human-caused hazards that can impact Colorado and an assessment of the vulnerability, and ultimately the risk, presented by those hazards. The next stage included a thorough evaluation of the state's current mitigation capabilities, followed by an update to the state's mitigation strategy. This strategy identified eight overarching mitigation goals, and related mitigation objectives, that define Colorado's path forward to implementing hazard mitigation. The mitigation goals included:

1. Minimize the loss of life and personal injuries from all-hazard events;
2. Reduce losses and damages to state, tribal, and local governments, as well as special districts and private assets, and support similar local efforts;
3. Reduce Federal, state, tribal, local, and private costs of disaster response and recovery;
4. Support mitigation initiatives and policies that promote disaster resiliency, nature-based solutions, cultural resources and historic preservation, and climate adaptation strategies;
5. Minimize interruption of essential services and activities;
6. Incorporate equity considerations into all mitigation strategies;
7. Support improved coordination of risk mitigation between and among the public, private, and non-profit sectors; and
8. Create awareness and demand for mitigation as a standard of practice.

In addition to the state-wide E-SHMP, this guide will help you identify further steps you can personally take to plan ahead before a wildfire occurs, an extremely important step in emergency preparedness.

To see the full E-SHMP, visit:

<https://www.colorado.gov/pacific/mars/enhanced-state-hazard-mitigation-plan-e-shmp>.

Flood Insurance

Homeowners, renters, and business insurance typically does not cover flooding. Floods are the nation's most common and costly natural disaster and cause millions of dollars in damage every year (FEMA, 2017). Because post-wildfire floods are typically more extensive than before wildfires, individuals and businesses downslope and downstream of wildfires need to reassess their flood risk and re-evaluate the need to purchase flood insurance in order to provide financial protection to their property. Normally, flood insurance policies have a 30-day waiting period. The Biggert-Waters Reform Act in 2012, provided a possible exception to the 30-day waiting period after a wildfire has occurred. This exception is only for new flood insurance policies purchased within 60 days of the fire containment date, and it is determined that the property is affected by flooding on Federal land that is a result of, or is exacerbated by, post-wildfire conditions. FEMA will notify certified flood insurance adjusters who will monitor policy claims and determine whether the 30-day waiting period applies. To find maps of the floodplains in your area and their associated flood insurance rates, visit <https://msc.fema.gov/portal/home>.

To learn more about flood insurance, visit FEMA's webpage at <https://www.fema.gov/national-flood-insurance-program> or visit the Colorado Department of Regulatory Agencies at <https://www.colorado.gov/pacific/dora/flood-insurance>.

Key Planning Ahead Points to Keep in Mind

In addition to creating and adopting various preparedness plans and frameworks, and looking into insurance options, keep these key points and questions in mind for planning ahead:

- ✓ **Document, document, document.** Document your community with photographs in case you need to use images after a wildfire for insurance or other financial purposes. Consider taking photographs or making scans of important documents and securely saving copies or storing them online with a cloud-based service.
- ✓ **Plan for social recovery.** If a wildfire happened, it is important to plan for social recovery as well as providing for services and provisions such as shelter, food, supplies, medications, and counseling. Be informed of vulnerable populations – individuals with special or functional needs, persons with disabilities, and the elderly – in your community. Some local emergency management offices maintain registries of people with disabilities, which can be used for planning and/or emergency assistance. Has your community put together a registry?
- ✓ **Plan ahead for funding the recovery.** How will your community come up with matching funds for grants? Planning ahead for finances and for volunteers can help your community begin its recovery more quickly.
- ✓ **Address post-wildfire hazards.** If a wildfire occurs, how does the community address the threat of post-wildfire flooding and debris flows? After wildfires in Colorado and the western United States, flooding and debris flows pose significant threats to life and property.

- ✓ **Equipment readiness.** What equipment, materials, and training will the community use and need in order to respond quickly to post-wildfire threats? Sandbagging is a simple, effective way to prevent or reduce floodwater damage. Are sandbagging materials on-hand? Has adequate training been provided? What equipment is necessary to remove debris blockages in waterways?
- ✓ **Tabletop exercises and emergency action plans.** Help your community be prepared by practicing response and communication exercises prior to an event. Bringing all the involved agencies and community leaders together to walk through an emergency scenario step-by-step can improve response times and ensure all parties understand what their roles are.

USACE can support Silver Jackets teams by providing table top exercise support at a community or state level. In 2019, USACE-Sacramento District assisted several Nevada communities with one-day emergency action plan workshops that identified gaps in existing plans and contents that could be enhanced.

Mobilize Your Community Before & After a Wildfire

Wildfires that create wide-scale damage inherently necessitate a community-scale response for recovery. The local Emergency Manager official will work with Federal and state partners to handle the disaster response and immediate needs. However, mobilizing a team or group of teams within a community can serve as a crucial part of the recovery process. Successful recovery requires informed and coordinated leadership throughout all levels of government as well as neighborhood or community-level volunteers (Colorado Resiliency and Recovery Office , 2019).

Unlike wildfire suppression, post-fire response is not generally conducted by a unified Federal or state team. Instead, each agency and each level of government continue to act on their own authority. This creates an even greater need for coordination at the local level and the sharing of information among agencies to coordinate wildfire recovery efforts. Information that will need to be shared among agencies could include:

- Emergency shelter locations;
- Road closures and openings;
- Status of critical infrastructure;
- Burn severity maps;
- Flood and debris flow hazard assessments;
- Sources for Federal, state, and local assistance for individuals;
- Federal and state assistance to local governments;
- Flood insurance information;
- Weather forecasts; and
- Flood and debris flow warnings.

As a supplement to Federal, state, and local agency response, grassroots volunteers provide essential services to their fellow community members. Often, volunteer groups fulfill needs that government organizations may not be able to meet.

This section offers guidance for community leaders and provides information to help volunteers organize recovery efforts.

Initial Assessment

Before you begin, take inventory on what your community's needs are. First, ask yourself the following questions to determine which resources are available to you now and which you might have to acquire.

- Does your community have a local Hazard Mitigation Plan?

- Are paid staff available to help after a wildfire?
- Does your community have a Recovery Plan?
- Who has technical and engineering skills to assist with on-the-ground rehabilitation?
- Who has writing skills to prepare grant proposals and to submit documents required to apply for assistance? In order to receive financial reimbursement for a Federally declared disaster, good record keeping is essential.
- Who are the administrators that can handle grants and attend funding-related meetings?
- Who can assist with immediate needs such as shelter, food, medications, supplies, and emotional support?

Establish a Local Government Post-Fire Coordination Group

Each community is encouraged to establish its own version of a Post-Fire Coordination Group (PFCG) to lead and direct the response to any subsequent post-wildfire natural hazards and help determine post-fire mitigation options. The local emergency management office is well suited to take the lead on developing this group. The PFCG should be responsible for working directly with local, state or Federal agencies, emergency response officials, and others to help in a coordinated response. Primary functions of the PFCG might include:

- Coordinating the risk assessment and the exchange of pertinent information among agencies;
- Assembling and exchanging geospatial data;
- Supporting public communications;
- Matching risk with the agency best suited to mitigate the risk; and
- Coordinating with elected officials.

The structure and size of the PFCG will depend on the size and complexity of the fire, the number of agencies involved, and community size.

Establish a Community Post-Fire Coordinator

The Post-Fire Coordinator is appointed by the community to support a coordinated response to a wildfire and to facilitate the community's post-fire recovery. The role of the Post-Fire Coordinator is distinct from those of the Federal, state, and local authorities and agencies that participate in emergency response and post-fire community recovery efforts. However, the Post-Fire Coordinator is likely to work with many of these agencies during or after a fire.

While the Post-Wildfire Coordinator should handle many of the community coordination tasks, such as coordinating with the PFCG, local officials will be responsible for incident response and providing governance. This includes serving as the collective decision-making body of the

community; ensuring fiscal accountability and responsibilities are met; providing for public health and safety; and keeping community members informed.

