2013 Colorado Flood Recovery: Three Years of Progress

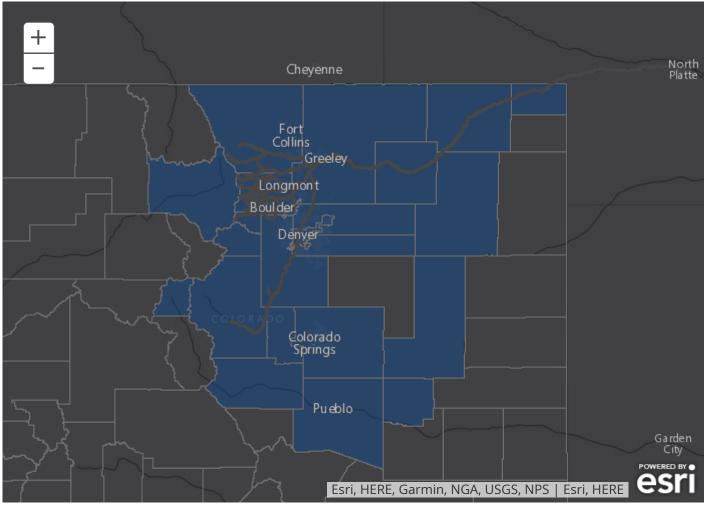
This is a printed version of a story map. Dynamic content such as videos and interactive maps is only available in the online version at <u>http://arcg.is/2gd4DVs</u>





Photo above: Debris Cleanup - CRRO Photo to the Left: State Highway 7, South St. Vrain; Photo source: CDOT

2013 Historic Flood Event

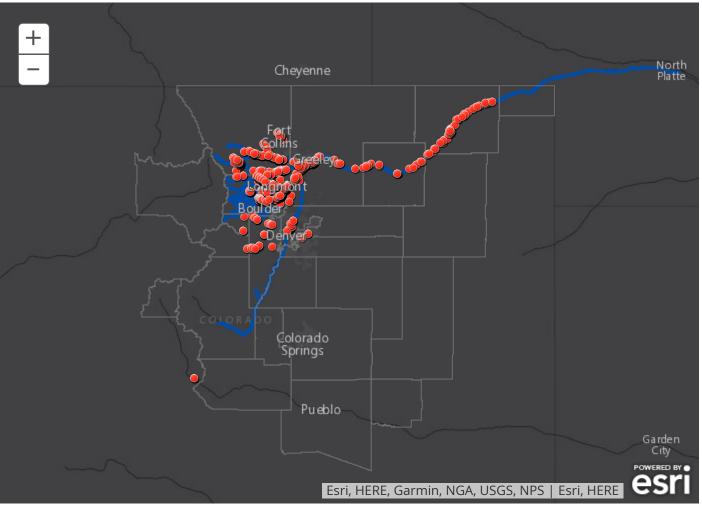


After the rain began to fall on September 11, 2013, the sheer scope of Colorado's worst natural disaster was staggering. In the span of 3 days, unprecedented levels of rain fell on 24 counties and sent high-velocity floodwater coursing through narrow mountain canyons and onto the plains below. More than 18,000 people were forced to evacuate their communities, many by Chinook helicopters flown by the Colorado National Guard. The immediate, coordinated hands-on action from emergency responders, military personnel and numerous agencies was tremendous and heroic. The floodwaters ripped apart homes, lives and communities. The President declared a major disaster making Federal Emergency Management Agency Public Assistance and Individual Assistance available to support response and recovery.



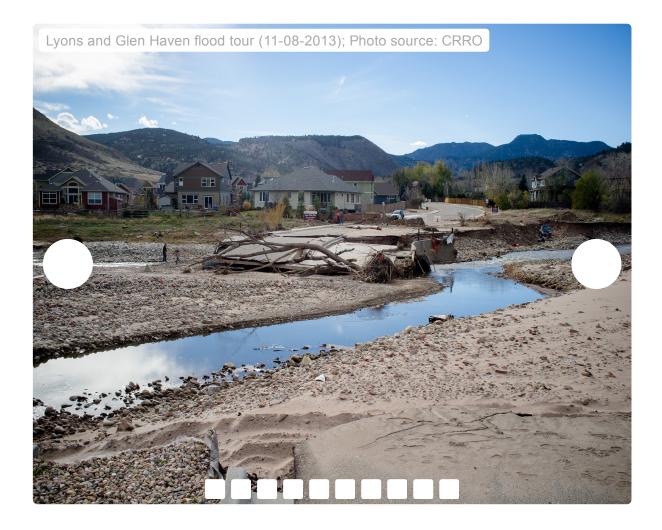
US 34 East of Greeley - CDOT

The Floodwaters



- Took 10 lives;
- Impacted 28,000 households;
- Destroyed 1,800 homes;
- Inflicted \$3.9 billion in damage to homes, businesses, infrastructure and watersheds;
- Carved new river channels; and
- Changed thousands of lives forever.

Click here to see heat map (link available only in online story)



The Colorado Spirit



Coloradans are connected to one another. They roll up their sleeves and get to work. The real story of the Flood of 2013 is that Coloradans are resilient. Neighbors helped neighbors. Volunteers reached out to help impacted communities. Communities pulled together to begin the long, difficult challenge of rebuilding better, stronger, and more resilient. Three years later, much progress has been made. Across the flood impacted areas, local governments, non-profits, the private sector, federal partners and the State have worked together to rebuild homes and infrastructure, to restore watersheds and to reduce risk to the next disaster.

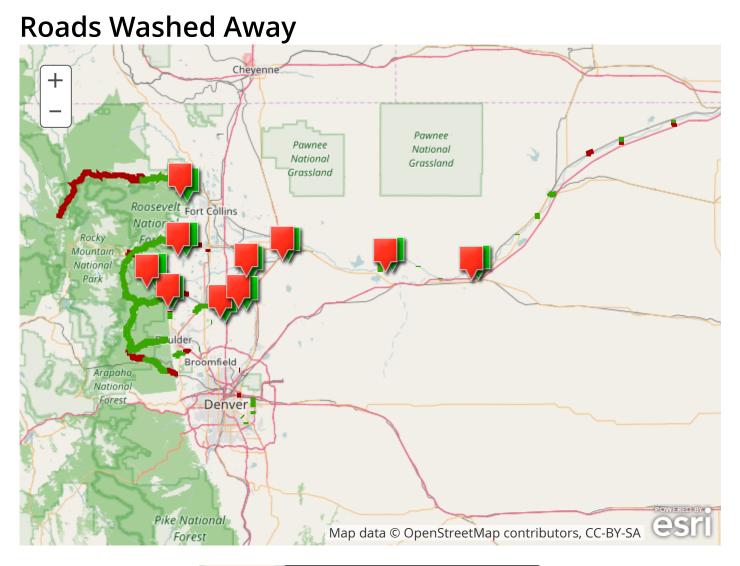
There is still more to do.

