



Mineral County Hazard Mitigation Plan



2016

*Mineral County
City of Creede*

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Mineral County Hazard Mitigation Plan

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(Updated from original version prepared and approved in 2010)

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Executive Summary

The purpose of the Mineral County Hazard Mitigation Plan is to provide local officials with a tool to guide policies and actions that can be implemented to reduce risk and future losses from natural hazards. Information in this plan is intended for use by local officials to help guide mitigation activities and inform decisions on local land use policy in the future. Nationwide, proactive mitigation planning has proven to help reduce the cost of disaster response and recovery to communities and property owners by protecting critical community facilities, reducing liability exposure, and minimizing overall community impacts and disruption.

Formal approval of this plan by the Federal Emergency Management Agency (FEMA) also assures that participating jurisdictions in Mineral County will remain eligible for federal grant **funding under FEMA's Hazard Mitigation Grant Program (HMGP)**, Pre-Disaster Mitigation (PDM) program and Flood Mitigation Assistance (FMA) program. Participation in the multi-hazard mitigation planning process also allows jurisdictions to earn planning credits for the **National Flood Insurance Program's Community Rating System (CRS)**.

Several significant natural hazard events have occurred in the San Luis Valley since the last update of this plan, most notably the West Fork Fire Complex in June 2013, a federally-declared fire emergency that cost more than **\$31 million** to contain. Information about that event, as well as other smaller-scale events, is provided in the table below.

Incident	Date(s)	Location	Impacts
Streams Lake Fire	May 31-June 2, 2013	Mineral County	Approximately 100 acres of forest burned
West Fork Fire Complex	June 5-July 31, 2013	Mineral County	109,615 acres burned; FEMA PA Grant: \$7.9 million
Flood-Crestone	May 4-June 16, 2015	Saguache County, Town of Crestone	Federally declared for Public Assistance (DR-4229); >\$100,000 damage to roads and bridges
High Water Event	June 8, 2015	Conejos County	County bridge on CR 13 damaged and closed for several days
Ice Jam Flood	December 28, 2015	Conejos County	Ice dam at CR H and CR 13 caused water to approach homes; 3-day effort by Road/Bridge to clear ice
Beaver Park Dam Incident	February 24-March 20, 2016	Rio Grande County	Depressions on dam embankment triggered drawdown of reservoir until stabilization work completed

The mitigation actions identified in this updated plan are based on an assessment of hazards and risks and a planning process that engaged a wide range of stakeholders, including the general public. The research examined the recorded history of losses resulting from natural hazards, and analyzed the future risks posed by these hazards. The table below identifies the 12 natural hazards profiled in this plan and assesses each hazard with respect to probability and severity of consequences.

Severity > Probability v	Catastrophic	Critical	Limited	Negligible
Highly Likely	Wildfire	Drought		
Likely		Avalanche Lightning Winter Storm	Hail Landslide Windstorm	
Occasional			Earthquake Flood	
Unlikely		Dam Failure	Tornado	

Based on this hazard assessment, risks to community assets were identified and the vulnerability of people and property to these risks was assessed. The following goals were established to guide the development of the mitigation strategy:

1. Reduce loss of life and personal injury caused by natural hazards
2. Reduce damage to critical facilities, personal property, and other community assets
3. Minimize economic losses associated with natural hazards.

A mitigation strategy for achieving these goals is highlighted by a range of distinct mitigation actions, summarized in the table below.

2016 Mitigation Actions			
#	Description/Benefits	Lead Agency	Priority
Mineral County			
1	Work with FEMA to update floodplain maps	Mineral County OEM	High
2	Continue to expand capacity of existing local warning systems to reach the population at various times of the day and evaluate EverBridge and other systems for use in Mineral County	Mineral County OEM	High
3	Partner with recreation entities and retailers to promote safety and increase public awareness of natural hazards outdoors and in the backcountry	Mineral County OEM	Medium
4	Promote the sale of the CORSAR (Colorado Outdoor Recreation Search and Rescue) card	Mineral County OEM	Medium
5	Identify one additional high-capacity source of water for fighting wildfire, including procedures for emergency access	Mineral County OEM	High
6	Reduce fuels and create defensible space within existing subdivisions	Mineral County OEM	High
7	Provide information on county website regarding natural hazards and actions that residents and businesses can implement to reduce risk	Mineral County OEM	Medium
8	Identify appropriate facility for public shelter and seek funding assistance to purchase generator for the facility	Mineral County OEM	High
9	Work with the State of Colorado and the National Weather Service to identify funding and support for the placement of a	Mineral County OEM	High

	Doppler radar tower in the area to improve weather predictions and warnings		
10	Evaluate benefits of participating in Colorado Certified Burner program endorsed by the Colorado Division of Fire Prevention and Control to increase awareness of wildfire red flag warnings	Mineral County Sheriff; Fire Protection Districts	High
City of Creede			
11	Assess repair and maintenance needs for the Willow Creek Funnel (Flume) and identify potential partners and funding sources.	City of Creede	High

This updated version of the Mineral County Hazard Mitigation Plan builds on the original 2010 version, incorporating current hazard research, studies and information about natural hazard events that have occurred in the county since 2010. Like the previous version, this updated plan includes a regional mitigation element that addresses hazards, goals and mitigation actions that are common to counties in the San Luis Valley region (Alamosa County, Conejos County, Mineral County, Rio Grande County, and Saguache County).

Project management and technical planning assistance to facilitate updates to this plan were provided by the following individuals and organizations:

- Mineral County Emergency Manager - Project Manager
- San Luis Valley Hazard Mitigation Steering Committee (Alamosa, Conejos, Mineral, Rio Grande and Saguache Counties) - Project Oversight
- Mineral County Planning Team - Data Collection, Review and Guidance
- Colorado Division of Homeland Security and Emergency Management - Technical Planning Assistance
- Consultant/Contractor - Research and Plan Development

In addition to Mineral County, the City of Creede also participated in development of this updated plan. The collaborative effort further demonstrates the ongoing commitment in Mineral County to reducing risks to people and property posed by natural hazards, in addition to maintaining eligibility for federal funding.

Chapter One

Introduction

1.1 Purpose

The purpose of this plan is to provide Mineral County and political subdivisions within the county with a comprehensive hazard mitigation strategy for reducing long-term risks to people, property and natural resources. It is the intent of this plan to help ensure that Mineral County remains a safe place to live and work and to provide a framework for addressing potential future hazards through hazard mitigation planning.

Hazard mitigation is defined by FEMA as **“any sustained action taken to reduce or eliminate long-term risk to human life and property from a hazard event.”** Mitigation creates safer communities by reducing loss of life and property damage.

1.2 Participating Jurisdictions

- Mineral County
- City of Creede

1.3 Background and Scope

While some communities are less hazard-prone than others, there are no hazard-free communities and all communities face some degree of risk from natural disasters. Each year in the United States, disasters take the lives of hundreds of people and injure thousands more. Nationwide, taxpayers pay billions of dollars annually to help communities, organizations, businesses, and individuals recover from disasters. Recent flood, tornado and **wildfire disasters along Colorado’s Front Range have had devastating impacts for communities** like Windsor, Jamestown, Evans, Longmont, Boulder, Lyons and Colorado Springs.

Disasters can weaken local economies and dramatically reduce local tax bases. The rising cost of natural disasters has sharpened interest in identifying effective ways to reduce vulnerability to hazards. Many disasters are predictable, and much of the damage caused by these events can be alleviated or even eliminated by implementing cost-effective hazard mitigation measures.

Hazard mitigation planning is the process through which hazards that threaten communities are identified, likely impacts of those hazards are determined, mitigation goals are set, and appropriate strategies to lessen impacts are determined, prioritized, and implemented. Hazard mitigation plans assist communities in reducing risk from hazards by identifying resources, information, and strategies for risk reduction. This plan documents the local hazard mitigation planning process, identifies relevant hazards and risks, and outlines the strategies that will be used to decrease vulnerability and increase resilience and sustainability.

1.4 Mitigation Planning Requirements

This plan was prepared pursuant to the requirements of the Disaster Mitigation Act of 2000 (Public Law 106-390) and the DMA 2000 implementing regulations set forth by the Interim Final Rule published in the *Federal Register* on February 26, 2002 (44 CFR §201.6) and finalized on October 31, 2007. These regulations established the requirements that local hazard mitigation plans must meet in order for a local jurisdiction to be eligible for certain federal disaster assistance and hazard mitigation funding under the Robert T. Stafford Disaster Relief and Emergency Act (Public Law 93-288), also known as the Stafford Act.

Significant steps in the process of preparing this updated plan included (a) forming a local planning committee, (b) preparing a strategy for public involvement, (c) identifying and assessing natural hazards, (d) determining the vulnerability of community assets to identified natural hazards, and (e) then determining a corresponding set of measures and actions to minimize or manage those risks.

1.5 Grant Programs Requiring Hazard Mitigation Plans

FEMA-approved hazard mitigation plans qualify communities for the following federal mitigation grant programs:

- Hazard Mitigation Grant Program (HMGP)
- Pre-Disaster Mitigation (PDM)
- Flood Mitigation Assistance (FMA) Program

The HMGP and PDM grant programs are authorized under the Stafford Act and DMA 2000. The HMGP is a state competitive grant program for communities in areas covered by a recent disaster declaration. The PDM grant program is also competitive but is available on an annual basis and does not require a disaster declaration; they rely on specific pre-disaster grant funding sources.