The Post-Fire Coordinator does not need to be an elected official. They can be a community volunteer (e.g., a Neighborhood Watch Group lead, a member of a Firewise USA® community group or Community Emergency Response Team) or a resourceful and dedicated community member. An inspiring story on community leadership is provided at the following links where two sisters filled this role after a tornado hit their town in Massachusetts: <https://recovers.org/> or view their TED Talk at:

www.ted.com/talks/caitria_and_morgan_o_neill_how_to_step_up_in_the_face_of_disaster.

Skills and qualifications that an effective Post-Fire Coordinator would possess include:

- ✓ Managerial skills
- ✓ Internet and social media skills (the coordinator assists in communication with the public, among other tasks)
- ✓ Experience with government agencies, programs, and working across jurisdictions
- ✓ Knowledge about the community
- ✓ Availability to serve throughout a fire emergency response and recovery effort
- ✓ Ability to meet with others and attend various local meetings and gatherings
- ✓ Bilingual skills – though not required, they could be an asset under some circumstances

You may want to plan to have multiple coordinators to help share responsibilities. For example, different coordinators could work in different phases, such as a coordinator during the fire and another to coordinate the response after the fire (focusing on rebuilding, flooding, restoration, etc.). In other cases, depending on the geography, size, or scale of the community affected by a fire, multiple coordinators may be helpful to support post-fire response on a neighborhood or regional scale.

Volunteer Coordination

The amount of work to be done in the wake of a disaster can be daunting, and recovery often takes years of work. Volunteers are essential to helping your community recover from a wildfire. Below are some steps that can help you develop a strong and organized group of volunteers.

- ✓ **Identify a volunteer coordinator.** This should be a personable and organized individual with prior management experience. Your coordinator can take the lead in:



Figure 11. Colorado Community Emergency Response Team

- Handling volunteer requests
 - Handling volunteer offers and screening volunteers
 - Creating and maintaining the volunteer database
 - Tracking volunteers, services, and donations
 - Matching the right volunteer with the right project
 - Reviewing project proposals
 - Researching and obtaining funding and resources for projects
 - Recruiting volunteers through social media, press releases, and outreach opportunities
- ✓ **Assess resources.** In order to get the skill set you need to accomplish the tasks you've identified for your community, it is important to consider the following questions:
- What jobs need to be done that we do not have the resources for?
 - What tasks can be done by volunteers?
- ✓ **Recruit volunteers.** Typically, volunteers with the following skills will be needed:
- Patient, kind, knowledgeable people to answer telephones.
 - Well-organized and detail-oriented people to handle volunteer applications, enter information into computer databases, and make follow-up calls.
 - People willing to get dirty (cleanup, filling sandbags, raking, seeding, and related activities). When working with volunteers on physical jobs, safety is paramount. Ensure people are properly trained, and keep groups small (about seven people with each volunteer leader). The leader should be trained in the work being implemented and have clearly written instructions for accomplishing the task at hand. Keep instructions simple and clear for hands-on work.
 - People who can operate equipment and lift and place heavy erosion-control materials.
 - People with professional skills such as grant writing, accounting, legal skills, and media and outreach skills.
- ✓ **Motivate volunteers,** but keep them from going "overboard". Volunteers can injure themselves or experience overwhelming fatigue. Monitor volunteer well-being to avoid dangerous situations.
- ✓ **Have a plan for addressing liability and injury issues.** This includes the creation of a volunteer waiver and forms for release of liability. These forms can also include a volunteer work agreement to help ensure projects get completed.

- ✓ **Find tasks for people who want to help.** If possible, rather than turn away someone who wants to volunteer, try to find the right job for that person. Allowing community members to pitch in and help out not only provides needed labor, but can also promote community cohesion. To help match volunteers with needs, use online resources such as <https://recovers.org/communities?address>.
- ✓ **Maintain a volunteer database.** Developing a volunteer database is an important step. Each project and community will require different information, but at a minimum the database should include:
 - First name, last name (or name of organization and primary contact)
 - Address, city, county, state, zip code
 - Work phone and extension, home phone, mobile phone
 - Email address
 - Whether volunteer is an adult or minor
 - Skills/type of work volunteer is willing to perform and any relevant experience or expertise
 - Availability
- ✓ **Clearly define volunteer response roles.** Responsibility for the numerous tasks required for community wildfire response and post-wildfire recovery is divided among many entities. It is critical that volunteers know what their roles and responsibilities are. This will help ensure their safety and the safety of others.

Communication

Clear and efficient communication is a foundational pillar for building a successful response team and lead a community to take action (University of Colorado Boulder - Natural Hazards Center, 2020). The Natural Hazards Center at the University of Colorado Boulder developed a Principles of Risk Communication guide to help advance risk communication best practices, which utilizes academic research and available guidance on the topic of disasters and hazard risk communication. The three overarching principles and their underlying concepts identified in the guide are as follows:

1. **Communicate through familiar and trusted messengers.** If recipients are to be receptive and take risk communication seriously, then the information must come from a credible source. Risk communicators must be viewed as legitimate and trustworthy sources of information.
2. **Provide clear, actionable information.** Risk communicators should create messages that are designed and tested to ensure they are clear, consistent, and comprehensible. Messages should include actionable guidance so people know exactly how to appropriately respond.

3. **Tailor messages and information pathways for target audiences.** Know your audience.

A one-size fits all risk communication approach will be ineffective because communities are all different. Some populations will require variations in the way information is received.

Taking this information, below are some ideas on ways it can be applied.

- ✓ **Emergency notification:** Develop and maintain various emergency notification systems that allow authorized officials to alert residents and businesses of emergency situations and relay life-saving information through several different channels to reach different population types.
- ✓ **Communication of hazards that exist after a wildfire:** Convey post-wildfire hazards to the public through an identified credible point of contact. The Post-Fire Coordinator may be a great person to serve in this role.
- ✓ **Getting the word out:** Decide the best way to inform the broader community through outreach such as public meetings, phone calls, radio, TV, or social media. Be diverse in your approach to increase your success rate in reaching various population who may have varying resources. Include actionable steps to remove uncertainty on what actions should or shouldn't be taken.
- ✓ **Public meetings:** Group forums can be vital sources of information about programs and services available in the community after a wildfire. Determine the best ways to inform the public, whether that be by phone calls, radio, TV, signage boards, and/or social media.
- ✓ **Communication with multiple entities:** Determine how local officials, emergency response teams, stakeholders, and volunteers will interface and communicate with your community team based upon your needs assessment. Make sure they are aware of the risk communication principles to ensure successful communication across agencies and public.
- ✓ **Online tools:** Online resources such as <https://recovers.org/> can help you communicate with the public and match volunteers to needs. Make sure web sites are credible and actionable information is included for viewers to follow.
- ✓ **Work with educational institutions:** Check with labs and universities to see if they have emergency notifications systems that allow for alerts to residents and businesses.
- ✓ **Alert system sign-up:** Encourage residents to sign up for alert systems to receive early notifications on emergencies. See the sections Resources of Weather and Emergency Alerts and Mobile Apps for more information on how to do so.

Risk Reduction

Communities cannot entirely eliminate the risk of flooding or debris flows after a fire, but they can take steps that can reduce risk. Risk is a function of the probability of an event occurring and negative consequences created by the event.

Strategies to mitigate risk include measures to address both components of risk.

Reducing Probability: While nothing can control the weather, some measures can reduce the chances of an event on the ground. For instance, culverts can clog easily with debris, which can cause water to back up and overtop roadways, potentially eroding away the slope and suddenly releasing a large amount of water (Figure 12). Debris control structures can be installed upstream of culverts, or culverts can be replaced with larger structures to reduce the chances of this situation occurring. This type of mitigation addresses the probability component of risk.

Reducing Consequences: Measures that mitigate the consequence component of risk include creating warning systems to allow for evacuation prior to a flood or fire, thereby reducing loss of life or property. Purchasing flood insurance is another example of a measure that can be taken to reduce consequences of flooding. In both examples, the probability of a flood or a fire is not reduced, however the resulting consequences due to such an event can be limited or mitigated.