Together, Colorado remembers the toll the floods took. Together, Colorado celebrates progress that has been made to date. And together, Colorado will maintain a sense of urgency until the recovery is complete and Colorado is more resilient.

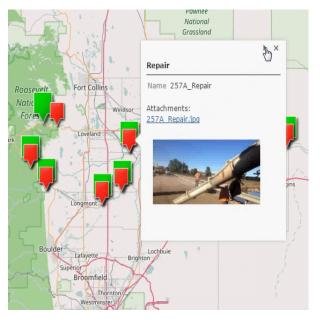
While searching through flood debris, Athena Ross, second from left, smiles after finding a box containing her birth certificate. Church volunteer Linda Pekarek, right, claps her hands, in Longmont, Colo. Sept. 18, 2013. Also pictured helping:(left to right) Katie Byrne, Elizabeth and Jonathan Dipert, and Andre Whitehair. (AP Photo/Brennan Linsley)



Photo to left: Brian Montgomery helps his mother Barbara Yanari to clean up the mud in her flooded basement on Saturday, Sept. 14, on Olde Stage Road in Boulder, Colo. Rescuers rushed by land and by air Saturday to evacuate Coloradoans stranded by epic mountain flooding as debris-filled rivers became muddy seas that extended into towns and farms miles from the Rockies. Four people have been confirmed dead since the harrowing floods began Wednesday. And hundreds of others have not been heard from in the flood zone, which has grown to cover an area covering nearly 4,500 square miles (11,655 square kilometers), nearly the size of the U.S. state of Connecticut. (AP Photo/Daily Camera, Jeremy Papasso)







See me in action!

The extreme rainfall in the mountainous areas quickly flooded canyons and destroyed roads through many of the canyons descending out of the Front Range.





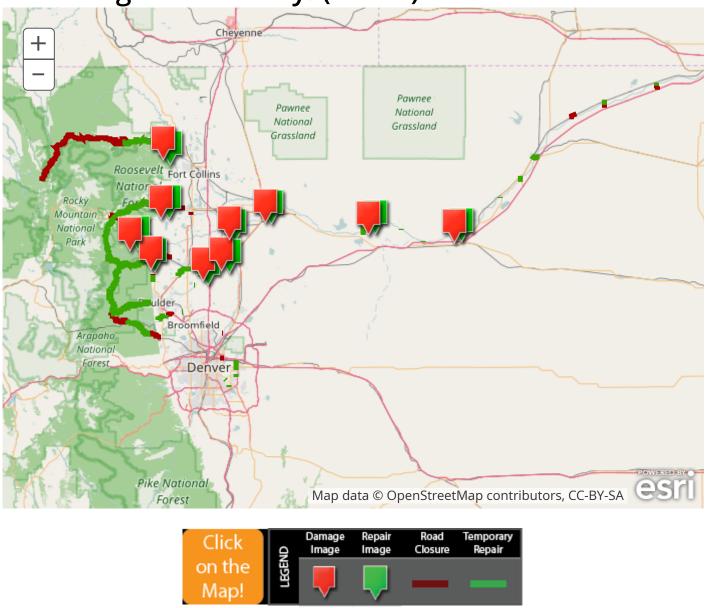
US 34 - Big Thompson Canyon - We Are Ok - CDOT

The 2013 floods washed away federal, state and local roads as well as private infrastructure throughout the flood impacted areas:

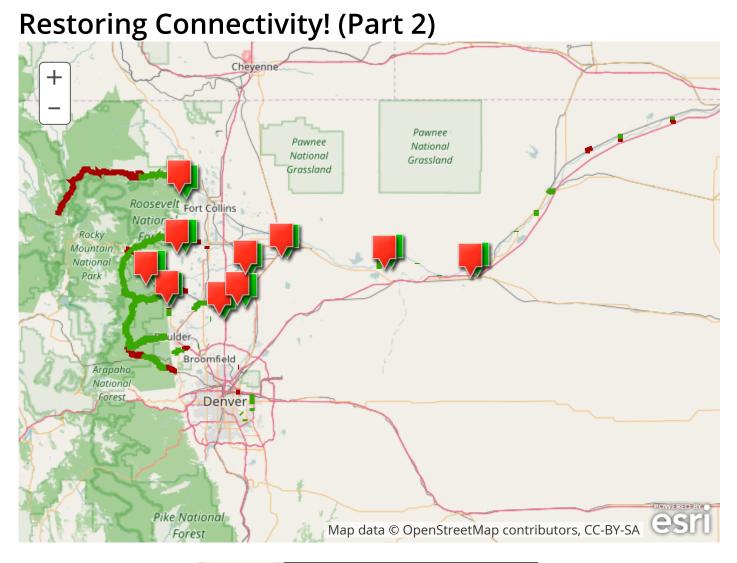
- \$480 million estimated damage to public transportation infrastructure
- \$153 million estimated local costs
- 486 miles of state highway closed
- 200+ bridges and culverts damaged
- 140,000 cubic yards of debris removed

As floodwaters continued east downstream and converged on the South Platte River, many areas on the eastern plains suffered widespread flooding as well.

Restoring Connectivity! (Part 1)



An initial high priority was to restore functionality of the roads to reconnect communities. Many people lost access to the outside world as a result of the flood. During and immediately following the rainstorm event, CDOT engaged in a massive flood response effort to protect the traveling public, and rebuild damaged roadways and bridges to get critical travel corridors open again in an unprecedented 90 days. Although temporary, this was a critical milestone in the recovery process.