Disaster-Funded Mitigation Assistance

Hazard Mitigation Grant Program (HMGP)

Provides grants to States, Tribes, and local entities to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. Projects must provide a long-term solution to a problem, for example, elevation of a home to reduce the risk of flood damages as opposed to purchasing supplies to fight the flood. **In addition, a project's potential savings must be more than the cost of implementing the project.** Funds may be used to protect property or to purchase property that has been subjected to, or is in danger of, repetitive damage. The amount of funding available for the HMGP under a disaster declaration is limited. The program may provide a state or tribe with up to 15 percent of the total disaster grants awarded by FEMA. The cost-share eligibility requirement for this grant is 75 percent federal/25 percent non-federal. Funding from other federal sources cannot be used for the 25 percent share with one exception. Funding provided to states under the Community Development Block Grant program from the Department of Housing and Urban Development can be used to meet the non-federal share requirement.

Hazard Mitigation Assistance Programs

Pre-Disaster Mitigation (PDM) Program

Provides funds to States, Tribes, and local entities, including public universities, for hazard mitigation planning and the implementation of mitigation projects prior to a disaster event. Grants are awarded on a nationally competitive basis. Like HMGP **funding, a PDM project's potential savings must be more than the cost of** implementing the project. In addition, funds may be used to protect either public or private property or to purchase property that has been subjected to, or is in danger of, repetitive damage. The cost-share eligibility requirement for this grant is 75 percent Federal/25 percent non-Federal. There is approximately \$50 million to \$150 million available each year (\$90 million was allocated for FY 2016).

Flood Mitigation Assistance (FMA) Grant Program

The goal of the FMA grant program is to reduce or eliminate flood insurance claims under the National Flood Insurance Program (NFIP). Particular emphasis for this program is placed on mitigating repetitive loss properties. Repetitive loss properties are properties for which two or more NFIP losses of at least \$1,000 each have been paid within any 10-year period since 1978. Grant funding is available for three types of grants, including planning, project, and technical assistance. Project grants, which use **the majority of the program's total funding, are awarded to states, tribes, and local** entities for planning and technical assistance and/or to apply mitigation measures to reduce flood losses to properties insured under the NFIP. The cost-share eligibility requirement for this grant is 75 percent federal/25 percent non-federal. For FY 2016, \$199 million was allocated for FMA program grants nationwide.

1.6 Plan Organization

The Mineral County Hazard Mitigation Plan is organized as follows:

- Executive Summary
 - Provides an overview of the process and findings
- Chapter 1 - Introduction
 - **Describes the plan's purpose, participating** jurisdictions, hazard mitigation planning requirements, and federal hazard mitigation programs
- Chapter 2 - Community Profile
 - Provides a general description of the county, including its location, geography, climate, history, population, economy and government
- Chapter 3 - Planning Process
 - Describes the process used to develop the updated plan, including how it was prepared, who was involved in the process, and how the public was involved
- Chapter 4 - Risk Assessment
 - Identifies and profiles the hazards that could affect the county, assesses vulnerability to those hazards, provides an inventory of critical facilities and other community assets, describes land-use trends, and assesses capability related to mitigation
- Chapter 5 - Mitigation Strategy

- Identifies, assesses and prioritizes goals and actions to mitigate hazards in each participating jurisdiction, based on the risk assessment, and includes a strategy for implementation
- Chapter 6 - Plan Adoption, Maintenance and Evaluation
 - Provides a formal process for monitoring, evaluating and updating the plan, identifies methods for continued public involvement, and describes how the updated plan will be incorporated into existing planning mechanisms
- Chapter 7 - Regional Coordination
 - Provides a regional mitigation element that addresses hazards, goals and mitigation actions that are common to counties in the San Luis Valley region
- Appendices
 - A. Acronyms
 - B. Plan Participants
 - C. References and Resources
 - D. Documentation of the Planning Process
 - E. Disaster Mitigation Act of 2000 (DMA 2000) Summary
 - F. FEMA Plan Review Tool
 - G. Record of Adoption

Chapter Two

Community Profile

Mineral County is located in the San Juan Mountains of southern Colorado. Figure 2.1 shows **Mineral County's location** within Colorado. According to the U.S. Census 2014 American Community Survey, Mineral County is the second smallest county in population in the State of Colorado (the smallest is San Juan County, population 653). The county was named for the many valuable minerals found in the mountains and streams of the area. The county seat is the City of Creede. Ninety-five percent (95%) of Mineral County is publicly-owned.

The City of Creede is the only incorporated municipality in Mineral County. Spar City (also known as Fisher City) is an unincorporated community located along an unpaved road southwest of Creede. This section describes the geography, climate, history, population, economy, and government of Mineral County and the City of Creede.

Table 2.1 Mineral County Facts and Figures

	Mineral County	City of Creede
Latitude	37.66N	37.85N
Longitude	-107.01W	-106.90W
Land Area (Square Miles)	878	.061
Elevation (Feet)	8,500-14,000	8,799
Population (2010)	712	290
Population (2014-Estimated)	704	188
Population (2015-Estimated)	726	294

Source of population data: U.S. Census, American Community Service, 2010-2014 5-Year Population Estimate

2.1 Geography and Climate

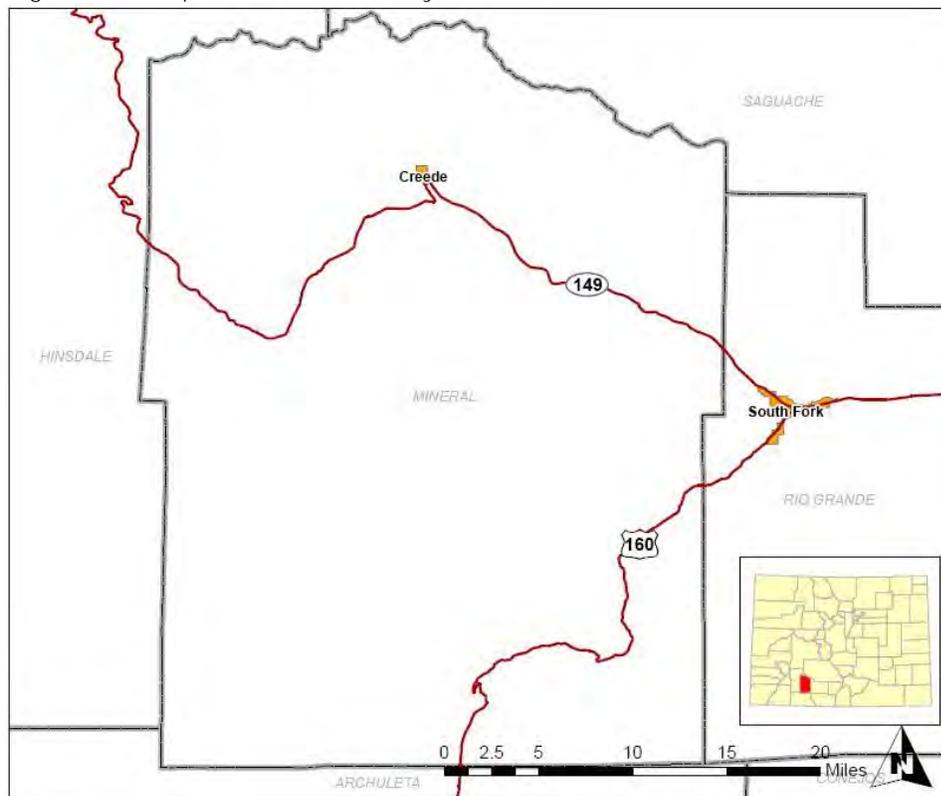
Geography

Mineral County has a total area of 878 square miles, of which the majority is unpopulated. Mineral County is a significant study area for ancient geologic activity. The formation of the La Garita and San Juan mountains began about 30 million years ago. Eruptions from massive volcanoes, like the Creede Caldera, were followed by tremendous flows of ash and mud. As the layers of volcanic debris cooled, crystals and mineral ores collected into veins and pockets to create extensive mineral fields. This era of mountain building laid down the volcanic tuff that has become the Wheeler Geologic Area, named for the 19th Century Surveyor of the West, Captain George M. Wheeler. Water erosion over the millennia has carved an impressive landscape of fragile capstones, needles, and spires along the Rio Grande River.

The headwaters of two important rivers are located in the San Juan Mountains in Mineral County: the Rio Grande River and the San Juan River. The Rio Grande River, the third longest river in the United States is well known as an international border with Mexico and has played a critical role in the development of farming and ranching in the San Luis Valley. Tributaries

of the San Juan River begin on the western slope of the Continental Divide across from Spar City. It joins the Colorado River just north of Lake Powell.

Figure 2.1 Map of Mineral County



Source: Created by URS

Climate

Mineral County experiences cold winters and moderate summers and approximately 284 days of sunshine per year. The average annual rainfall is 13.4 inches and the average annual snowfall is 46.8 inches. The high mountains and alpine valleys experience an average high winter temperature of 48 degrees and a low of zero, though low temperatures often reach 20 below. Summer temperature averages can reach a high of 91 degrees and a low of 52 degrees. The average high temperature in Mineral County in July is 78 degrees and the average low temperature in January is -6.1 degrees.