When all levels of government act, risk mitigation measures are more effective. Activities to respond to the post-fire threat are broken down into three categories:

1. **Independent State/Federal Government Actions:** Actions occur with limited community input.
2. **Direct State/Federal Government Assistance:** Support potentially available by community request.
3. **Community-Driven Activities:** Risk mitigation activities with a more limited state/Federal role.



Figure 12. Clogged Culverts Raise Flood Concern in Black Forest (KRDO News)

Independent State/Federal Government Actions

The actions in this category will occur regardless of how proactive local communities are in asking for support. The community can inform these actions, but they will usually occur with no formal request. Some examples include:

1. Federal declared disasters. Federally declared disasters are when a State or Tribal Chief submits a request to the President, through the appropriate FEMA Regional Administer, within 30 days of the incident. The request must be based on the finding that the situation is beyond the capability of the State or Tribal government, and Federal emergency assistance is necessary to save lives, protect property, or lessen the threat of the disaster.
2. Non-declared disaster. A non-declared disaster is when the State and local governments or Tribal government have the capability to provide disaster assistance and don't need to receive Federal emergency assistance. They are responsible for managing the recovery needs of the community.
3. Incident Management Team. State or Federal agencies typically lead the direct response and firefighting activities. This team dissolves once the immediate threat of the fire is over.
4. Burned Area Emergency Response (BAER). BAER teams identify and manage potential risks to resources on Federal National Forest lands and reduce these threats through appropriate emergency stabilization measures to protect human life and safety, property, and critical natural or cultural resources. More information about BAER teams is included in the Recovery Support Programs section of this document.
5. Targeted forecasting. Targeted forecasting of rainfall in a burned area begins while the fire is still ongoing. The NWS further refines the post-fire forecasts by reviewing values at risk and placing greater focus on watches and warnings near the burned area.

State/Federal Government Assistance

The community must request most assistance programs from Federal and state agencies.

Proactive communities ask for this support so that the burden of reducing risk is not borne entirely locally. Assistance is not always available, and different programs become available depending on the size of the fire and on what lands it occurs. For a summary of assistance programs with eligibility requirements and possible cost-sharing percentages, refer to the Recovery Support Programs section of this document.

Emergency declarations often open the door to larger state and Federal assistance. Local government provides initial response to the emergency or disaster. Neighboring communities and volunteer agencies supplement these efforts. If local governments are overwhelmed, the emergency management office requests that the county commissioners declare a state of emergency and request state assistance. Once the state exceeds the amount of assistance it can provide, the Governor may make a request to the President, who may issue "major disaster" or "emergency" declarations before or after catastrophes occur.

Emergency declarations trigger aid that protects property, public health and safety, and lessen or avert the threat of the incident becoming a catastrophic event. A major disaster declaration constitutes broader authority of Federal agencies to provide supplemental assistance to help state and local governments, families and individuals, and certain nonprofit organizations recover from the incident.

State and Federal assistance takes two general forms: direct services and financial grants. Direct services are those actions in which the agencies do the work themselves, with no transfer of funds to the community. Other assistance programs use a more grant-based approach that transfers financial resources to the community for it to manage. Grant funding is often uncertain: financial limitations, benefit-cost requirements, and competition sometimes prevent awards of grants. The table below gives some examples of direct services and financial grants—see the Recovery Support Programs section for further description of these types of services.

Direct Services	Financial Grants
Rapid-deployment rain gages (NWS)	Emergency Watershed Protection Program (NRCS)
Flood and debris flow risk assessments (USGS)	Hazard Mitigation Assistance Grant Program (FEMA)
Emergency permitting (USACE)	Environmental Quality Incentive Program (e.g., reseeded) (NRCS)

Community-Driven Activities

State and Federal assistance will not cover all the needs of a community. While state and Federal agencies support risk mitigation activities, many actions require a stronger local lead.

Local governments are better suited to lead many activities, since they know the area and population much better than state and Federal officials. Local governments should work with private landowners and soil and water conservation districts to accomplish these risk reduction measures. Some activities that the local community typically leads include:

1. **Risk communication to residents and landowners.** While state and Federal agencies may hold occasional public meetings and emphasize risks via their public information offices, trusted voices to residents are often the local government agencies. Residents and businesses in areas downstream of a wildfire should be aware of the hazards they face, the steps they can take to reduce their risk, and resources that may be available to assist them. Ensuring that the community is well-informed and prepared for risks will help the community be more resilient if a flood occurs. At a minimum, residents should be encouraged to sign up for emergency alert services (see Resources for Weather and Emergency Alerts).
2. **Flood insurance.** Local governments can encourage residents and business owners to purchase flood insurance policies. Refer to the Planning Ahead section for more information about flood insurance.
3. **Flood warning systems.** One option to reduce risk is to install a flood warning system with sirens or other warning cues. While the NWS may be able to assist in alert thresholds, it is up to the local government to operate the system. Refer to the Know your Fire and Flood Risk section to learn more about data sources which can help inform about your local fire and flood risk.

Recovery Support Programs

In cases of wide-scale need, the local Emergency Manager or other government representative will coordinate with government agencies, public safety officials, nonprofit organizations, and elected officials to secure public facilities (e.g., emergency shelters), identify government assistance for special-needs populations, and obtain emergency food and water supplies. In Colorado, the Office of Emergency Management, in coordination with other state departments, will facilitate logistical support for statewide emergency operations (i.e., provide supplies and equipment).



This section describes a selection of recovery programs and services provided by government and non-governmental organizations to individuals, families, businesses, and communities.

Note that programs and funding levels can change from year to year, and assistance may not always be available. You may also find additional assistance from community volunteers and local organizations that are not included here.

If an official disaster declaration was declared for your area, visit www.disasterassistance.gov/ to find information, support, services, and a means to access and apply for disaster assistance.

Social Services and Disaster Recovery Programs

A separate attachment to this document, Attachment 1, has been compiled to summarize various social service support programs which are available to those affected by disasters.

- For individual, family, or business assistance: See Section 1 of Attachment 1. Topics covered pertain to housing, food, social services, pets and livestock evacuation, farm rehabilitation, business recovery support, and non-governmental organizations.
- For Tribal resources: See Section 2 of Attachment 1.
- For community and state assistance: See Section 3 of Attachment 1. Topics covered include food, social services, religious organizations, and non-governmental organizations.

State of Colorado Recovery Programs

At a state-level, a number of programs and resources are available to aid communities as they begin the recovery process.

Colorado Water Conservation Board (CWCB)

The Colorado Water Conservation Board (CWCB) offers numerous loans and grants to water providers and other entities statewide for a variety of water-related projects, studies, planning documents, awareness campaigns, and other activities. For more information, visit <https://cwcb.colorado.gov/loans-grants>

CWCB – Water Project Loan Program

Provides low-interest loans for agricultural, municipal, and hydroelectric projects in Colorado.

CWCB – Grants

The CWCB offers numerous loans and grants to water providers and other entities statewide for a variety of water-related projects, studies, planning documents, awareness campaigns, and other activities. One such opportunity is the Flood and Drought Response Fund, which is not a formal grant program with established guidelines or timelines or applications. It is by design an as-needed program that responds to circumstances.

Federal Recovery and Technical Assistance Programs

The Federal government offers a number of programs and resources to aid communities in disaster recovery, several of which are described in this section.

United States Department of Agriculture (USDA)

USDA – USFS Burned Area Emergency Response (BAER)

The United States Forest Service (USFS) administers the BAER program, which identifies and manages potential risks to resources on National Forest System lands and reduces these threats through appropriate emergency measures to protect human life and safety, property, and critical natural or cultural resources. BAER is an emergency program for stabilization work to complete time-critical activities before the first damaging storm event. All fires with over 500 acres of national forest system lands are evaluated for the need of a BAER team assessment.