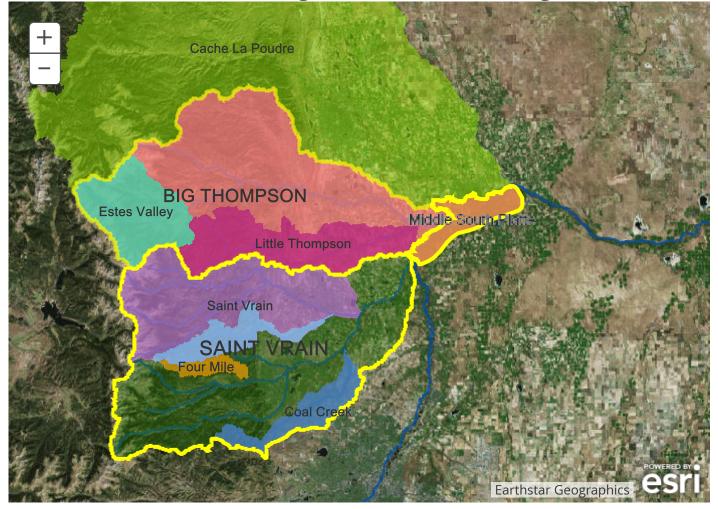




Efforts undertaken for temporary repairs resulted in the successful opening of all the impacted roadways by November 26th, 2013.

In the news: <u>State of Colorado Department of Public Safety News</u> <u>State of Colorado News Portal</u>

Watersheds Threading Communities Together



Formation of Watershed Coalitions

Shortly after the floods, the State of Colorado set aside funding to support local efforts to develop watershed master plans. With support from the State, 11 master plans were developed with the understanding that watershed recovery and resilience requires a holistic approach from the top of the watershed to the bottom, and also requires the engagement and participation of a broad range of watershed stakeholders, including local and state government, non-profits, businesses and landowners. The master planning process provided a collaborative approach to identify and prioritize needs, to develop projects and to guide the implementation. The master planning process also catalyzed the formation of watershed coalitions which are now actively guiding restoration and resiliency efforts within the flood impacted watersheds.

Watersheds & Master Plans

- Boulder Creek Watershed, (link available only in online story) <u>Master Plan</u>, and <u>Interactive</u> <u>Map for Community Comments</u>
- Big Thompson Watershed (link available only in online story) and Master Plan
- Coal Creek Canyon (link available only in online story) Watershed & Partnership
- Estes Valley Watershed (link available only in online story) & <u>Coalition</u>
- El Paso County Regional Watershed (link available only in online story) & Collaborative
- Fourmile Watershed (link available only in online story) & <u>Coalition</u>
- Lefthand Watershed (link available only in online story) Oversight Group
- Little Thompson Watershed (link available only in online story) Restoration Coalition
- Middle South Platte River Watershed (link available only in online story) <u>Alliance</u>
- Saint Vrain Creek (link available only in online story) <u>& Coalition</u>

See Map in Action!

Watersheds Threading Communities Tog

Formation of Watershed Coalitions

Shortly after the floods, the State of Colorado set aside funding to supp watershed master plans. With support from the State, 11 master plans understanding that watershed recovery and resilience requires a holist the watershed to the bottom, and also requires the engagement and p of watershed stakeholders, including local and state government, nonlandowners. The master planning process provided a collaborative app needs, to develop projects and to guide the implementation. The mast catalyzed the formation of watershed coalitions which are now actively resiliency efforts within the flood impacted watersheds.

Watersheds & Master Plans

- Boulder Creek Watershed, <u>Master Plan</u>, and <u>Interactive Map for Comm</u>
 Big Thompson Watershed and <u>Master Plan</u>
 Coal Creek Canyon Watershed & <u>Partnership</u>

- Coal Creek Carryon Watershed & <u>Dartnership</u>
 Estes Valley Watershed & <u>Coalition</u>
 El Paso County Regional Watershed & <u>Collaborative</u>
 Fourmile Watershed & <u>Coalition</u>
 Lefthand Watershed <u>Oversight Group</u>
 Utitie Thompson Watershed <u>Restoration Coalition</u>
 Middle South Platte River Watershed & <u>Alliance</u>

- Saint Vrain Creek & Coalition



2014: Building A More Resilient Colorado

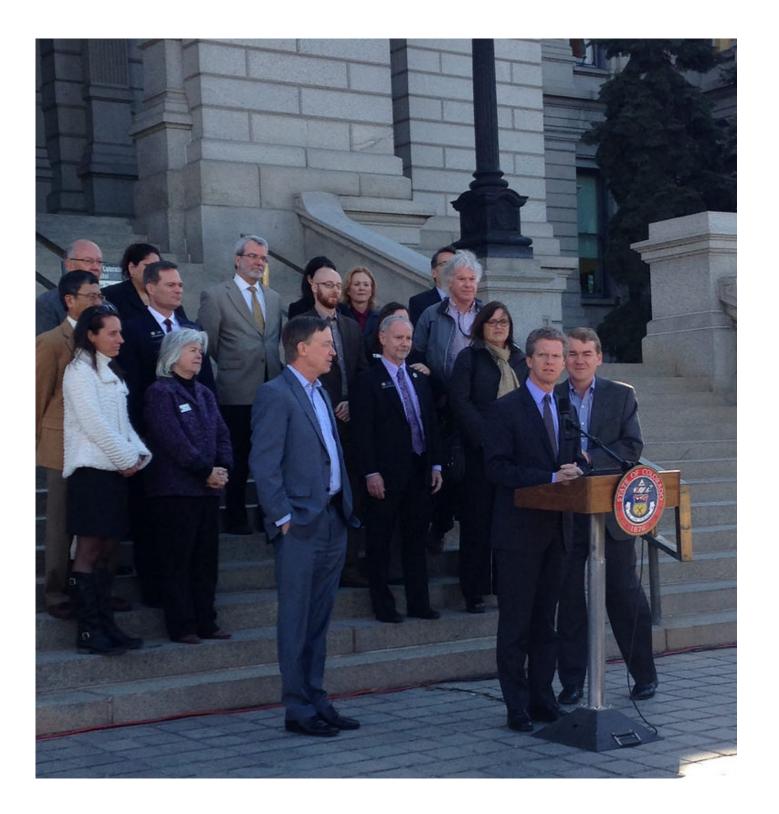


In the aftermath of the 2013 floods, it became clear that resiliency was not an option, but rather something we must do to protect people, community vitality and Colorado's unique way of life into the future. In 2014 the State and partners laid the foundation of building resiliency in Colorado, including developing the Colorado Resiliency Framework, the Colorado Resiliency Working Group, implementing a post-flood hydrology update, and launching a watershed resilience pilot program.