2.2 History

Native American peoples frequented the Upper Rio Grande Valley for thousands of years. Archeologists have found evidence that the Paleo-hunters camped in the high country. A later hunter-gathering group, known today as the Utes, also migrated through the San Juan Mountains. After the discovery of gold in the San Juan Mountains, troops at Fort Garland moved the **San Luis Valley's Ute people off their traditional lands onto reservations in the Four Corners region**. The Denver & Rio Grande Railroad began transporting tourists into the area as early as 1883 with the opening of the depot at Wagon Wheel Gap. The hot springs soon became a popular spa with tourists coming for the curative and restorative benefits being promoted by the railroad.

In 1890, Nicholas Creede discovered a high-grade silver vein on Willow Creek. The population quickly swelled to 10,000. In 1891, Colorado Springs railroad tycoon William Palmer extended the rail line into Willow Creek Canyon where, during the boom years, two trains arrived and departed Creede daily. By 1892 over a million dollars in silver had been shipped down- valley. Hard rock mining continued as the dominant economy in the Town of Creede for nearly a century. In 1985, the last mine, known as the Homestake, closed permanently. The Creede Repertory Theatre (CRT) was founded in 1966 and has won numerous awards and is the largest summer employer in Mineral County (source: City of Creede, www.creede.gov).

2.3 Population

Table 2.2 describes some of the demographic and social characteristics of Mineral County's population.

Table 2.2 Demographic and Social Characteristics of Mineral County and City of Creede

Characteristic	Mineral County	City of Creede
Population (2014)	704	188
Median Age	61.2	55.3
Population 65 Years and Over	274	47
Female Population	353	98
Male Population	351	90
Average Household Size (2010)	2.01	1.82
Average Family Size (2010)	2.50	2.53
Percent of Total Population with Disabilities	19.7	23.9
Residents with Disabilities less than 18 Years	0	0
Residents with Disabilities 18-64 Years	55	26
Residents with Disabilities over 65 Years	84	19
Residents with Health Insurance Coverage	653	161
Residents with High School Degree (Percent)	96.5	94.3
Residents with Bachelor's Degree (Percent)	39.4	40.0

Source: U.S. Census, American Community Service, 2010-2014 5-Year Population Estimate

2.4 Economy

Select housing and economic characteristics for Mineral County and the City of Creede are provided in the table below. For the period 2010-2015, Mineral County issued an average of approximately 7 building permits per year.

Table 2.3 Economic and Housing Characteristics of Mineral County and the City of Creede

Characteristic	Mineral County	City of Creede
Median Household Income	\$47,986	\$30,000
Percent of Total Population that is Unemployed	0.6	1.9
Percent of Families Living Below Poverty Level	0.0	0.0
Percent of Individuals Living Below Poverty Level	6.8	19.1
Total Housing Units	1,248	205
Vacant Housing Units	873	105

Homeowner Vacancy Rate	3.9	10.2
Rental Vacancy Rate	22.5	33.3

Source: U.S. Census, American Community Service, 2010-2014 5-Year Population Estimate

According to the U.S. Census (2014 County Business Patterns), the total number of establishments located in Mineral County in the first quarter of 2014 was 66 and the total number of employees was 187 (the data does not include most government employees, railroad employees and self-employed individuals). The largest major industry sector was Accommodation and Food Services (18 establishments), followed by Retail Trade (15 establishments), and Construction (7 establishments).

Table 2.4 lists the major industries in Mineral County for the first quarter of 2014 by number of establishments (number of employees per establishment unavailable).

Table 2.4 Industry Distribution in Mineral County

Industry	Establishments
Accommodation and Food Services	18
Retail Trade	15
Construction	7
Arts, Entertainment and Recreation	5
Professional, Scientific and Technical Services	4
Real Estate and Rental/Leasing	3
Finance and Insurance	2
Health Care and Social Assistance	2
Other Services (except Public Administration)	5
Total (including sectors not listed above)	66

Source: U.S. Census Bureau, 2014 County Business Patterns

2.5 Government

There is a total of 5 local government entities in Mineral County (1 county, 1 municipal, 1 school district and 2 special districts). In accordance with Colorado law, a three-member Board of County Commissioners, elected to four-year terms, governs Mineral County. Mineral County Departments include the County Administrator, Assessor, Clerk & Recorder, Treasurer, **Sheriff's Department, Regional Library, Land Use, and Health Center. The Mineral County Fire District**, served by a volunteer fire department, and the Mineral County Emergency Medical Technicians (EMTs) provide emergency services in and around the Town of Creede.

Creede is a statutory town governed by a Board of Trustees composed of a mayor and six council members. Town revenues are generated through a 2% sales tax, Colorado Lottery funds, the Colorado Highway Users fund, city property taxes, and Enterprise Zones for the city water and sewer treatment facilities.

Chapter Three

Planning Process

3.1 2016 Plan Update Process

The overall effort to obtain a planning grant and complete the latest updates was guided by the San Luis Valley Hazard Mitigation Steering Committee (Steering Committee), composed of emergency managers from each of the five counties and select state and regional partners. The Steering Committee was established to address hazards, identify goals, and explore opportunities for collaborative mitigation actions on a regional level.

Table 3.1 San Luis Valley Hazard Mitigation Steering Committee

San Luis Valley Hazard Mitigation Steering Committee
Alamosa County Emergency Management
Conejos County Emergency Management
Mineral County Emergency Management
Rio Grande County Emergency Management
Saguache County Emergency Management
San Luis Valley Emergency Preparedness and Response (EPR)
San Luis Valley Regional Emergency Trauma Advisory Committee (RETAC)

The planning process began with a Steering Committee kickoff meeting in Alamosa on January 28, 2016. At the initial meeting, the Steering Committee discussed future steps and milestones, including reconvening County Planning Teams, scheduling county-level kickoff meetings, providing opportunities for public involvement, and coordinating with partner agencies.

The project to update the Mineral County Hazard Mitigation Plan was managed by the Mineral County Emergency Manager and funded by a combination of federal grant and local funds. Technical planning assistance was provided by staff from the Colorado Division of Homeland Security and Emergency Management. The services of a planning consultant were secured to conduct research, facilitate data collection, incorporate best available current data into revisions, and produce draft and final plan documents in accordance with DMA 2000 requirements.

Updates to this plan were based on research from a wide variety of sources, historical perspectives, and future projections of vulnerability and resource capacity. Updates were **completed using the most current state and federal guidance, including FEMA's Local Mitigation Planning Handbook (March 2013)**, to ensure that the plan met federal requirements. A concerted effort was also made to ensure that 2016 revisions were consistent with information in the Colorado Natural Hazards Mitigation Plan (December 2013), including the definition and detailed description of each hazard profiled in Chapter 4, Risk Assessment.

3.2 Multi-Jurisdictional Participation

Mineral County and the City of Creede are formal participants in updates to this plan. In accordance with DMA 2000, each participating jurisdiction must be involved in the planning process and formally adopt the mitigation plan. Participating jurisdictions that adopt this plan remain eligible for FEMA hazard mitigation grant funding. Other jurisdictions participating in the process can also receive FEMA grant funds, but only if the project is consistent with this plan and an eligible local government entity agrees to apply on their behalf.

Table 3.2 Mineral Hazard Mitigation County Planning Team

Mineral County Hazard Mitigation Planning Team	
Mineral County Sheriff	San Luis Valley EPR
Mineral County Clerk	San Luis Valley RETAC
Mineral County Coroner	Alamosa County OEM
Mineral County Public Health	Costilla County OEM
Mineral County Land Use	Mineral County OEM
Mineral County OEM	Saguache County OEM
Mineral County Coroner	Colorado State Patrol
Mineral County Search and Rescue Board	Colorado State Forest Service
City of Creede Public Works	U.S. Forest Service
Santa Maria Reservoir	Creede Heli
Colorado Division of Homeland Security and Emergency	Colorado Division of Fire Prevention and Control

The Mineral County Hazard Mitigation Planning Team (Planning Team) was reconvened to provide needed data, review draft updates, and assist with development of new and updated mitigation actions.

3.3 10-Step Planning Process

The planning process followed for the 2016 plan updates conforms to **FEMA's** four-phase DMA process and the **10-step process used for FEMA's Community Rating System (CRS) and Flood Mitigation Assistance (FMA)** programs. Table 3.3 shows how the modified 10-step process corresponds with the planning requirements of DMA 2000.

Table 3.3 Plan Development Methodology

FEMA's Four-Phase DMA Process	Modified 10-Step CRS Process
1) Organize Resources	
201.6(c)(1)	1) Organize the Planning Effort
201.6(b)(1)	2) Involve the Public
201.6(b)(2) and (3)	3) Coordinate with Other Departments/Agencies
2) Assess Risks	
201.6(c)(2)(i)	4) Identify the Hazards
201.6(c)(2)(ii)	5) Assess the Risks
3) Develop the Mitigation Plan	
201.6(c)(3)(i)	6) Set Goals
201.6(c)(3)(ii)	7) Review Possible Activities

201.6(c)(3)(iii)	8) Draft an Action Plan
4) Implement Plan/Monitor Progress	
201.6(c)(5)	9) Adopt the Plan
201.6(c)(4)	10) Implement, Evaluate and Revise the Plan

3.4 Phase One: Organize Resources

Step 1: Get Organized -- Building the Planning Team

In conformance with the DMA 2000 planning regulations and guidance, members of the Planning Team participated in the planning effort in the following ways:

- attending and participating in Planning Team meetings
- providing available data
- evaluating and rating area risks and hazards
- identifying goals and objectives for the mitigation strategy
- reviewing and providing comments on the plan drafts
- assisting in the implementation of the public input process
- identifying specific projects to be eligible for funding, and
- assisting with the formal adoption of the plan by the governing board.