USDA – NRCS Emergency Watershed Protection (EWP) Program

The EWP program was created to reduce the threats to life and property posed by wildfire and other “sudden watershed impairments.” It is a Federal program administered by the USDA’s NRCS that provides technical and financial assistance to eligible sponsors for emergency measures that address potential damages associated with runoff, flooding and erosion hazard. Work is not limited to any one set of prescribed measures, but it must be environmentally and economically defensible. Common post-fire EWP projects in recent years have included clearing channels, installing debris and flood barriers and diversions, mulching bare soil, and protecting culverts.

- For NRCS contact information, visit:
www.nrcs.usda.gov/wps/portal/nrcs/detail/ca/contact/?cid=nrcs144p2_064190
- For information on the EWP Program, visit:
www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/landscape/ewpp/

USDA – NRCS Snowpack Monitoring

The USDA-NRCS Snow Survey Team can provide snowpack information to communities impacted by catastrophic wildfires. The information helps communities determine the potential for rain-on-snow events in burned areas that can lead to debris slides and flooding. Weekly snowpack reports for burned areas are produced and can be distributed to emergency management officials, landowners, and other partners.

USDA – NRCS Emergency Watershed Protection Program

Through the Emergency Watershed Protection (EWP) Program, the USDA-NRCS provides financial and technical assistance to communities responding to natural disasters, such as floods, wildfires, and debris flows. Activities covered under the program include but are not limited to: debris removal from stream channels, culverts, and bridges; streambank protection; channel and grade stabilization; vegetation establishment; and levee repair. Projects must reduce threats to life and property; be economically, environmentally, and socially sound; and must meet NRCS engineering standards and specifications.

NRCS can pay up to 75% of the cost for eligible emergency projects. Local project sponsors must provide the remaining 25% in cash or in-kind services.

USDA – NRCS Environmental Quality Incentives Program (EQIP)

EQIP is a voluntary program where financial and technical assistance is provided to agricultural producers to address natural resources concerns and deliver environmental benefits such as improved water and air quality, conserved ground and surface water, increased soil health, reduced soil erosion and sedimentation, improved habitat, and mitigation against drought and increasing weather changes. When agricultural producers implement best conservation practices, it can lead to cleaner air and water as well as improve soil health and wildlife habitat.

United States Army Corps of Engineers (USACE)

The USACE has a variety of different programs and authorities that can assist communities to prevent or recover from flooding or other water resource related concerns. Use the following information and map (Figure 13) to identify and contact the USACE district for your area to discuss potential assistance opportunities.

1. **Omaha District**
1616 Capitol Ave., Ste. 9000,
Omaha, NE 68102
Phone: (402) 995-2229
2. **Sacramento District**
1325 J St.,
Sacramento, CA 95814
Phone: (916) 557-5100
3. **Albuquerque District**
4101 Jefferson Plaza NE,
Albuquerque, NM 87109
Phone: (505) 342-3100
4. **Kansas City District**
601 E 12th St.,
Kansas City, MO 64106
Phone: (816) 389-2000

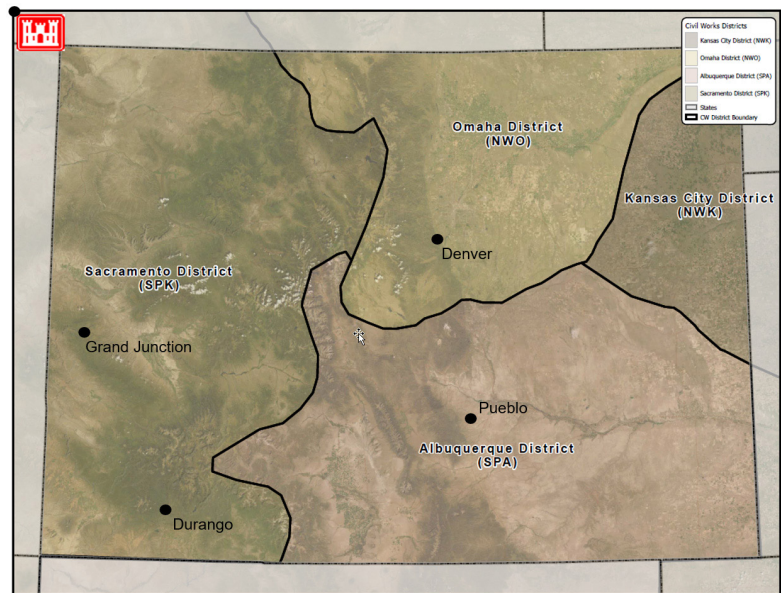


Figure 13. USACE District Boundaries in Colorado (USACE)

The following is a summary of some of the programs that could support your community.

USACE – Advance Measures

The Advanced Measures Program can provide emergency assistance to non-Federal governments, prior to flooding, to protect life and property. For this to occur, there must be an “imminent threat of unusual flooding from adverse conditions”. The assistance under this program, either technical or direct, is limited to the actions necessary to prevent or reduce impacts of floods that either pose a significant threat to life and/or improved property, and is beyond the capability of local interests and the State to perform in a timely manner. Technical assistance includes technical review, advice, and/or recommendations to non-Federal governments before an anticipated flood event. Direct assistance is provided in the form of supplies, equipment, and/or contracting for the construction of temporary and/or permanent flood control projects. This type is only available as part of an approved Advanced Measures project.

USACE – Silver Jackets

Silver Jackets are state-led interagency teams bringing together multiple Federal, state, and sometimes local and tribal agencies to learn from one another in reducing flood risk and emergency preparedness. Combining expertise from many agencies, the teams enhance their emergency preparedness, and response and recovery efforts when events do occur.

USACE – Continuing Authorities Program

This program is for relatively small projects dealing with floodplain management, flood control, ecosystem restoration, erosion control, and streambank protection. This program is broad, including activities such as streambank erosion protection and modifications to existing infrastructure. This program is funded annually by Congress and all projects implemented under the various authorities require a non-Federal cost sharing sponsor to coordinate with, contribute funds, and to own and maintain the final constructed project. For more information, visit: <https://www.spn.usace.army.mil/Missions/Projects-and-Programs/Continuing-Authorities-Program/>.

USACE – Emergency Flood Protection

USACE can provide emergency assistance during flood events. USACE emergency assistance is intended, by law, to be temporary in order to meet immediate threats. Through this program, USACE can provide technical assistance to state and local governments with regard to emergency preparedness and planning activities. Assistance is intended for developing contingency plans, evacuation plans, and exercises to help communities gain expertise in both areas. For more information, visit: www.usace.army.mil/Missions/Emergency-Operations/Floods.

USACE – Tribal Partnerships Program

This program provides authority for USACE to perform water-related planning activities and the study, design, and construction of water resources projects located on tribal lands for Federally recognized tribes. Work performed under this program can relate to flood risk management, water supply, erosion or sedimentation control, ecosystem restoration, watershed planning, cultural resources protection, and environmental resources management. For more information, visit: www.usace.army.mil/Missions/Civil-Works/Tribal-Nations.

USACE – Flood Plain Management Services Program

Through this program, USACE can provide a full range of technical services and planning guidance that is needed to support effective floodplain management. Types of studies that have been conducted under the program include: floodplain delineation/hazard, dam failure analyses, hurricane evacuation, flood warning, flood damage reduction, stormwater management, flood-proofing, and inventories of flood-prone structures. For more information, visit:

www.iwr.usace.army.mil/Missions/Flood-Risk-Management/Flood-Risk-Management-Program.

USACE – Planning Assistance to States

USACE can provide states, local governments, other non-Federal entities, and eligible Native American Indian Tribes assistance with preparing comprehensive plans for developing, utilizing, and conserving water and related land resources. Typical studies are only at the planning level; they do not include detailed designs for project construction. For more information, visit: www.nae.usace.army.mil/Missions/Public-Services/Planning-Assistance-to-States.

USACE – Emergency Permitting

USACE can approve special permitting procedures in emergencies. An “emergency” is a situation that would cause an unacceptable hazard to life, a significant loss of property, or an immediate, unforeseen, and significant economic hardship if corrective action requiring a permit is not undertaken within a period less than the normal time needed to process the application under standard procedures. The emergency work proposed under the permit should be the minimum to resolve the emergency. USACE may not view an action as an emergency if the applicant has known of the deficient condition and the need for work but has not attempted to secure permits and to conduct the work promptly.