Photo Source:

Additional Federal Support





HUD Approves Colorado's first CDBG-DR Action Plan in the Amount of \$62.8 million

On December 16, 2013, The U.S. Department of Housing and Urban Development (HUD) announced the allocated \$62.8 million in Community Development Block Grant - Disaster Recovery (CDBG-DR) funding to cover a portion of unmet needs not addressed by other federal resources. The State engaged in extensive public outreach efforts across flood impacted communities, and conducted an unmet needs analysis to guide how CDBG-DR funding would be used. Unmet needs, local feedback and community priorities gathered from the public engagement process led to the State developing an Action Plan that defined and outlined activities to be funded. In accordance with HUD rules, 50% of CDBG-DR funding must serve low-to-moderate income areas or households, and 80% of the funds must go to the most impacted counties of Boulder, Larimer and Weld.

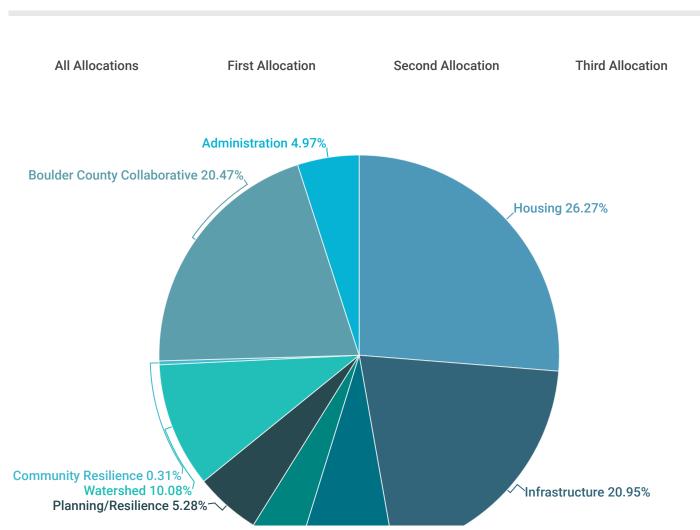
The Action Plan was approved by HUD on April 28, 2014 and the State immediately began to implement the CDBG-DR program, addressing:

- Household assistance;
- Housing new construction;
- Home access (private roads and bridges);
- Infrastructure;
- Small businesses and agricultural businesses;
- Tourism; and
- Resiliency planning.

During 2014, HUD announced two more allocations of CDBG-DR funding to support Colorado recovery efforts. In total, HUD allocated \$320 million in funding.

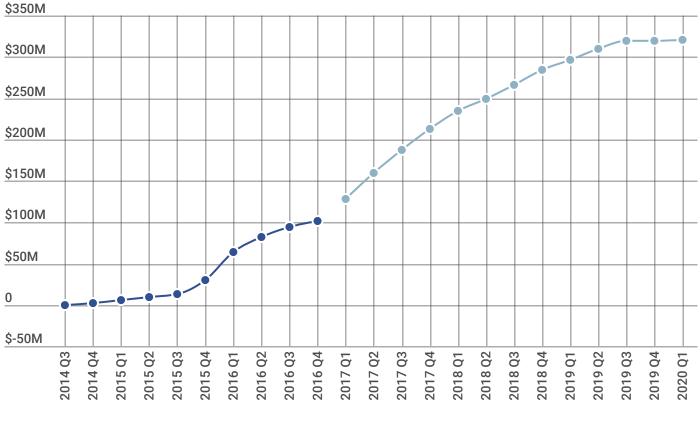
Photo to Left: **U.S. Department of Housing and Urban Development Secretary Shaun Donovan announces the allocation of \$62.8** *million in CDBG-DR funding to support Colorado Flood Recovery efforts. Source: Sec. Donovan.*

Allocation Charts for Funding Distribution



Allocation Breakdown





Actual Investment

Projected Investment

Source: Colorado Department of Local Affairs

Learn More: <u>Disaster Recovery Metrics and Allocation</u> <u>CDBG-DR Grant Program Overview</u>

Resiliency Through Action





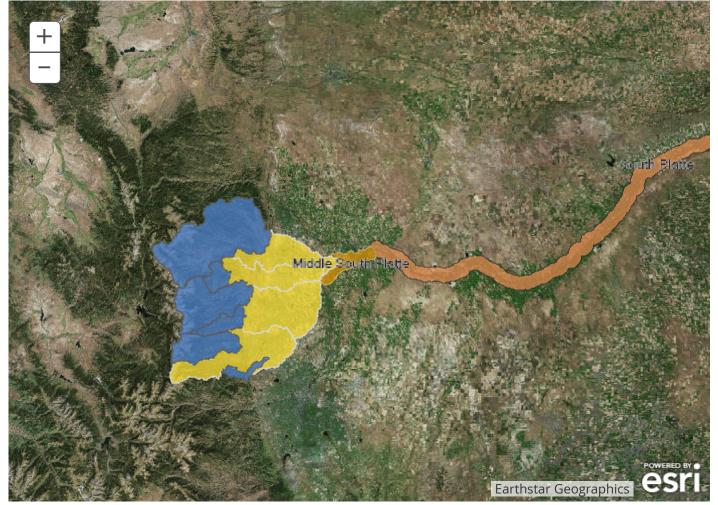
Photo Source: CRRO

In June of 2014, the Colorado Recovery Office convened stakeholders from federal, state, local, non-profit and private sector partners for a Resiliency and Sustainability Summit. The summit brought together a broad range of experts to assess Colorado's efforts to integrate resiliency into the flood recovery process, and to identify strategies to further enhance those efforts.

The recommendation that came out of the summit was for Colorado to develop an actionable roadmap - not just for the flood recovery, but also to address risks and vulnerabilities from future disasters. Following the summit, the Governor formed a cross-agency collaborative team, the Colorado Resiliency Working Group (CRWG). This leadership team was charged with developing a resiliency roadmap, and to serve as the steering committee for the State's ongoing resiliency initiatives.