Two sets of formal review meetings, one at the mid-project point and another at the final draft stage, were scheduled to update and obtain feedback from the Planning Team.

During the planning process, the Planning Team communicated by a number of means, including planning meetings, formal briefings, email correspondence and face-to-face interviews. This updated plan is a result of planning team input provided through a combination of technical data collection and sharing, comments on draft planning elements, and information gathered during planning meetings.

The meeting schedule and topics are listed in Table 3.4 below. Meeting summaries and agendas are included in Appendix D, Documentation of the Planning Process.

Table 3.4 Planning Meetings and Topics

Meeting Date and Location	Meeting Purpose
Initial SLV Steering Committee Meeting, January 28, 2016 (Alamosa, CO)	Discuss future steps and milestones (i.e., establishing County Planning Teams, county-level kickoff meetings, public involvement strategy, stakeholder coordination)
Mineral County Kickoff Meeting, July 19, 2016 (Creede, CO)	Reconvene County Planning Team, outline DMA 2000 process, identify timelines, review and update hazard assessment, discuss significant events last five years
Mid-Project Progress Report, June 29, 2016 (Colorado Springs, CO)	Update Steering Committee on progress to date and identify remaining information needs
Mitigation Actions Workshop, September 23, 2016 (Creede, CO)	Review 2010 mitigation actions and identify and prioritize mitigation actions for 2016; provide opportunity for citizens and private interests to comment on draft updates

Step 2: Plan for Public Involvement - Engaging the Public

The strategy for promoting public involvement and citizen participation consisted of:

- **One open public meeting** to provide opportunities for interested citizens to participate in updates of the Mineral County Hazard Mitigation Plan near the end of the planning effort after a final draft is available for review
- Information posts on county/municipal/district web pages
 - announcing the date, location and purpose of open public meeting
 - providing a final draft for public review and comment
 - providing a comment/feedback form for public use
- News release in local newspaper, advertising plan update, public meetings and comment period
- Public meeting announcement on social media, as needed
- Interviews and presentations by Mineral County Emergency Management and the planning consultant.

Step 3: Coordinate with Other Departments and Agencies

The Mineral County Office of Emergency Management invited a range of local, state, and federal agencies and other interested parties to participate on the Planning Team and review and comment on draft updates to the plan. The following departments and agencies participated in the process by attending planning meetings, providing needed data, and/or reviewing the final document draft.

- County/Municipal Elected Officials and Staff
- School Districts
- Special Districts
- Police Departments
- Fire Departments/Fire Protection Districts
- Colorado Division of Homeland Security and Emergency Management
- Colorado Division of Fire Protection and Control
- Colorado State Forest Service
- San Luis Valley Emergency Preparedness and Response (EPR)
- San Luis Valley RETAC
- U. S. Forest Service

3.5 Phase Two: Assess Risks

Step 4 - Identify Hazards

For the 2016 update, the Planning Team reviewed previous versions of the hazard assessment and established new ratings and priorities. The results of that process and hazard profiles for all significant hazards are detailed in Chapter 4, Risk Assessment. In addition to input from the planning team, a variety of state, federal, nonprofit and university sources were consulted to collect data required for the update of this plan, including:

- Colorado Department of Public Health and Environment (CDPHE)
- Colorado Department of Natural Resources, Office of the State Engineer
- Colorado Geological Survey (CGS)
- Colorado State Forest Service

- Colorado Water Conservation Board (CWCB)
- Federal Emergency Management Agency (FEMA)
- History Colorado
- National Oceanic and Atmospheric Administration (NOAA), National Centers for Environmental Information (formerly the National Climatic Data Center)
- National Weather Service (NWS)
- Rocky Mountain Insurance Information Association (RMIIA)
- University of South Carolina (SHELDUS)
- U.S. Census Bureau
- U.S. Geological Survey (USGS)

Step 5 - Assess Risks

To initiate this step, the Planning Team completed a hazard assessment worksheet that reevaluated hazard probability and severity and incorporated information about documented recent events.

Chapter 4, Risk Assessment, provides a detailed description of the hazard assessment process and results, including a vulnerability assessment, hazard maps, and an updated capabilities assessment. The capability assessment process identified existing policies, tools, and actions in place that can reduce risk and vulnerability from natural hazards, such as comprehensive plans, building codes and floodplain management ordinances. Combining the results of the hazard assessment with the capability assessment helps to inform the process of developing the goals, objectives, and proposed actions of this plan.

A profile of each identified hazard was created using available GIS data, online data sources, and existing plans and reports. The profiles included a hazard description, geographic location, past occurrences, probability of future occurrences, and magnitude/severity (extent) for each hazard. The profiles also describe overall vulnerability of each jurisdiction to each hazard and identify structures and estimate potential losses to structures in identified hazard areas.

3.6 Phase Three: Develop the Mitigation Plan

Step 6 - Set Goals

Based on the results of the risk assessment, the Planning Team established the 2016 Goals for this plan and mitigation strategy. The goals set for the plan are as follows:

1. Reduce loss of life and personal injury caused by natural hazards
2. Reduce damage to critical facilities, personal property, and other community assets caused by natural hazards and
3. Minimize economic losses associated with natural hazards.

Step 7 - Review Possible Activities

The Planning Team discussed a wide range of possible mitigation actions, and employed the STAPLEE methodology endorsed by FEMA to evaluate and prioritize each proposed action. For each recommended action, the planning team developed a project summary that included a description of the action, the department or agency responsible for implementing it, and a

timeframe for completion. The results of this collaborative process are captured in Chapter 5, Mitigation Strategy.

The Planning Team identified and prioritized mitigation actions at the second planning team meeting. Details on this process are included in Chapter 5. **The planning team identified the responsible agency, cost estimates, and timeline for each identified action.**

Step 8 - Draft the Plan

Based on hazard assessment results and the goals and activities identified in Planning Steps 6 and 7, a complete first draft of the plan was prepared and distributed for review and comment. Final comments from the Planning Team and **interested citizens were integrated into the final draft,** which was advertised and distributed to collect public input and comments. A final draft was produced for the Colorado Division of Homeland Security and Emergency Management and FEMA Region VIII to review and approve, contingent upon final adoption by Mineral County and participating jurisdictions.

3.7 Phase Four: Implement the Plan and Monitor Progress

Step 9 - Adopt the Plan

In order to officially implement the plan, the plan is tentatively scheduled for adoption by Mineral County and the City of Creede in early 2017, following conditional approval by FEMA Region VIII of the updated plan.

Step 10 - Implement, Evaluate and Revise the Plan

The primary benefit of mitigation planning is the effective implementation of specific mitigation projects and action items. Each mitigation action recommended in this update of the plan includes a description of the problem and recommended solution, a lead/responsible agency, project priority, cost estimate, and possible funding sources. An overall implementation strategy is described in Chapter 6, Plan Maintenance. A plan update and maintenance schedule and a strategy for continued public involvement are also included in Chapter 6.

Chapter Four

Risk Assessment

This chapter profiles the natural hazards that affect Mineral County and assesses vulnerability to those hazards. The risk assessment allows Mineral County communities to better understand their risks and provides a framework for developing and prioritizing mitigation actions to reduce risk from future natural hazard events.

Risk is the potential for damage, loss, or other impacts created by the interaction of natural or other types of hazards with community assets. When people, property or other community assets are exposed to hazards, incidents or extreme events can lead to disastrous impacts. “Impacts are the consequences or effects of the hazard on the community and its assets. The type and severity of impacts are based on the extent of the hazard and the vulnerability of **the asset, as well as the community’s capabilities to mitigate, prepare for, respond to, and recover from events.**”¹

Hazard Assessment Terminology

Natural hazard - source of harm or difficulty created by a meteorological, environmental, or geological event

Community assets - the people, structures, facilities, and systems that have value to the community

Vulnerability - characteristics of community assets that make them susceptible to damage from a given hazard

Impact - the consequences or effects of a hazard on the community and its assets

Risk - the potential for damage, loss, or other impacts created by the interaction of natural hazards with community assets

Hazard assessment - product or process that collects information and assigns values to risks for the purpose of informing priorities, developing or comparing courses of action, and informing decision making.

Threat or human-caused incident - intentional actions of an adversary, such as a threatened or actual chemical or biological attack or cyber event.

Source: Local Mitigation Planning Handbook, FEMA (March 2013)

The risk assessment is a decision support tool that provides a framework for developing and prioritizing mitigation actions to reduce risk from future hazard events. For the 2016 updates to this plan, the process that was followed is consistent with the Hazard Identification and Risk Assessment (HIRA) process in the Colorado Natural Hazards Mitigation Plan (2013) and conforms to the methodology described in the FEMA publication *Understanding Your Risks—*

¹ Local Mitigation Planning Handbook, FEMA (March 2013), p. 5-1

Identifying Hazards and Estimating Losses (2002), which breaks the assessment down to a four-step process:

1. Identify Hazards
2. Profile Hazard Events
3. Inventory Assets
4. Estimate Losses

Data collected through this process have been incorporated into the following sections of this chapter:

Section 4.1 Hazard Identification identifies the hazards faced by Mineral County and evaluates the probability and potential consequences for each of these hazards.