Additional information about emergency permitting through USACE is included below in the USACE Emergency Permitting Post-Wildfire section.

Federal Emergency Management Agency (FEMA)**FEMA – Hazard Mitigation Grant Program (HMGP)**

The Colorado DHSEM – State Hazard Mitigation Officer administers the HMGP, which is designed to provide funding for communities to rebuild in a way that reduced, or mitigates, future disaster losses in their community. Grant funding is available following a major Presidential disaster declaration. Hazard mitigation includes long-term efforts to reduce the impact to people and property from natural hazards. Mitigation planning is a key process used to break the cycle of disaster damage, reconstruction, and repeated damage.

Under the HMGP cost share requirement, FEMA provides up to 75 percent of the total amount of eligible funds needed for mitigation projects. The remaining 25 percent local share can come from the state or local government, an individual, construction labor, Increased Cost of Compliance from a flood insurance policy, or Small Business Administration loans. Payment of Federal funds comes to the successful applicant as a reimbursement of costs submitted at least quarterly throughout the life of the project.

Under the HMGP, local governments are eligible sub-applicants and can sponsor applications on behalf of homeowners and business owners to submit to the applicant. Sub-applicants (i.e., local governments, private non-profits) submit mitigation planning and project sub-applications to their State during the open application cycle. After reviewing planning and project applications to determine if they meet the program’s requirements, the applicants (i.e., states, U.S. territories, or Federally recognized tribal governments) prioritize and forward the planning and project applications in an HMGP application to FEMA.

FEMA – Flood Mitigation Assistance (FMA)

FEMA makes Federal funds available through the FMA grant program to states, local communities, tribes, and territories (SLTTs) to reduce or eliminate the risk of repetitive flood damage to buildings and structures insured under the NFIP. The FMA grant program strengthens national preparedness and resilience and supports the mitigation mission area through FEMA’s strategic goal of building a culture of preparedness.

FMA provides funding to SLTTs for projects and flood planning that reduce or eliminate long-term risk of flood damage to structures insured under the NFIP. FMA funding is also available for management costs. Funding is appropriated by Congress annually.

FMA funding is distributed primarily for project scoping (previously Advanced Assistance) and community flood mitigation projects; remaining funds can address technical assistance, flood mitigation planning, and individual flood mitigation projects.

Federal funding is available for up to 75 percent of the eligible activity costs. However, FEMA may contribute the following Federal cost share for properties that are insured under the NFIP at the time of application and meet the following definitions:

- Severe Repetitive Loss Bi or Bii (up to 100 percent)
- Repetitive Loss (up to 90 percent)

Sub-applicants submit flood mitigation planning and project sub-applications to their state during the open application cycle. After reviewing project and planning applications to determine if they meet the program's requirements, the Colorado DHSEM or a Federally recognized tribal government prioritize and forward the FMA applications to their FEMA regional office.

Planning sub-applications submitted for consideration for FMA funding must only be used to support the flood hazard portion of State, tribal, or local mitigation plans to meet the requirements outlined in 44 CFR Part 201 Mitigation Planning.

Projects submitted for consideration for FMA funding must be consistent with the goals and objectives identified in the current, FEMA-approved state or tribal (standard or enhanced) hazard mitigation plan along with the local or tribal hazard mitigation plan for the jurisdiction in which the activity is located.

The FMA program is a highly competitive grant program. Funding is limited, and FEMA Headquarters must make difficult decisions as to the most effective use of grant funds. FEMA awards FMA funds to state, U.S. territory, and Federally recognized tribal applicants, who in turn provide sub-awards to local government sub-applicants.

Once FEMA reviews planning and project applications for eligibility and completeness, FEMA makes funding decisions based on the agency's priorities for the most effective use and availability of funds posted in the Notice of Funds Opportunity announcement on Grants.gov.

FEMA – Building Resilient Infrastructure and Communities (BRIC) – formerly Pre-Disaster Mitigation (PDM)

Federal FEMA makes Federal funds available through the new Building Resilient Infrastructures and Communities (BRIC) grant program to SLTTs for pre-disaster mitigation activities. BRIC is a new FEMA pre-disaster hazard mitigation program that replaces the PDM program. The Disaster Recovery Reform Act (DRRA), Section 1234, amended Section 203 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act) and authorizes BRIC. The new program supersedes the existing PDM grant program and aims to promote a national culture of preparedness through encouraging investments to protect communities and infrastructure and strengthening national mitigation capabilities to foster resilience. The BRIC priorities are to:

- Incentivize public infrastructure projects;
- Incentivize projects that mitigate risk to one or more lifelines;
- Incentivize projects that incorporate nature-based solutions; and
- Incentivize adoption and enforcement of modern building codes.

The BRIC Program is designed to assist SLTTs in implementing a sustained pre-disaster natural hazard mitigation program. Funding is intended to provide for mitigation projects, capability- and capacity-building activities, and management costs.

Guiding principles of the BRIC program are to (1) support SLTTs through capability- and capacity-building to enable them to identify mitigation actions and implement projects that reduce risks posed by natural hazards; (2) encourage and enable innovation while allowing flexibility, consistency, and effectiveness; (3) promote partnerships and enable high-impact investments to reduce risk from natural hazards with a focus on critical services and facilities, public infrastructure, public safety, public health, and communities; (4) provide a significant opportunity to reduce future losses and minimize impacts on the Disaster Relief Fund; and (5) support the adoption and enforcement of building codes, standards, and policies that will protect the health, safety, and general welfare of the public, take into account future conditions, and have long-lasting impacts on community risk reduction, including critical services and facilities and future disaster costs.

Mitigation goals reduce overall risk to the population and structures from future hazard events, while also reducing reliance on Federal funding in future disasters. This program awards planning and project grants and provides opportunities for raising public awareness about reducing future losses before disaster strikes. Mitigation planning is a key process used to break the cycle of disaster damage, reconstruction, and repeated damage.

BRIC grants are funded by DRRA legislation that allows FEMA to annually set aside 6 percent of estimated disaster expenses for each major disaster to fund a mitigation grant program to assist SLTTs and are awarded on a nationally competitive basis; however, there remains a state

set-aside amount allowed for certain project proposals. Projects submitted for consideration for BRIC funding must be consistent with the goals and objectives identified in the current, FEMA-approved state or tribal (standard or enhanced) hazard mitigation plan along with the local or tribal hazard mitigation plan for the jurisdiction in which the activity is located.

Local governments are eligible sub-applicants and can sponsor applications on behalf of homeowners to submit to the applicant. Sub-applicants (i.e., local governments) submit mitigation planning and project sub-applications to their State during the open application cycle. After reviewing planning and project applications to determine if they meet the program's requirements, the applicants (i.e., states, U.S. territories, or Federally recognized tribal governments) prioritize and forward the planning and project applications in a BRIC grant application to FEMA.

FEMA evaluates planning and project applications for eligibility and completeness according to established BRIC technical and qualitative criteria. A FEMA National Review Team determines final funding decisions based on the agency's priorities for the most effective use and availability of grant funds posted in the Notice of Funds Opportunity announcement on Grants.gov.

Similar to PDM, the BRIC program is a highly competitive grant program.

National Weather Service (NWS)

NWS – Rapid- Deployment Rain Gages

The Western Region of the NWS has a cache of rapid-deployment rain gages for rainfall monitoring in and around new burn scars. The rain gages are setup to transmit data via cellular networks or over satellite. Availability is limited, so the NWS expects entities to first explore other avenues for securing rain gages. After the fire is out and a needs-assessment is conducted, the NWS will help the land owner/manager make a case for procuring rain gages. One to two gages may be requested for a fire, although extenuating circumstances could allow for more.

NWS – Targeted Forecasting

Following a wildfire, the hydrologist at each office determines potential values at risk and then sets rainfall-rate thresholds for recent burn scars. Ideally, land-management agencies/communities responsible for the burned area assist with these forecasts. BAER reports or other assessments provide information to determine the severity of the impacts from the fire. Once these values at risk and thresholds are set, the NWS will set up their products for quickly issuing watches and warnings.