Over the course of 11 months, 150 stakeholders engaged in the CRWG to develop a vision, goals and strategies to build a culture of resilience, culminating in the Colorado Resiliency Framework.

Innovative Approach Using Science

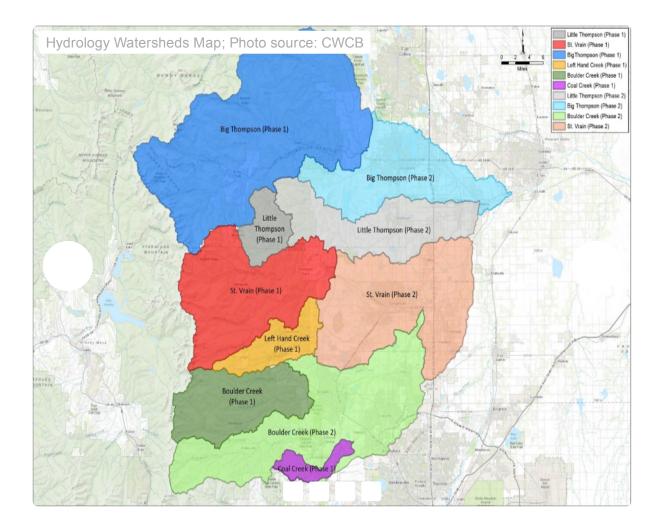


August 2014: Post-Flood Hydrology Study Update

To determine the size of event Colorado experienced, CDOT partnered with the Colorado Water Conservation Board (CWCB) to initiate hydrologic analyses in several key river systems impacted by the floods. The result was the most comprehensive and closely coordinated hydrologic evaluation in the State's history. This analysis included comprising rainfall-runoff modeling for almost 2000 square miles of watershed area. In addition, the hydrologic evaluation was extended along 200 miles of the South Platte River from Ft. Lupton to a point near the Nebraska state line at Julesburg. In partnership with FEMA, the studies have been accepted as "Best Available Data" so that the recovery efforts can take advantage of the updated information to better inform recovery designs and repairs.

Click here to read the Post-Flood Hydrology Study

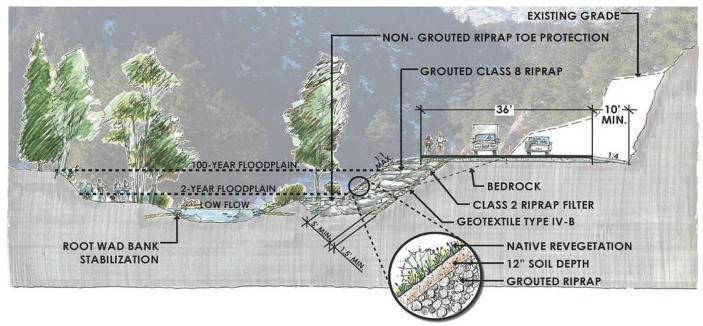
Phase 1 (link available only in online story) Phase 2 (link available only in online story) Phase 2 Gage Analysis (link available only in online story)



Designing Roads and Rivers in Harmony



PROPOSED REPAIR TYPICAL SECTION



U.S. 36 Repair Approach Cross Section; Photo Source: CDOT

CDOT, in partnership with Central Federal Lands and CWCB, put resiliency in motion when they went to work on the U.S. 36 Canyon. In order to build more resiliently, roadway repairs took into account the natural river system parallel to the roadway. The desire to have the roadway and the river work harmoniously together was realized in reconstruction that moved the roadway over to allow the river more room, and implementation of design solutions that would protect the road and river in the next event in an attempt to provide passable lanes for access throughout the canyon. This coordinated approach leverages funding and makes our streams and roadways more resilient and resistant to future hazard events.