Section 4.2 Hazard Profiles discusses the nature of each hazard, describes previous occurrences of hazard events and the likelihood of future occurrences, and estimates potential impacts and consequences.

Section 4.3 Vulnerability Assessment provides an overview of the total exposure to natural hazards, considering population and other community assets at risk, including critical facilities/infrastructure, economic assets, and natural, cultural and historic resources. This section also includes an analysis of trends in population growth and land use.

Section 4.4 Capability Assessment provides a summary of local hazard mitigation capabilities, including current mitigation activities and existing policies, regulations, and plans pertaining to mitigation and affecting net vulnerability.

4.1 Hazard Identification

4.1.1 Results and Methodology

For the 2016 update, the Mineral County Hazard Mitigation Planning Team (Planning Team) revisited the list of hazards from the 2010 hazard mitigation plan and reevaluated each based on recent events, historical frequency, and potential for causing significant human and/or monetary losses in the future. As a result of this review, the Planning Team determined that 12 natural hazards pose a threat to the county (as in 2010) and no additional hazards were added for the 2016 update.

Table 4.1 Significant Natural Hazards Affecting Mineral County

Significant Natural Hazards Affecting Mineral County		
Floods	Windstorms	Dam Failure
Wildfires	Tornadoes	Avalanches
Hail	Severe Winter Storms	Landslides
Lightning	Drought	Earthquakes

The Planning Team evaluated each of the identified hazards focusing on the number of previous occurrences, probability of future events, and the estimated magnitude and severity of impacts to community assets. The results of this analysis are indicated in the table below.

Table 4.2 Mineral County Risk Assessment 2016, Hazard Assessment Worksheet

Hazard	Location	Previous Occurrences (Last 50 Years)	Probability	Magnitude/Severity
Avalanche	Slopes in San Juan Mtns. (esp. Wolf Creek Pass)	At least 4 deaths since 1950	Likely	Critical
Drought	30 dams-13 w/EAPs (largest is Santa Maria @49,400 acre'); Willow Creek Funnel (Flume)	None on record	Highly Likely	Critical
Earthquake	Northwest Mineral County (Cannibal Fault)	4 events (1976-1977/ 2000-2003/2006/2007-2008)	Occasional	Limited
Flood	Rio Grande River; City of Creede	None on record	Occasional	Limited
Hail	Countywide	6 events (1970/1973/ 1979/1981/1984/ 2005)	Likely	Limited
Landslide	Countywide	No recorded events	Likely	Limited
Dam Failure	South and Southwest Mineral County	No recorded events	Unlikely	Critical
Lightning	Countywide	1 event – 7/28/2008 (shepherd struck and killed 9 miles NW of Creede)	Likely	Critical
Severe Winter Storm	Countywide	7 events (December 1982 caused >\$800,000 damages)	Likely	Critical
Tornado	Countywide	1 event (F2 on 10/10/1997, 10 mi. SE of Creede at 10,500-11,500 feet)	Unlikely	Limited
Wildfire	Valleys and lower elevations of San Juan Mtns.	West Fork Complex Fire in 2013 burned 109,000 acres (also, fires in 2006 and 2009)	Highly Likely	Catastrophic
Windstorm	Countywide	11 events (none >\$20,000 in damages)	Likely	Limited

The Planning Team reached consensus on the hazard ratings above using the following guide:

- Location
 - Geographic extent and participating jurisdictions affected
- Previous Occurrences
 - Known hazard incidents and information related to impacts
- Probability
 - Highly Likely - Annual event or occurs at least once per year (~100% chance)
 - Likely - Recurrence interval of 10 years or less (10-100% chance/year)
 - Occasional - Occurs every 11-100 years (1-10% chance/year)
 - Unlikely - Occurs greater than every 100 years (<1% chance in next 100 years)
- Magnitude/Severity
 - Catastrophic - Multiple deaths; property destroyed and damaged; population displacement; infrastructure damages; service disruptions > 72 hours

- Critical - Isolated deaths/injuries; major or long-term impacts to property, infrastructure and critical services; service disruptions 24-72 hours
- Limited - Minor injuries and illnesses; minimal property damage; infrastructure and critical services disruptions of less than 24 hours
- Negligible - No deaths; few injuries or illnesses; minor quality of life loss; brief service disruptions; but little or no other community impacts

4.1.2 Disaster Declaration History

Federal and/or state disaster declarations histories help document past occurrences of hazards in Mineral County and Colorado. Disaster declarations are granted when the magnitude and severity of impacts caused by an event surpass the ability of the affected local government to respond and recover. Most disaster assistance programs are supplemental and require a local cost-sharing match. When the response capacity of an affected jurisdiction is exhausted, a state disaster declaration may be issued, allowing for the provision of state assistance, usually for the purpose of covering the costs of state assets committed to response operations.

Should the severity of the disaster event surpass both the local and state government response capacity, a federal emergency or disaster declaration may be issued, allowing for the provision of federal disaster assistance. Generally, the federal government issues disaster declarations through FEMA. However, federal assistance may also come from the U.S. Department of Agriculture (USDA), the Small Business Association (SBA), or other government programs such as the Fire Management Assistance Grant Program. FEMA also issues emergency declarations, which are more limited in scope and without the long-term federal recovery programs of major disaster declarations. The quantity and types of damage are the determining factors. Table 4.3 lists state and federal disaster declarations in which Mineral County was a designated county.

Table 4.3 FEMA and State Disaster Declaration History (1965-2016) for Mineral County

Year	Event Type	Disaster Number
1970	Heavy rains and flooding; Mineral County designated federal disaster area	DR-293
1973	Flooding and landslides; Mineral County designated federal disaster area	DR-396
1984	Severe winter storm	State Declaration
2003	USDA Secretarial Disaster declaration for drought and insects	S1843
2005-2006	USDA Secretarial Disaster declaration for drought, fire, high winds and heat	S2327
2012	USDA Secretarial Disaster declaration for drought	S3260
2013	USDA Secretarial Disaster declaration for drought	S3545
2013	West Fork Fire Complex; FEMA Fire Management Assistance Declaration; 109,615 acres burned; FEMA PA Grant: \$7.9 million	FM-5031

Source: Colorado Natural Hazards Mitigation Plan (2013); FEMA, www.fema.gov/news/disasters.fema

4.2 Hazard Profiles

Each of the hazards identified as posing a threat in Mineral County is profiled in subsequent sections. Each profile includes a summary of the overall risk and vulnerability for each identified hazard for each participating jurisdiction. The sources used to collect information for the hazard profiles include, but are not limited to the following:

- State of Colorado Natural Hazards Mitigation Plan (2013)
- Information on past hazard events from the Spatial Hazard Event and Loss Database; (SHELDUS), a component of the University of South Carolina Hazards Research Lab, that compiles county-level hazard data for 18 natural hazard event types
- Information on past extreme weather and climate events from the National Oceanic and Atmospheric Administration's National Centers for Environmental Information (formerly the National Climatic Data Center or NCDC)
- Disaster declaration history from FEMA, the Public Entity Risk Institute (PERI), and the U.S. Department of Agriculture (USDA) Farm Service Agency
- State of Colorado datasets compiled by state and federal agencies;
- Existing plans and reports; and
- Information collected from the County Planning Team and additional stakeholders.

4.2.1 Hazard Profile Methodology

Each hazard is profiled in a similar format that describes hazard characteristics, hazard location, previous occurrences, probability, magnitude/severity, and vulnerable community assets.

- Hazard Description
 - This subsection provides a general description of the hazard and associated problems and considers the relationship between hazards.
- Geographic Location
 - This subsection identifies the areas within Mineral County that are vulnerable to each hazard, or whether potential impacts could affect the entire county.
- Previous Occurrences
 - This subsection contains an overview of information on historic incidents, including major incident impacts where known.
- Probability of Future Occurrences
 - This subsection provides a general description of the hazard and associated problems and considers the relationship between hazards. The probability, or chance of occurrence, was calculated based on existing data. Where data was available, the probability was determined by dividing the number of events observed by the number of years and multiplying by 100, providing the percent chance of the event happening in any given year. Given the experience and expertise of Planning Team members, final probability ratings were reached based on consensus of the group. Based on historical data, the probability of future occurrences is categorized as follows: Highly Likely (near 100 percent chance of occurrence next year or it happens every year); Likely (10-100 percent chance of occurrence next year or it has a recurrence interval of 10 years or less); Occasional (1-10 percent chance of occurrence in the next year or it has a recurrence interval of 11 to 100 years; and Unlikely (less than 1

percent chance of occurrence in the next 100 years or it has a recurrence interval of greater than every 100 years.

- Magnitude/Severity
 - This subsection summarizes the extent or potential extent of a hazard event in terms of deaths, injuries, property damage, and interruption of essential facilities and services. Magnitude/severity is categorized as follows: Catastrophic (multiple deaths; property destroyed and severely damaged; and/or interruption of essential facilities and service for more than 72 hours); Critical (isolated deaths and/or multiple injuries and illnesses; major or long-term property damage that threatens structural stability; and/or interruption of essential facilities and services for 24-72 hours); Limited (minor injuries and illnesses; minimal property damage that does not threaten structural stability; and/or interruption of essential facilities and services for less than 24 hours); and Negligible (no or few injuries or illnesses; minor quality of life loss; little or no property damage; and/or brief interruption of essential facilities and services).
- Vulnerability Assessment
 - This subsection **describes the county’s overall vulnerability to each hazard;** identifies existing and future structures, critical facilities, and infrastructure in identified hazard areas; and estimates potential losses to vulnerable structures, where data is available.