Watches and warnings are broadcasted on NOAA All Hazards Radio (Weather Radio) and, in special cases such as a Flash Flood Warning, NWS activates the Emergency Alert System (EAS) and a Wireless Emergency Alert (WEA). The EAS transmits the warning over TV and radio, notifying emergency services. WEA pings cell towers in and around the warning area. Any cellular user within range of these cell towers will receive the warning information.

The NWS pays special attention to weather affecting a fire due to safety concerns during the suppression efforts. Targeted forecasting begins while the fire is still burning. Once the fire is out, more will be learned about which areas of the burn scar need special attention, and specific criteria will be created and rainfall thresholds will be set and refined.

Targeted forecasting by the local weather office will continue until the burn scar is deemed to no longer be a threat. That decision will be made through discussion between the landowner/manager, emergency management officials, and the NWS.

United States Geological Survey

USGS – Early Flood-Warning Gages

USGS early flood-warning gages are designed to deploy quickly and temporarily to measure and transmit real-time hydrologic data in burned areas that may include: stream stage, stream surface velocity, precipitation, and soil moisture. That data can be used by emergency managers, weather forecasters, environmental scientists, natural resource managers, and the public to inform them of imminent or on-going hydrologic hazards. Early flood-warning gages are distinct from traditional USGS gages because they:

- Are portable and straightforward to install in remote terrain;
- Use multiple lines of evidence, including both precipitation and streamflow information, to confirm that a hazardous event is occurring;
- Use multiple sensors to maintain continuity in monitoring if one sensor is damaged;
- Use multiple forms of communication (satellite and cellular) for redundancy and to ensure essential data is transmitted during hydrologic events;
- Transmit data in real-time (every 1-minute) during conditions that may generate a hazardous hydrologic event and during an actual flood or debris-flow; and
- May use instrumentation, such as stage and velocity radars, installed above the stream channel to avoid damage due to flowing water and debris.

Cameras and other equipment can be added for rapid response monitoring. Anyone can self-enroll in USGS WaterAlert (<https://maps.waterdata.usgs.gov/mapper/wateralert/>) to receive text message or e-mail alerts from early-warning gages when streamflow or precipitation exceed user-defined thresholds.

USGS – Debris Flow Modeling

Post-fire debris-flow hazard assessments for recently burned areas in the western United States are provided free to any interested Federal, state, or local agency, or to any private organization, company or individual. These assessments rely upon field-validated estimates of soil burn severity in a geospatial format.

For more information on post-fire debris flow hazard assessments, or any questions you may have in regard to such matters, visit: https://landslides.usgs.gov/hazards/postfire_debrisflow/. Response time is dependent upon the current assessment workload. You may also call 1-888-ASK-USGS (8747).

USGS – Soil and Water Conservation Districts

Your local Soil and Water Conservation District (SWCD) may be able to provide help after a wildfire or natural disaster. For a listing of your SWCDs, visit: <https://www.colorado.gov/pacific/agconservation/conservationboard>.

Federal Transit Administration Emergency Relief Program

The program helps state and public transportation systems pay for protecting, repairing, or replacing equipment and facilities that may suffer or have suffered serious damage as a result of an emergency, including natural disasters such as floods, hurricanes, and tornadoes. The program can fund capital projects to protect, repair, or replace facilities or equipment that are in danger of suffering serious damage or have suffered serious damage as a result of an emergency. The program can also fund the operating costs of evacuation, rescues, and temporary public transportation service; or reestablishing, expanding, or relocating service before, during, or after an emergency. For more information, visit: www.transit.dot.gov/funding/grant-programs/emergency-relief-program/emergency-relief-program.

Department of Interior Agencies - Emergency Stabilization and Rehabilitation

(National Park Service, Bureau of Land Management, US Fish and Wildlife Service, Bureau of Indian Affairs)

The primary purpose of the Department of Interior's (DOI) Post-Wildfire Recovery Program is to reduce the risk of resource damage and restore landscapes affected by wildfire and to promote long-term restoration and recovery objectives. The Post-Wildfire Recovery Program is comprised of two parts: Emergency Stabilization (ES) and Burned Area Rehabilitation (BAR). It is the counterpart to the US Forest Service BAER program, which only applies to US Forest Service lands.

The principal purposes of the ES program are to prevent further degradation of natural and cultural resources and to protect life, property, and other values. ES activities reduce the risk of resource damage caused by floods, debris flows, erosion, or other fire-caused events. The ES program assesses and treats landscapes threatened from post-fire floods or other degradation. Funds are available for no more than one year plus 21 days after the ignition date of a wildfire, with an additional year available under special circumstances.

The BAR program's goals are to protect resources by repairing or improving landscapes unlikely to recover naturally to agency-approved conditions within an acceptable timeframe and to repair or replace minor assets. BAR program funding is intended to begin longer-term actions to repair damages caused by wildfire if natural recovery is unlikely to occur within an acceptable timeframe considering management objectives and to encourage the protection, conservation, and restoration of fire-impacted lands and resources consistent with land and resource management plan objectives. BAR funds are available for no longer than five years plus 21 days after fire ignition, with funding priorities based on agency-identified criteria. All BAR treatments must show a link to long-term recovery and restoration. This funding is available only for DOI-administered lands.

USACE Emergency Permitting Post-Wildfire

Following a wildfire, USACE can issue a Regional General Permit (RGP) 96, which can assist with certain natural disaster mitigation and flood-related activities in Colorado. This permit authorizes the discharge of dredged or fill material into all jurisdictional waters of the U.S. within Colorado, including, but not limited to, rivers, creeks, lakes, ponds, reservoirs, and wetlands. It can apply to localized or widespread events and includes, but is not limited to, the following activities:

- Repair and reconstruction of existing roads;
- Repair and construction of temporary levees;
- Protection and repair of bridge embankments;
- Protection and repair of utility structures;
- Stabilization and protection of stream banks;
- Protection and restoration of intake structures;
- Construction of debris catchment facilities; and
- Restoration/cleanup of mud/rockslides.

In order to qualify for RGP 96, first review the general conditions listed at <https://www.spa.usace.army.mil/Missions/Regulatory-Program-and-Permits/RGP/> to ensure you are in compliance. If you comply with the general conditions, you may apply for a PGN 96 permit by submitting a pre-construction notification to the USACE District Engineer in either the Albuquerque, Omaha, or Sacramento districts dependent upon proposed project location. For assistance in determining the appropriate regulatory office, reference Figure 12 or visit the website:

<https://www.nwo.usace.army.mil/Missions/Regulatory-Program/Colorado/>.

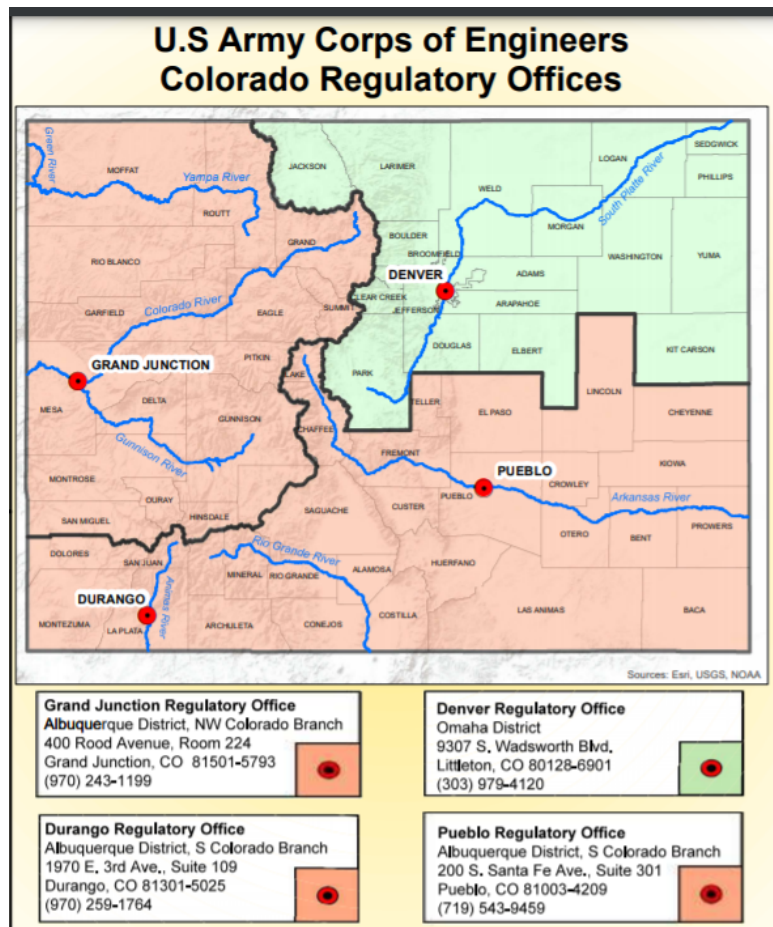


Figure 14. USACE Regulatory Office Locations throughout Colorado (USACE)