This video can be viewed in the online version of this story map

US 36 Repair Explosion; Video Source: CDOT

Resiliency in Motion

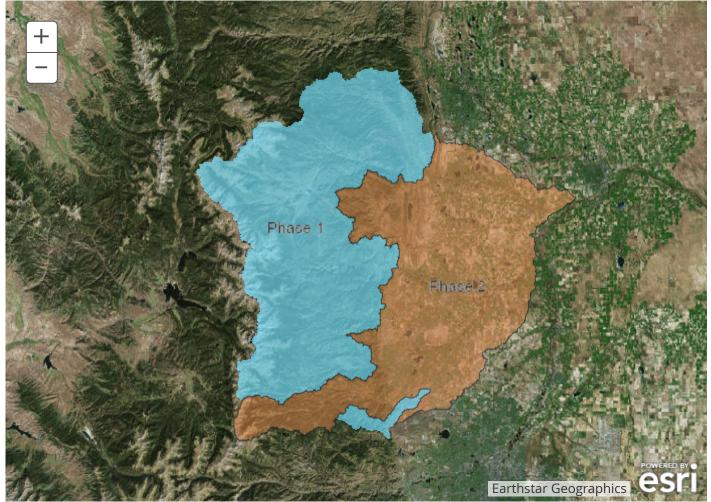


U.S. 36 Ribbon Cutting



U.S. 36 Ribbon Cutting; Photo Source: CDOT

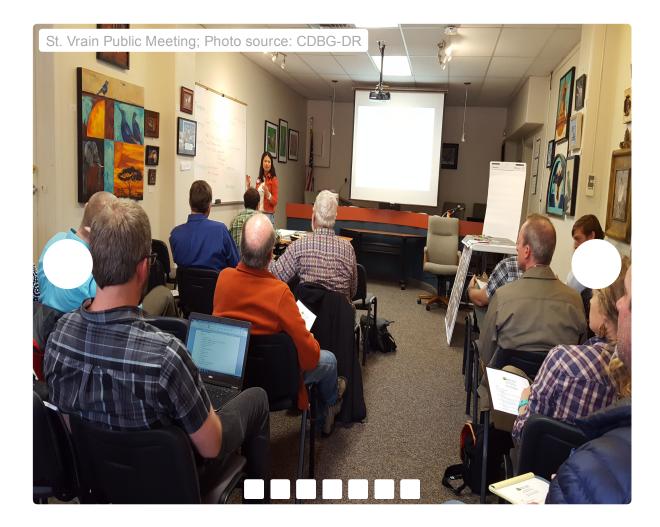
Piloting New Watershed Approach



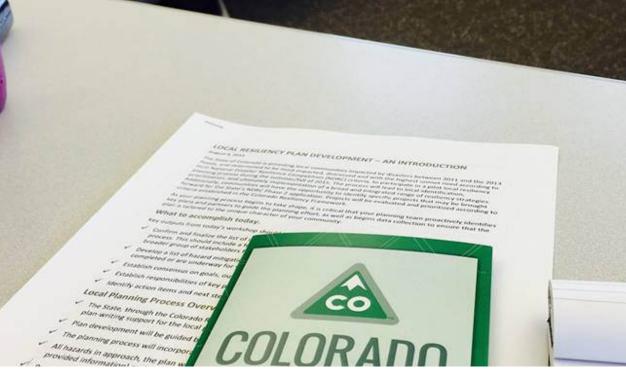
Watershed Resilience Pilot Program

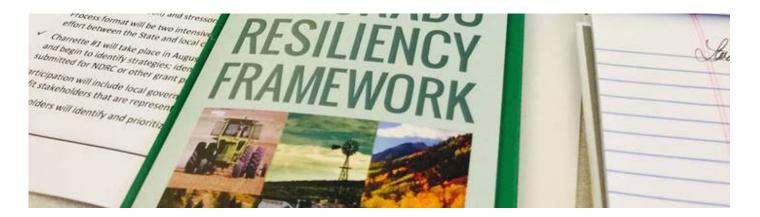
The State of Colorado created a first-of-its-kind watershed restoration program utilizing funding from U.S. Department of Housing and Urban Development (HUD). Through Community Development Block Grant – Disaster Recovery funds, the Watershed Resilience Pilot Program provides grants to watershed coalitions for staff support and resilient river restoration projects. These grant funds build coalition capacity, bringing together the diverse range of stakeholders required to restore disaster-impacted watersheds. River restoration

projects in this program not only restore natural systems, but achieve multiple benefits, such as increasing community connectivity by tying into trail systems, promoting safety by protecting infrastructure, enhancing local economy by incorporating recreational opportunities and building resiliency for communities and ecosystems.



2015: The Roadmap to Resiliency





In 2015, the State formalized its path towards long-term resiliency. With the adoption of the Colorado Resiliency Framework, and the signing of Senate Bill 15-245.

Building a Framework



Photo source: CRRO **Colorado Resiliency Framework** Call to Action Expand Knowledge • Build Community • Be an Advocate • Provide Flexibility Actions The State of Colorado will initiate the following in the first year: Educate and Develop Risk and Vulnerability Advance Local Establish the Colorado Community | Create Mapping and **Develop Statewide** Prepare an Annual Operating Develop and Refine Resiliency Strategies Plan and Resiliency Report **Resiliency Indicators** Resiliency Metrics Resiliency Partnership Fund Land Use Tools Engage Assessment Tools Resiliency Prioritization Criteria **Community Actions** State resiliency strategies and projects will be prioritized using the following criteria to ensure limited resources Actions that communities can take to expand the impact of the are leveraged for multiple, triple-bottom-line returns. Framework include: Co-Benefits Plan and coordinate regionally Innovation Address problems across multiple sectors to create Advance new approaches and techniques that maximize Dedicate staff to resiliency maximum benefit. efforts and resources and serve as models for others in Engage leadership High Risk and Vulnerability Colorado and beyond. Develop local resiliency strategie Adaptive Capacity Consider future unknowns of changing climate, economic, an well-being, physical infrastructure, Prioritize and implement projects and social conditions. Invest in resiliency estments for both the investors Harmonize with Existing Activity · Evaluate and update local land use practices and codes Expand, enhance, or leverage work being done to build on junity. • Educate and engage community organizations and members existing efforts. Establish new or support existing networks Include populations that are often most fragile and Long-Term and Lasting Impact vulnerable to sudden impact. Create solutions that are replicable and sustainable, creating benefit for present and future generations. Establish peer to peer relationships Technical Soundness Apply best practices that have been tested and proven to work in a similar regional contex Looking Forward - A Resilient Colorado in 5 years · Model projects are built and replicated by others. Resiliency is incorporated into local plans and resiliency officers are staff positions within local government. Long-term local and state budgets incorporate resiliency investments. · Colorado Resiliency Partnership Fund is established and financing resiliency projects. Neighborhoods and networks utilize resiliency practices. Regional economic blueprints include a hazard and vulnerability assessment · Risk and vulnerability mapping, community inclusion mapping, and model land use codes are adopted and utilized by communities · Transportation and watersheds plan and design together, and repair jointly. Design and implementation of natural and built systems is integrated. · Impacted residents and businesses are able to continue to live and operate in their communities after a disaster event. Colorado is a national model for statewide resiliency

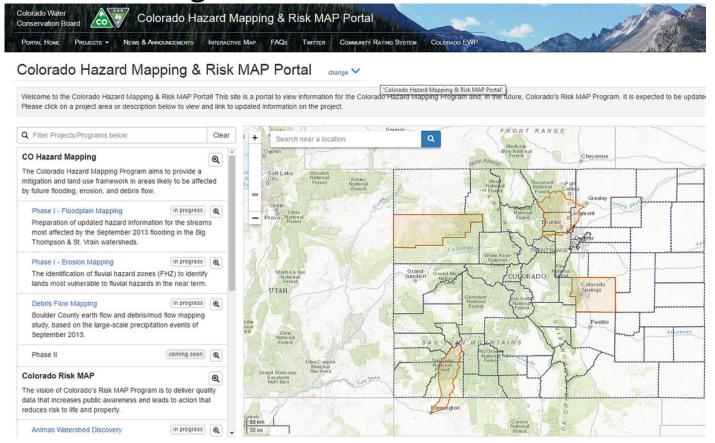
In May of 2015, Governor Hickenlooper adopted the <u>Colorado Resiliency Framework</u> - the first of its kind in the nation - and formalized the Colorado Resiliency Working Group as the steering committee for the State's resiliency efforts. With the adoption of the Framework, the

Colorado Recovery Office was renamed the Colorado Resiliency and Recovery Office, having the dual responsibility of continuing its recovery mission along with spearheading implementation of the States holistic resiliency efforts, coordinating State actions that lead to long-term resiliency in Colorado.