4.2.2 Flood

Hazard Description

Flooding in Mineral County can occur as a result of rain, melting snow or rain on melting snow (or due to the failure of a dam). According to the 2013 Colorado Flood Hazard Mitigation Plan, **“A flood is a general and temporary condition of partial or complete inundation of normally dry land areas from: (1) the overflow of stream banks, (2) the unusual and rapid accumulation of runoff of surface waters from any source, or (3) mudflows or the sudden collapse of shoreline land. Flooding results when the flow of water is greater than the normal carrying capacity of the stream channel.”**²

The 100-year flood is the national standard to which communities regulate their floodplains through the National Flood Insurance Program (NFIP). Participation in the NFIP requires adoption of a local floodplain management ordinance and its enforcement within a mapped Special Flood Hazard Area. Regulation of floodplain development by the community entitles citizens to purchase federal flood insurance.

Mineral County is at risk to both riverine and stormwater flooding. Riverine flooding occurs when a stream **exceeds its “bank- full” capacity and generally occurs as a result of prolonged rainfall**, or rainfall that is combined with soils already saturated from previous rain events. The area adjacent to a river channel is its floodplain (i.e., the area that is inundated by the 100-year flood).

² Colorado Flood Hazard Mitigation Plan, Colorado Water Conservation Board, November 2013, p. 16

Stormwater refers to water that collects on the ground surface or is carried in the stormwater system when it rains. In runoff events where the amount of stormwater is too great for the system, or if the channel system is disrupted by vegetation or other debris that blocks inlets or pipes, excess water remains on the surface. This water may pond in low-lying areas, often in street intersections. Stormwater ponding, also known as localized flooding, may result in deep water and pollution. Stormwater can pick up debris, chemicals, dirt, and other pollutants from impervious surfaces.

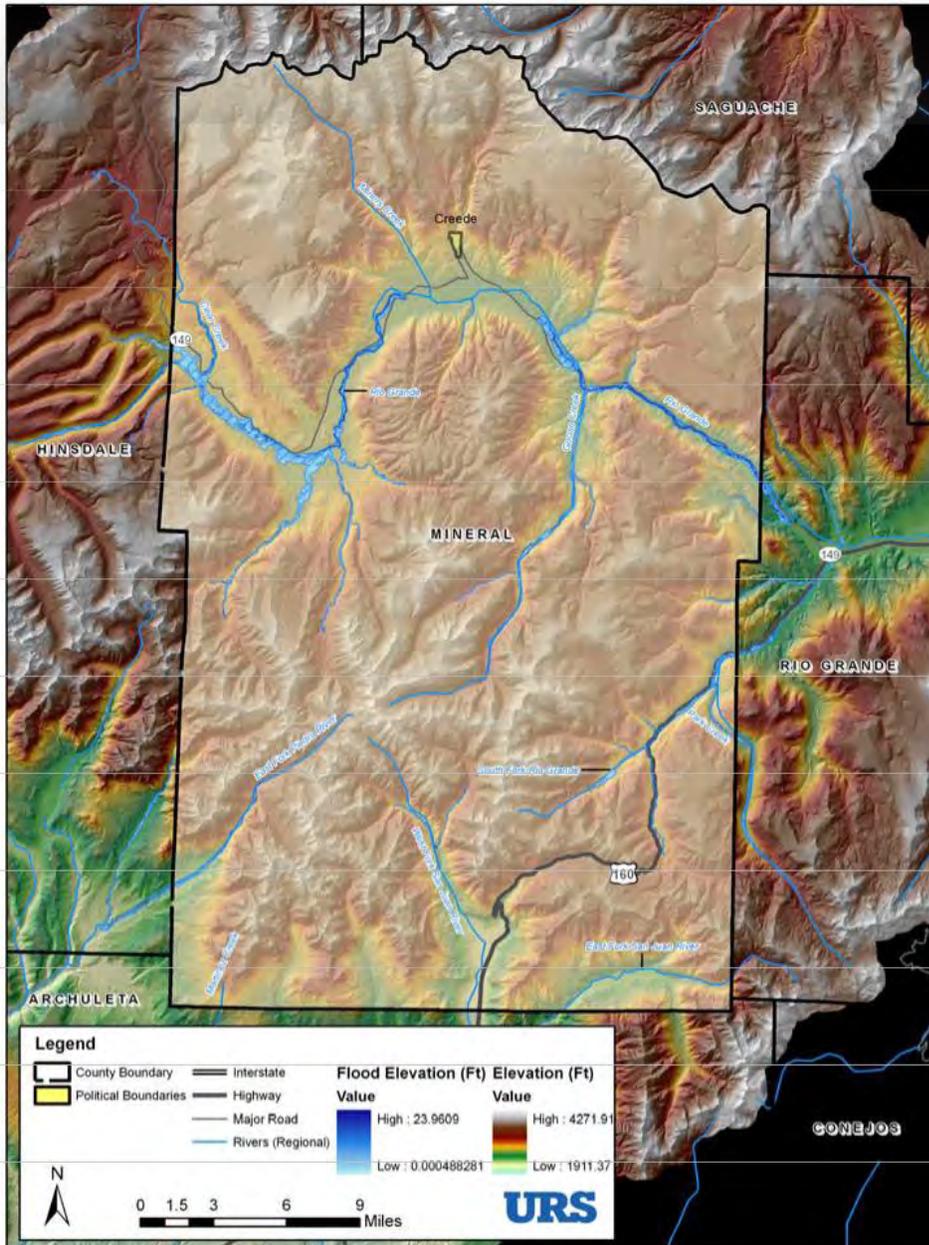
The potential for flooding is altered by land use changes that change the impervious characteristics of the land surface. A change in environment can create localized flooding problems inside and outside of natural floodplains by altering or confining watersheds or natural drainage channels. **Wildfires create hydrophobic soils, a hardening of the earth's** surface that prevents rainfall from being absorbed into the ground, which can increase runoff, erosion, and downstream sedimentation of channels.

Geographic Location

Mineral County is located within the Rio Grande River drainage basin in south central Colorado. The Rio Grande River is the greatest source of flood hazards. Mineral County is particularly vulnerable to flooding related to Severe Weather events between May and June when snowmelt runoff is flowing.

Data for riverine flooding in Mineral County was generated by HAZUS-MH MR3, FEMA's software program for estimating potential losses from disasters. HAZUS was used to generate a 1 percent annual flood, or 100-year flood, in Mineral County. The software produces a flood polygon and flood-depth grid that represents the 100-year flood. While not as accurate as DFIRMs, these floodplain boundaries are useful for GIS-based loss estimation. Figure 4.1 is a map of the 100-year floodplain for Mineral County and each participating jurisdiction.

Figure 4.1 100-Year Floodplains in Mineral County



Source: HAZUS MH MR-3 (2009)

Previous Occurrences

Table 4.4 provides information about significant flood events in Mineral County, compiled from a number of sources as noted.

Table 4.4 Significant Flood Events in Mineral County

Year	Location	Description
1970	Mineral County	Heavy rains and flooding; Mineral County designated federal disaster (DR-293)

1973	Mineral County	Flooding and landslides; Mineral County designated federal disaster (DR-396)
1979	Mineral County	Flooding (severe storm); property damages totaling \$392,845 (ADJ 2014)
1981	Mineral County	Flooding (severe storm); property damages totaling \$130,218 (ADJ 2014)
1984	Mineral County	Flash flooding caused \$785,000 (ADJ 2014) in damages to crops and property
2005	City of Creede	10-year flood event

Source: Colorado Natural Hazards Mitigation Plan (2013); SHELUDS

Probability of Future Occurrences

The 1% annual chance flood event is the standard national measurement for flood mitigation actions and insurance. This recurrence level is an average and does not mean that a flood of that magnitude will occur exactly every 100 years. Likewise, the 2% chance flood, or 500-year flood event, has a 2% (or 1 in 500) chance of occurring in a given year.

Although flood events in Mineral County are rare, severe weather and snowmelt runoff present a threat of serious flooding along rivers and creeks in the county each year. The Planning Team has rated the probability of future flood events in Mineral County occasional, with a recurrence interval of 11-100 years, or a 1-10 percent chance of occurrence in the next year.

Magnitude/Severity

Flooding presents a risk to life and property, including buildings, their contents, and their use. Floods can also affect lifeline utilities (e.g., water, sewage and power), transportation, the environment, jobs and the local economy. The extent of damage depends on the depth and velocity of floodwaters. Past flood events in Mineral County have damaged roads, bridges, private property, businesses, and public facilities. Future events may result in greater damages depending on patterns of growth and land use development. The Planning Team has rated the severity of the flood hazard in Mineral County limited, meaning that minor injuries and minor property damages are possible, with minimal disruptions to infrastructure and critical services.