Attachment One – Social Services and Disaster Recovery Programs

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Section 1: For Individuals, Families, and Businesses

Personal and Social Services

Housing

Federal Emergency Management Agency (FEMA)

The first step toward getting housing assistance – after calling your insurance company – is to register with FEMA. Go online to www.disasterassistance.gov/ or call the FEMA helpline at 800-621-3362, (TTY) 800-462-7585. Once you have registered, FEMA will arrange for an inspector to examine your home. (Note that if you receive an SBA loan application, completing it is an important step in finding out what aid may be available to you.)



Individuals and Household Program

In a Federally Declared Disaster, FEMA's Individuals and Households Program for housing assistance provides money, up to the program maximum, for necessary housing-related expenses and serious needs that can't be met through other means.

Housing assistance under the program includes:

- Temporary housing
- Repair or replacement of existing home
- Semi-permanent or permanent housing construction

For questions or to apply by phone, call 1-800-621-FEMA (3362) or visit: www.fema.gov/media-library/assets/documents/24945.

Federal Housing Administration (FHA)

Homeowners with FHA loans may qualify for relief if a presidentially declared disaster has affected their ability to make mortgage payments. Let your lender know that you are an affected borrower. More information can also be found at:

- FHA and Housing: www.hud.gov/program_offices/housing
- Disaster Relief: https://www.hud.gov/program_offices/housing/sfh/nsc/qaho0121

U.S. Department of Housing and Urban Development (HUD)

In the past, HUD has provided Federal disaster assistance programs for Colorado homeowners and low-income renters forced to leave their homes due to ongoing wildfires. They have offered state and local governments Federally guaranteed loans for housing rehabilitation, economic development, and repair of infrastructure.

For more information, visit:

https://www.hud.gov/program_offices/housing/sfh/nsc/qaho0121.

Food***Colorado Department of Education***

School Food Authorities (SFA) and other child nutrition program sponsors are able to provide free meals to children in the event of an unanticipated school closure, extreme weather event, natural disaster, or other similar situation. The Colorado Department of Education has encouraged SFA and sponsors to have an Emergency Readiness Plan put into place to provide quick response if a situation would occur.

For more information on school districts and sponsors, and various resources, visit: <https://www.cde.state.co.us/nutrition/nutriemergencyfeeding>.

United States Department of Agriculture (USDA)

The Disaster Supplemental Nutrition Assistance Program (D-SNAP) may help you replace food lost in a disaster or help you apply for D-SNAP benefits online. An expedited D-SNAP program for disasters exists to provide benefits within seven days. For more information, call 1-800-283-4465 or visit: www.fns.usda.gov/snap/d-snap-resources-state-agencies-and-partners.

Care and Share Food Bank for Southern Colorado – The Emergency Food Assistance Program (TEFAP)

TEFAP is a Federal program that provides people living on low income with extra food each month.

To determine if you qualify and learn more on the program, visit: <https://careandshare.org/programs/the-emergency-food-assistance-program/>.

Colorado Department of Human Services (CDHS)- Food Distribution Programs (FDP)

The FDP provides U.S. Department of Agriculture (USDA) foods to households, food banks, schools, and childcare facilities throughout Colorado. CDHS has authority to release foods to disaster relief agencies for mass feeding when the president issues a disaster declaration and in other types of emergencies.

To learn more about the program and alerts, visit: <https://www.colorado.gov/pacific/cdhs/disaster-feeding-and-commodity-alerts>.

Social Services

FEMA Disaster Unemployment Assistance (DUA)

The purpose of FEMA's DUA is to provide unemployment benefits and re-employment services to individuals who have become unemployed as a result of a major disaster and who are not eligible for regular state unemployment insurance.

For additional information, visit:

- DUA Fact Sheet: www.fema.gov/media-library/assets/documents/24418
- DUA Program Information: www.benefits.gov/benefits/benefit-details/597

U.S. Administration for Children and Families

For fact sheets, guides, activities for young children, and tools that can help families prepare for, respond to, and recover from disasters, visit: www.acf.hhs.gov/ohsepr/children-and-families.

Physical Recovery

USDA Farm Service Agency (FSA)

The Emergency Conservation Program

Provides emergency funding and technical assistance to farmers and ranchers to rehabilitate farmland damaged by natural disasters. Find your FSA office at:

<https://offices.sc.egov.usda.gov/locator/app>.

Assistance with Natural Disaster Losses

Provides assistance to agricultural producers for natural disaster losses resulting from drought, flood, fire, freeze, tornadoes, pest infestation, and other disasters.

Emergency Loan Program

Provides loans to help producers who suffer qualifying farm-related losses directly caused by the disaster in a county declared or designated as a primary disaster or quarantine area. Also, farmers located in counties that are adjacent to the declared, designated, or quarantined area may qualify for emergency loans.

For additional information, visit:

www.fsa.usda.gov/programs-and-services/disaster-assistance-program/index.

USDA Rural Development Disaster Assistance

This program provides a variety of loan assistance for individuals and businesses in rural areas that experience a Federally Declared Disaster, including housing and noninsured crop losses.

- For information on various USDA Programs, visit: www.usda.gov/sites/default/files/documents/fact-sheet-usda-programs-assist-individuals-small-businesses_1.pdf.
- To locate your local USDA Service Center, visit: www.fsa.usda.gov/state-offices/index.

NRCS General Environmental Quality Incentives Program (EQIP) Financial Assistance

Where the effects of wildfire have impacted soil, water, or other natural resources but do not pose an imminent threat to life or property, landowners may be eligible for technical and financial assistance through the EQIP.

For more information about EQIP, visit:

www.nrcs.usda.gov/wps/portal/nrcs/main/ca/programs/financial/eqip/.

Pet and Livestock Evacuation***ReadyColorado***

ReadyColorado has developed a 2-page document compiling a number of helpful tips and available resources to help pet and livestock owners keep animals safe during a disaster. To view this guide, visit:

<http://hermes.cde.state.co.us/drupal/islandora/object/co:27564/datastream/OBJ/view>.

American Society for the Prevention of Cruelty to Animals

Offers temporary sheltering assistance and funding to qualified animal welfare organizations and government agencies whose communities suffer the impact of natural and other disasters. Contact local animal shelters for additional information.

Business Recovery Support***Colorado Small Business Development Center Network (CSBD)***

The CSBD provides assistance to businesses affected by recent disasters throughout Colorado. They work with the U.S. Small Business Administration, among other partners and consultants, to provide assistance with disaster loan applications, long term planning, insurance navigation, physical and economic loss estimations, and business preparedness.

For more information, visit: <https://www.coloradosbdc.org/>.

Small Business Administration (SBA)**Home and Personal Property Loans**

If you are in a Federally Declared Disaster area and are the victim of a disaster, you may be eligible for financial assistance from the SBA, even if you do not own a business.

Economic Injury Disaster Loans

If you are in a Federally Declared Disaster area and have suffered economic injury, regardless of physical damage, you may qualify for an Economic Injury Disaster Loan.