The Framework is a call to action and represents a partnership among State agencies based on collaboration and teamwork, along with active participation from community stakeholder groups throughout the state. It provides a concrete roadmap for action that informs Colorado's recovery efforts, as well as its forward-looking actions to reduce risk from future disasters. Through implementation of the Framework, Coloradans are working together to protect communities; enhance Colorado's recreation, beauty and quality of life; and to thrive in the face of changing conditions.

Photo to Left: Larimer Framework Process; Photo Source: CRRO

Understanding Risk



Senate Bill 245



Governor Hickenlooper signing Senate Bill 245; Photo Source: CWCB Photo to Left: Hazard Mapping and Risk Map Portal; Photo Source: CWCB

During the 2013 floods, many Coloradans experienced catastrophic damages outside of regulatory floodplains. Updated hydrology showed that Colorado's risk was higher than previously understood. In recognition of the need for accurate and updated risk information, the General Assembly directed the Colorado Water Conservation Board (CWCB), through Senate Bill 15-245, to reexamine flood risks throughout the flood affected area.

New floodplain maps are currently being developed with the updated hydrology and new topographic information in order to ensure that communities have access to the latest science and risk information as rebuilding continues. In addition, all remaining paper-only floodplain maps in 28 Colorado counties will be converted to a digital platform and incorporate best available information. The bill authorizes development of a new erosion hazard identification process and continuation of the identification of debris flow areas.

Senate Bill 15-245 represents the most comprehensive update to state floodplain maps since the creation of the National Flood Insurance Program, and will inform how communities

rebuild - and how they grow - for years to come.

Check out the new maps at www.coloradohazardmapping.com

See HUC 8 Watershed Boundaries (link available only in online story)

2016: Taking Action

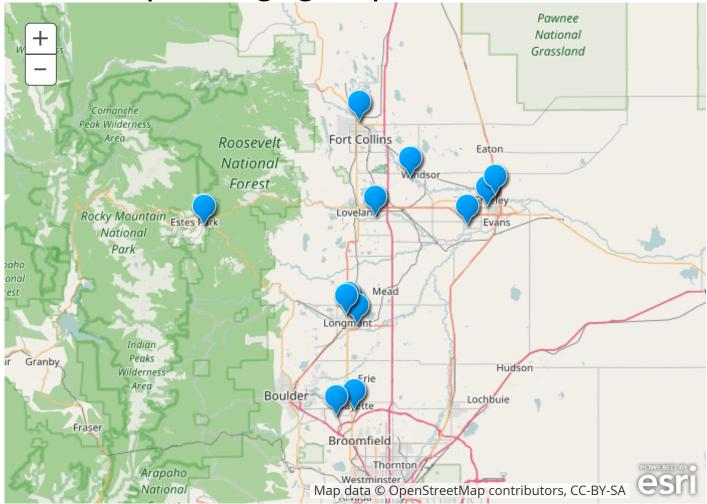


With the Colorado Resiliency Framework in place, the State and its partners had a clear path for developing and implementing coordinated projects that build resiliency throughout the state. 2016 saw the kickoff and completion of a number of projects that took resiliency from an idea to a reality.



Lyons Watershed Recovery Project; Photo Source: CRRO

Partnerships - Bringing People Home



Local governments, housing authorities and the State of Colorado are taking a collaborative and multi-pronged approach to rebuild, restore, replace or mitigate housing damaged by the floods.

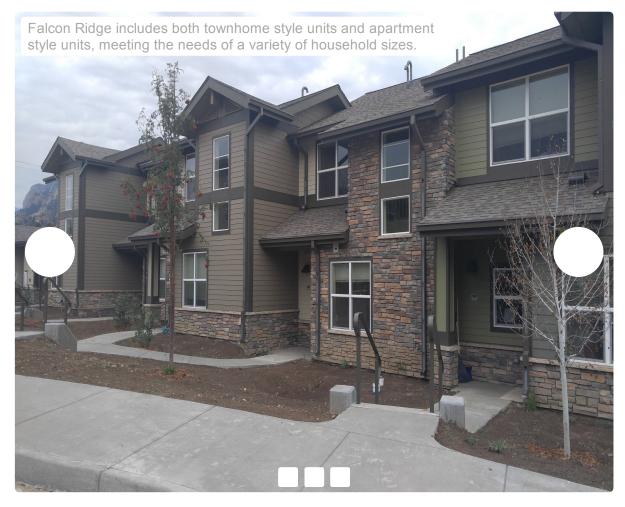
Three years after the flood, significant progress has been made:

- 124 disaster-damaged housing units have been rehabilitated;
- More than 100 properties are being mitigated through elevation or property acquisition in hazardous areas; and

• 102 new units of affordable housing have been constructed.

July of 2016 represented another milestone in Colorado's housing recovery efforts. Construction of Falcon Ridge Apartments was completed in Estes Park, providing an additional 45 units of affordable housing in the Estes Valley, an isolated mountain area that sustained loss of affordable units, and was cut off from the surrounding communities for an extended period of time following the floods. Additional housing will continue to be built in disaster impacted areas through 2016, 2017 and beyond, providing disaster-impacted households with safe, sustainable and affordable housing options for the long-term.

 Falcon Ridge Apartments
 Locate on Map (link available only in online story)



Falcon Ridge Apartments is nestled in a residential community in the Estes Park Valley, with views of the surrounding mountainscape from most locations on the property. It includes a centrally-located playground for residents, with townhome and apartment style units, meeting the needs of a variety of household sizes.

Home Access Projects

The <u>Home Access Program</u> provides resources to reconstruct non-county maintained roads and bridges, giving access homeowners and renters to critical emergency access routes.

Construction methods have become more sustainable, resilient and less costly to maintain through the course of the Home Access program. Materials have transitioned from solid pipe or box culverts (cement or other material in one solid piece) to sectional construction materials (such as corrugated sheet metal), allowing maintenance and repairs to be made to sectional areas instead of requiring complete removal and replacement of the culvert - improving turnaround times for repairs following a disaster, and lowering cost maintenance for the property owners on an ongoing basis.

Home Access project materials in preparation for completion of the installation of a culvert and bridge to provide access to the residents in the canyon in Larimer County (same location as photo above). Construction methods have become

more sustainable, resilient, and less costly to maintain through the course of the Home Access program.