Vulnerability Assessment

The HAZUS flood analysis results provide the number of buildings impacted, estimates of the building repair costs, and the associated loss of building contents and business inventory. Building damage can cause additional losses to a community as a whole by restricting the **building's** ability to function properly, resulting in vacant homes and businesses. Income loss data accounts for losses such as business interruption and rental income losses as well as the resources associated with damage repair and job and housing losses. These losses are calculated by HAZUS using a methodology based on the building damage estimates. Flood damage is directly related to the depth of flooding. For example, a two-foot flood results in **approximately 20% of the structure being damaged (or 20% of the structure's replacement value)**.

To identify critical facilities located in the floodplain, GIS data from Mineral County showing the locations of critical facilities was combined with the 100-year floodplain map. The Mineral County/Creede Fire Station is within the 100-year floodplain and could potentially be damaged in a 100-year event.

Table 4.5 shows that HAZUS estimates total building damages of over \$6 million in Mineral County. In addition, HAZUS estimates that the number of people displaced by the flood event is 74 and the number of people requiring short-term sheltering is 2.

HAZUS estimates for direct economic losses for buildings are shown in the table below.

Table 4.5 Potential Flood Losses: HAZUS Estimates

Type of Loss	Damage Estimate
Building Damage	\$3,730,000
Contents Damage	\$2,300,000
Inventory Loss	\$6,000
Relocation Loss	\$10,000
Wages Losses	\$2,000
Rental Income Loss	\$2,000
Total Loss	\$6,050,000

Source: HAZUS-MH MR3 (2009)

It should be noted that the HAZUS-generated floodplain boundaries do not conform to the FEMA Flood Insurance Rate Map (FIRM or DFIRM) boundaries and are most useful for disaster-planning purposes. Mineral County has been mapped by the NFIP and published flood maps are more accurate than results from HAZUS. For normal local planning and development review, the most current FIRM or DFIRM is the regulation standard.

Mineral County joined the National Flood Insurance Program (NFIP) in 1991. Any structure built in the floodplain now has to meet Mineral **County's floodplain requirements**. Table 4.6 provides information on the NFIP participation of communities in Mineral County. **NFIP insurance data indicates that as of July 31, 2016, there are four flood insurance policies in force in the unincorporated areas of Mineral County and nine policies in the City of Creede (\$6,409,100 in total coverage).**

Table 4.6 Mineral County NFIP Information

Jurisdiction	Date Joined	Effective FIRM Date	Policies	Insurance in Force (\$)	Number of Claims	Total Claims (\$)
Mineral County	4-16-1991	April 16, 1991	4	\$483,000	1	\$268
City of Creede	1-1-1986	1-16-1976	9	\$1,926,100	0	0

Source: FEMA Community Status Book Report (August 4, 2016); NFIP BureauNet Reports (July 31, 2016)

Development in floodplains could be regulated by adopting floodplain regulations where they **don't currently exist**. **Floodplain management when properly enforced minimizes** risk of flooding to future development. Floodplain management programs within Mineral County and the City of Creede would minimize the overall risk of flooding for future development.

FEMA initiated the Map Modernization program in 2002 in which Digital Flood Insurance Rate Maps will eventually be produced for all Colorado Counties. This involves a public-private

partnership in order to meet the needs of each entity. Several counties begin the process during each program year; however, Mineral County has not yet been included. Once these maps are complete and approved estimates of structures and values within the floodplain **should be revised using the Assessor's data and the new maps.**

4.2.3 Wildfire

Hazard Description

According to the 2013 Colorado Natural Hazards Mitigation Plan, a wildfire is “an unplanned, unwanted wildland fire including unauthorized human-caused fires, escaped wildland fire use events, escaped prescribed fire projects, and all other wildland fires where the objective is to put the fire out. Wildfires are divided into four categories:

- Wildland fire - fuel consists mainly of natural vegetation;
- Interface or intermix fire - urban/wildland fires that consist of vegetation and manmade fuel;
- Catastrophic fire - a very intense event that makes suppression very difficult and negatively impacts human values;
- Prescribed fire - **Any fire ignited by management actions to meet specific objectives.**³

Three factors that contribute to fire ignition and growth are fuel, topography, and weather. Fuel sources include dead tree needles, leaves, twigs, branches, dead standing trees, live trees, brush, and cured grasses. Light fuels such as grasses burn quickly and serve as a catalyst for the **spread of fire. “Ladder fuels” can spread a** ground fire up through brush into trees, leading to a devastating crown fire in the upper canopy that cannot be controlled.

Topography, or an area's terrain and land slopes, affects its susceptibility to wildfire spread.

Due to the convection of heat, both fire intensity and rate of fire spread increases as slope increases. Weather components such as temperature, relative humidity, wind, and lightning also affect the potential for wildfire. High temperatures and low relative humidity dry out the fuels that feed the wildfire creating a situation where fuel will more readily ignite and burn more intensely. Winds are the most dangerous and unpredictable weather factor that affects fire behavior.

Geographic Location

As noted in the 2013 Colorado Natural Hazards Mitigation Plan, prolonged drought has resulted in extremely dry and volatile fuels and a corresponding upswing in large, erratic wildfires, on grasslands as well as in the forests. Wildfires occur naturally (often through lightning strikes) and also from human causes, including illegal outdoor fires, sparks from trains, discarded cigarettes, and outdoor cooking grills.

The previous 2010 assessment of the wildfire hazard noted that the wildfire hazard in Mineral County lies primarily in the lower elevations of the San Juan Mountains and in the valleys throughout the county and the wildfire risk is predominantly associated with wildland-urban

³ Colorado Natural Hazards Mitigation Plan (December 2013), Colorado Division of Homeland Security and Emergency Management, p. 3-214

interface areas (areas where development occurs within or immediately adjacent to wildlands, near fire-prone trees, brush, and/or other vegetation). While this assessment is still valid, the West Fork Fire Complex in 2013 provides evidence that widespread beetle-kill in mountain forests has resulted in an increased fire threat at higher elevations.

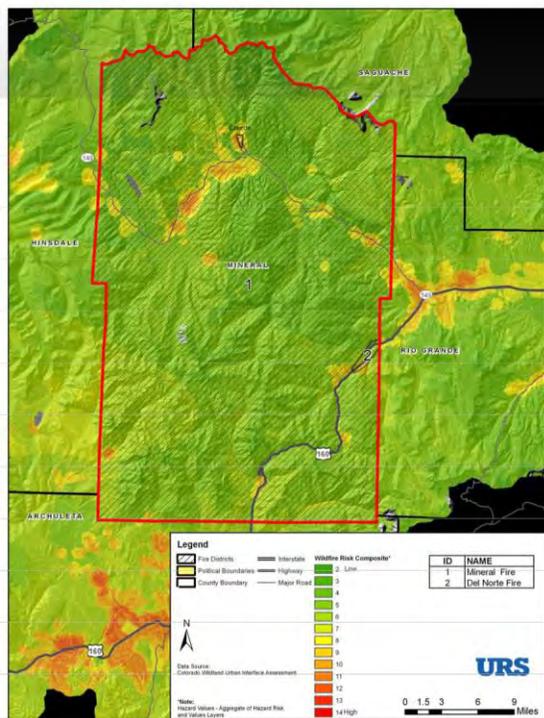
The Mineral County Fire Protection District provides protection for private properties located in portions of northern Mineral County. Approximately 95% of the county is made up of public lands, protected by the U.S. Forest Service.

The Colorado State Forest Service (CSFS) conducts regular assessments to evaluate wildfire risks and hazards in the state. CSFS uses the following three GIS layers to determine fire danger:

- *Risk* - probability of ignition (e.g. lightning strike intensity; existence of 100-meter road and railroad buffers)
- *Hazard* - vegetative and topological features affecting intensity and rate of spread
 - Slope, aspect and vegetation (fuels)
- *Values* - natural or manmade components of the ecosystem on which a value can be placed (e.g., housing density)

Figure 4.2 below shows how these layers can be combined to create an overall risk composite ranking for Mineral County, with fire protection district boundaries.

Figure 4.2 Fire Protection Districts and Wildfire Risk Composite in Mineral County



Source: Created by URS, data from Mineral County Fire Protection District Community Wildfire Protection Plan (2009)

The assessment indicates that the wildfire hazard in Mineral County is fairly widespread, with significantly high risk across the valley, likely due to the greasewood fuels and wind patterns. The lower elevations of the San Juan Mountains are also at higher risk than other portions of the county due to slope, dense forestation, and inadequate roads. The wildfire risk is greatest in the wildland-urban interface areas (areas where development occurs within or immediately adjacent to wildlands, near fire-prone trees, brush, and/or other vegetation), and during the traditional spring ditch burning season, where property can easily be damaged when high winds turn an otherwise controlled burn into a conflagration.

Previous Occurrences

The West Fork Fire Complex began as a series of lightning strikes in the San Juan National Forest, starting with the West Fork and Wolf Creek Fires on June 5, 2013. On June 13, 2013 the Windy Pass fire was detected, and on June 20, 2013 the Papoose Fire ignited in the neighboring Rio Grande National Forest. While the Wolf Creek Fire was suppressed early on, the remaining three fires were long-term events and were managed under a common command structure known as the West Fork Fire Complex.