Business Physical Disaster Loans

Any business or organization located in a Federally Declared Disaster area and that was damaged during the disaster may apply for a loan to help replace or restore damaged property.

For additional information, visit:

- SBA: www.sba.gov/
- Disaster Preparedness and Recovery Plan: www.sba.gov/document/support--disaster-preparedness-recovery-plan
- Disaster Preparedness and Recovery Plan PDF: www.sba.gov/sites/default/files/2018-07/2018-disaster-preparedness-and-recovery-plan.pdf
- Disaster Loan Liquidation Policy and Procedures: www.sba.gov/document/policy-notice-5000-1186-disaster-loan-liquidation-policy-and-procedures

Non-Governmental Organizations***The American Red Cross***

The American Red Cross responds to disasters 365 days a year and can help assist impacted individuals with their immediate emergency needs. Go to www.redcross.org/ and click on "Get Help," or call 1-800-RED-CROSS (1-800-733-2767).

The Salvation Army

The Salvation Army may provide temporary assistance for families in need, including vouchers for rent, emergency aid, and legal aid. For information on services provided by the Salvation Army, visit: www.salvationarmy.org/.

Section 2: Tribal Resources

Administration for Native Americans (ANA)

The ANA occasionally provides funding to help Native American communities recover from natural disasters. If you are an ANA grantee affected by a disaster, please contact your program specialist as soon as possible. If you are not a grantee, please contact ANA at the toll-free Help Desk number at 877-922-9262.

Indian Health Service (IHS)

The IHS may fund repairs and reconstruction of homes on reservation lands in coordination with tribal authorities. IHS may use their interagency agreements to fund cleanup costs and work with area leaders to assess further needs of impacted communities.

Section 3: For Community & State Assistance

Food

Feeding America

Feeding America is the nation's largest domestic hunger-relief organization, delivering food to communities impacted by tornadoes, storms, hurricanes, flooding, and wildfire. For more information, visit: www.feedingamerica.org/.

Colorado Department of Human Services (CDHS)- Food Distribution Programs (FDP)

The FDP provides USDA foods to households, food banks, schools, and childcare facilities throughout Colorado. CDHS has authority to release foods to disaster relief agencies for mass feeding when the President issues a Federal Disaster Declaration and other types of emergencies.

To learn more about the program and alerts, visit:

<https://www.colorado.gov/pacific/cdhs/disaster-feeding-and-commodity-alerts>.

Social Services

Federal Emergency Management Agency

The Crisis Counseling Program

Surviving a wildfire can be a highly stressful, traumatic experience for many. The Crisis Counseling Program assists individuals and communities in recovering from the effects of natural and human-caused disasters through community-based outreach, psychological counseling, and educational services. Supplemental funding for crisis counseling is available to state mental health authorities through two grant mechanisms:

The Immediate Services Program

Provides funds for up to 60 days of services immediately following a disaster declaration.

The Regular Services Program

Provides funds for up to nine months following a disaster declaration. More information about these programs can be found at: www.fema.gov/recovery-directorate/crisis-counseling-assistance-training-program.

Religious Organizations

Religious organizations can be important and valuable resources for individuals and communities that have been impacted by natural disasters. They can provide a variety of services, including emotional and spiritual support, coordinating volunteers through local affiliates, and providing long-term recovery efforts by addressing unmet needs months or even years after a disaster strikes. Contact your local congregation for additional information.

United Methodist Committee on Relief (UMCOR)

The UMCOR is a nonprofit organization that provides humanitarian relief and disaster response to communities in the United States and worldwide. When responding to a disaster in the United States, UMCOR provides training for teams of volunteers, financial assistance to the affected communities, expertise in disaster response, and networking with non-governmental organizations, experts, local government, and other organizations that can help communities recover from disaster. For more information, visit:

www.umcor.org/UMCOR/Programs/Disaster-Response/Disaster-Response.

Colorado Baptist Disaster Relief

The Colorado Baptist Relief meets the immediate needs of communities affected by disasters through debris removal, hot meals, laundry services, and more. To learn more about receiving community assistance or to volunteer with recovery activity, visit:

<http://coloradodr.org/contact-us-2/>.

Lutheran Disaster Response

Lutheran Disaster Response collaborates with other disaster response organizations and religious entities in the United States. Some key areas of work include: providing emotional and spiritual support, coordinating volunteers through local affiliates, and providing long-term recovery efforts by addressing unmet needs months or even years after a disaster strikes. For more information, visit:

www.elca.org/Our-Work/Relief-and-Development/Lutheran-Disaster-Response.

Non-Governmental Organizations***Coalition for the Upper South Platte (CUSP)***

CUSP is working to protect the water quality and ecological health of the Upper South Platte Watershed. They recognize the connections between wildfires, floods, and watershed impacts and, while proactively working with communities beforehand to improve forest conditions, they also take part in wildfire recovery. Following a wildfire, CUSP works across jurisdictional boundaries with government agencies, private landowners, other nonprofits, and local communities to quickly prepare for flooding and implement emergency stabilization projects to mitigate post-fire flooding, protect lives and property, and jump-start the healing process for the landscape.

For more information, visit: <https://cusp.ws/flood-mitigation/>.

Coalitions and Collaboratives, Inc. (COCO)- Cohesive Strategy Program

COCO was created in response to the overwhelming support CUSP received both locally and nationally, and utilizes the expertise and knowledge gained from the CUSP programs. COCO aims to identify funding opportunities and provide resources to organizations to assist with hiring local specialists and facilitate the growth of mitigation programs in high-risk areas throughout Colorado. The organization has been a key player in developing a mitigation best practices toolbox that provides a variety of resources to aid in preparedness and risk reduction.

For more information, visit: <https://co-co.org/mitigation-best-practices-toolbox/>.














Fire Adapted Colorado (FACO)

FACO serves as a collective voice and representative organization that provides educational and networking opportunities for communities, groups, and individual stakeholders focused on reducing the negative impacts of wildfires throughout Colorado. They serve as a statewide platform for wildfire related information sharing and discussion to create safer and more resilient communities living in wildfire-prone areas.

For more information, visit: <https://fireadaptedco.org/>.

Attachment Two – Colorado Programs

Assistance Program Inventory

Program Name	Agency	Ownership			Type of Assistance	Matching Funds Required	Emergency or Disaster Declaration Required	Time to Receive Assistance	Must be requested from local government?	Guide Page Number
		Private	State	Federal	Tribal					
Burned Area Emergency Response	 USFS			✓		Direct	None	Medium	✗ No	#36
Emergency Stabilization and Rehabilitation	 DOI			✓	✓	Direct	None	Medium	✗ No	#45
Advance Measures	 USACE		✓	✓	✓	Direct	None	Fast	✓ Yes	#38
Rapid Deployment Rain Gages	 NWS		✓	✓	✓	Direct	None	Fast	✗ No	#43
Early Flood-Warning Gages	 USGS	✓	✓	✓	✓	Direct	None	Fast	✗ No	#44
Targeted Forecasting	 NWS		✓	✓	✓	Direct	None	Medium	✗ No	#43
Snowpack Monitoring	 NRCS		✓	✓	✓	Direct	None	Medium	✗ No	#37
Emergency Watershed Protection Program	 NRCS	✓			✓	Funding	25% of Cost	Fast/Medium	✗ No	#37
Emergency Permitting	 FEMA	✓	✓	✓		Direct	Permit Fee (\$100)	Fast	✗ No	#40
Debris Flow Modeling	 USGS	✓	✓	✓	✓	Direct	None	Fast	✗ No	#44
Hazard Mitigation Grant Program (HMGP)	 FEMA		✓	✓	✓	Funding	25% of Cost	Medium	✓ Yes	#40
Flood Mitigation Assistance	 FEMA		✓	✓	✓	Funding	0 - 25% of Cost	Slow	✗ No	#40
Building Resilient Infrastructure & Communities	 FEMA		✓	✓	✓	Funding	25% of Cost	Slow	✗ No	#42

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