Maximizing Resources



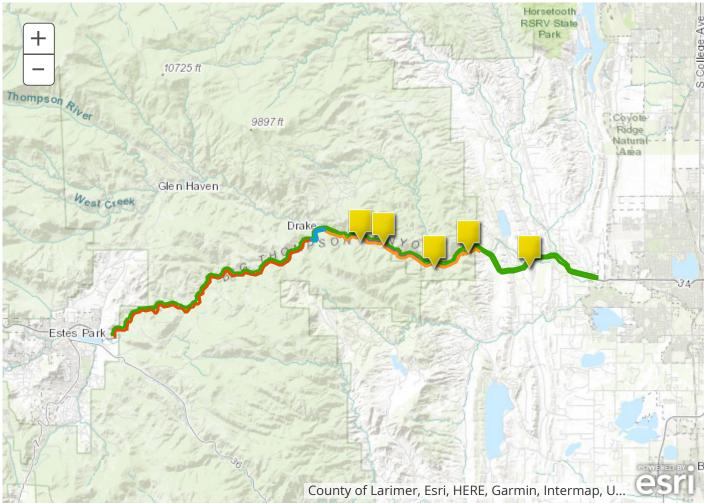
Recovery and resiliency efforts go farther when partner resources and funding are leveraged in a coordinated manner. Examples of the benefits of leveraging resources to aid in the efforts since the 2013 floods include:

- The State of Colorado allocated \$111 million to support recovery efforts, including half of the required non-federal match for programs such as FEMA Public Assistance and Hazard Mitigation, and the Natural Resources Conservation Service Emergency Watershed Protection Program.
- Local governments are dedicating local resources to recovery projects.
- Volunteers have contributed more than 100,000 hours to support recovery efforts.
- HUD Community Development Block Grant Disaster Recovery (CDBG-DR) funding is being used to leverage multiple programs and ensure critical recovery projects can be completed.
- The State of Colorado and The Colorado Housing Finance Authority are jointly underwriting housing recovery projects with housing tax credits and CDBG-DR funds.
- Five different federal, state and local funding sources are being packaged together to rebuild U.S. 34 and to restore the Big Thompson River.
- In-kind match and donated resources are being used, where feasible, to meet cost share requirements.

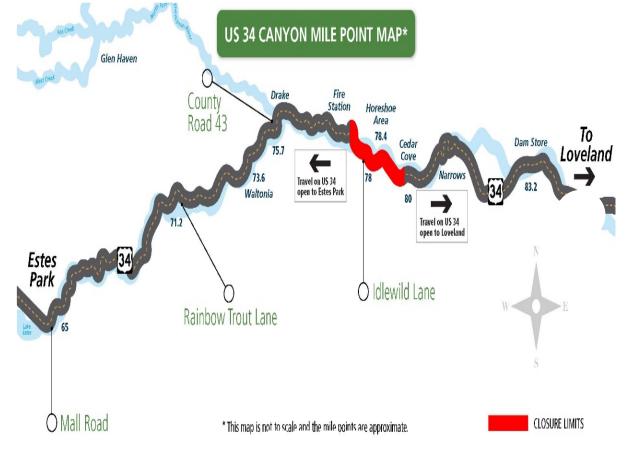
Funding Resources Page 1, (link available only in online story) Funding Resources Page 2 (link available only in online story)

Photo to left: Leftover rock generated during road construction has been used as construction material for watershed restoration projects and has helped meet non-federal match requirements.

Kick-off of U.S. 34



Work begins on the U.S. 34 Big Thompson Canyon Permanent Repair Project – July 2016



Colorado Resiliency Framework Actions for the First Year; Photo source: CRRO

The U.S. 34 canyon has seen ongoing design and resiliency efforts since late 2014. The extensive roadway work by the design and construction teams allowed for CDOT to begin work in the canyon in the summer of 2016. Collaboration with cities, counties, coalitions and other stakeholders continues as the Canyon Program moves forward with repairs to the river, roadway and private property. Multiple funding sources are used together to allow for the

right solution to become a reality within the canyon in an effort to provide increased resiliency for the communities that thrive there.

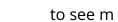
See monthly report for US HWY 34

Package 1 (link available only in online story) Package 2 (link available only in online story) Package 3 (link available only in online story) Package 4 (link available only in online story) Package 5 (link available only in online story)

US 34 Canyon Closure Limits (link available only in online story)

CDOT Emergency Repair Projects

Elsewhere in the foothills and along the front range, roadwork repair efforts continue.



CDOT Emergency Repair Projects (link available only in online



Permanent Repair Stats:

- 21 of 32 CDOT Permanent Repair projects are under construction or completed.
- 14.6 lane miles have been repaired out of 120 affected lane miles.
- 13 out of 23 Local Agency Permanent Repair projects are under construction or completed.

2017: Recovery and Resiliency Continues



Coloradans have shown remarkable strength, courage and resilience since the 2013 floods. The progress made to date reflects the leadership and dedication shown by citizens, businesses, non-profits and government agencies. Working together, homes have been repaired, roads have been rebuilt, watersheds have been restored and communities have taken significant steps to build resilience in the face of future threats.

Recovery takes time, and Colorado will continue to work collaboratively to fulfill the promise of 100% recovery from the floods. In the coming years:

- Rehabilitation and protection of existing homes, and construction of new affordable housing will continue.
- The state and communities will continue to implement permanent repairs to roads, bridges, utilities and other infrastructure, with an eye on building back stronger to protect communities from the next disaster
- In Colorado's flood-impacted mountain canyons, roadways and rivers will be permanently reconstructed and restored together, in harmony, to reduce risk from future floods.
- Watersheds will continue to be restored; water quality, wildlife habitat and recreational opportunities will be enhanced.
- Businesses will continue to be supported with resources such as recovery grants and loans, workforce training and technical assistance to enhance their ability to recover from the floods and withstand future disasters.
- The portfolio of flood recovery resources will continue to be maximized and leveraged to achieve resilient outcomes.

While the floods catalyzed the Resiliency roadmap for Colorado, implementing it is about the future. Together, we will work to protect and enhance all that makes Colorado the best place to live, work, and play. photo galleries generated with ISM