Figure 4.3 West Fork Fire Complex from Town of South Fork



Source: U.S. Forest Service

Although no homes were lost, the West Fork Fire Complex burned 109,632 acres and cost \$31,433,000 to contain. Prior to the West Fork Complex Fire, most wildland fires in Mineral County were small and there are no documented incidents of wildfire damage. The traditional wildfire season runs from March through August, but wildfires and grassfires can occur any time of the year. Although most are controlled when they are small (one acre or less), the Mineral County Fire Protection District and neighboring fire protection districts respond to a number of events each year.

Probability of Future Occurrences

The location of a fire is almost impossible to predict, since the factors which contribute to a fire are highly variable, including weather conditions, drought cycles, fuel-loading, lightning strikes, and human activities.

Chances for wildfires increase with periods of drought, high winds, and extreme heat conditions. Historically, much of the wildfire risk in Mineral County has been associated with agricultural ditches and overgrown grasses and weeds (spring ditch burning season). Controlled burns can ignite their immediate surroundings and result in escaped wildfires. Wildfires occur nearly every year in Mineral County. The presence of extensive forest fuels caused by spruce-beetle killed trees increases the probability that large, uncontrollable fires like the West Fork Fire Complex will occur again in the future. As a result, the Planning Team has rated the probability of future wildfire events highly likely, meaning a near-100 percent chance of occurrence next year or it happens every year.

Magnitude/Severity

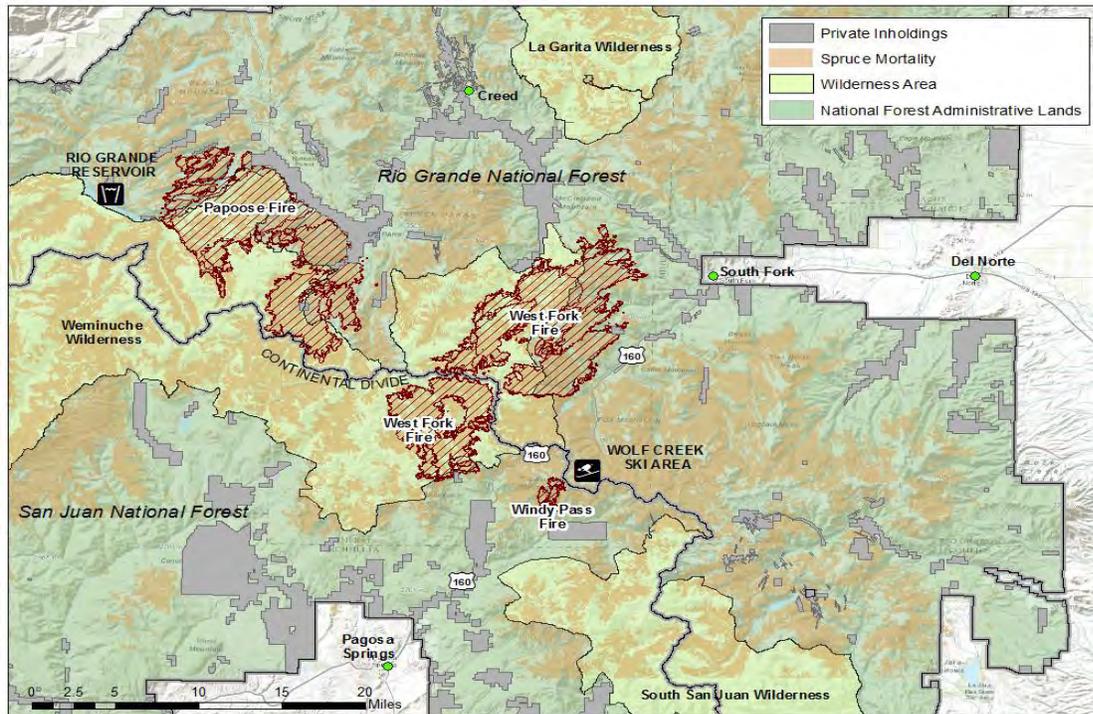
The growth and behavior of wildfires and grassfires are influenced by topography, fuel, and weather. Additionally, other hazards can trigger wildfires, such as lightning or power lines brought down by high winds. Drought conditions increase wildfire potential by decreasing fuel moisture. When conditions combine to cause a fast-moving wildfire or grassfire, potential impacts include destruction of structures, vehicles, signage and other property, as well as smoke damage to buildings.

Wildfires can also impact utilities, watersheds, natural and cultural resources, range and crop lands, and local economies (e.g., fire expenditures/loss of tourism). Smoke and air pollution from wildfires can be a severe health hazard. Other secondary impacts include future flooding and erosion during heavy rains. As a result of dangerous fuel load levels in mountain forests, the severity of the wildfire hazard in Mineral County is rated catastrophic by the Planning Team, meaning that multiple deaths, damaged and destroyed structures, and/or interruption of essential facilities and service for more than 72 hours can be expected in a major fire event.

Vulnerability Assessment

New development in the wildland-urban interface will place more people and property at risk. The threat of wildfire and potential losses will increase as population increases and the wildland-urban interface expands. Additionally, most Colorado forests have been infested with spruce or **pine beetle or “bark beetle.”** The San Juan mountain range will continue to be susceptible to future infestation. Older trees, trees in crowded or poor growing conditions, and those with root damage or disease are most likely to be attacked. As the beetle population grows, so does the fuel for wildfire.

Figure 4.4 Map of West Fork Fire Complex and Spruce Mortality Areas



Source: U.S. Forest Service

The Mineral County Fire Protection District completed their Community Wildfire Protection Plan in April 2009. This plan identifies 20,902 acres located within wildland-urban interface (WUI) areas, approximately 4% of the total 561,920 acres within Mineral County.

There are several neighborhoods within Mineral County that are at moderate or high risk to damages from wildfire. These subdivisions were evaluated based on accessibility, risk, and ease of evacuation. Table 4.7 below provides an overview of the wildland-urban interface areas within Mineral County and their respective risk levels.

Table 4.7 Wildland-Urban Interface Subdivisions Community Wildfire Ratings for Mineral County

Low Risk	Moderate Risk	High Risk
Bristol Head Acres	Bachelor Loop	Big River Ranch
Creede Haven	Bristol View Acres	Blue Creek Summer Homes
Eagle Nest Park	Kid Peak Estates	Cade Ranch
	Rio Grande Haciendas	Lost Valley of San Juans
	Spring Creek Ranch	Lucky 7
	Goose Creek	Metroz Lake
		Spar City
		Wolf Creek Village

4.2.4 Hail

Hazard Description

According to the 2013 Colorado Natural Hazards Mitigation Plan, Colorado is one of the most hail-prone states in the country. The Northeast Plains and Front Range experience a higher frequency of large-diameter hail than any part of the state, but all regions of the state, including the San Luis Valley, are vulnerable to storms that can produce severe (>1 inch) hail. The Colorado hail season is April 15 to September 15. Colorado hailstorms occur most frequently in June and are most likely to be destructive in mid-June.⁴

Hail forms when updrafts carry raindrops into extremely cold areas of the atmosphere where they freeze and turn into ice. The hailstones fall downward when they become heavy enough to overcome the strength of the updraft, reaching speeds of 120 mph.

The National Weather Service classifies hail by diameter size in comparison to everyday objects to help relay scope and severity to the population. The table below indicates the hailstone measurements utilized by the National Weather Service.

Table 4.8 Hailstone Measurements

Severity	Description	Hail Diameter Size (Inches)
Non-Severe Hail Does not typically cause damage and does not warrant severe thunderstorm warning from NWS.	Pea	0.25
	M&M Plain	0.50
	Penny	0.75
	Nickel	0.875
Severe Hail Research has shown that damage occurs after hail reaches about 1" in diameter and larger. Hail of this size will trigger a severe thunderstorm warning from NWS.	Quarter	1.00
	Half Dollar	1.25
	Ping Pong Ball/Walnut	1.50
	Golf Ball	1.75
	Hen Egg/Lime	2.00
	Tennis Ball	2.50
	Baseball	2.75
	Teacup/Large Apple	3.00
	Grapefruit	4.00
	Softball	4.50
Average	0.75-1.50	

Source: Colorado Natural Hazards Mitigation Plan (December 2013)

Geographic Location

Although there have been no reported hail events in Mineral County, hail has been regularly observed in neighboring counties and poses some degree of risk to people and property in unincorporated areas and the City of Creede.

Previous Occurrences

According to SHEL DUS and the National Centers for Environmental Information, Mineral County has experienced 0 hailstorms that resulted in crop and/or property damages since 1960.

⁴ Colorado Natural Hazards Mitigation Plan, December 2013, Colorado Division of Homeland Security and Emergency Management, p. 3-62

Probability of Future Occurrences

It is nearly impossible to pre-determine where hail may fall more than a few hours ahead of a severe storm. Atmospheric convection activity producing conditions favorable to hail events is expected to occur in the future as in the past. A hail storm with the potential to cause damage to crops and property can be expected to occur every year. Hail events in Mineral County are considered likely, with a recurrence interval of 10 years or less (10-100% chance in a given year).

Magnitude/Severity

The severity of a hailstorm is influenced by a variety of factors, including hail diameter, hail density, fall speed and surface wind speeds. Hail is primarily a risk to property -- vehicles, roofs and landscaping are the property most commonly damaged by hail. However, large hail can also cause death or injury to people caught outside and exposed to the elements. Hail can also block culverts and drainage ditches, causing flooding. Although large hail events frequently result in high aggregate insured losses, property damages are generally limited, serious injuries are rare, and there is typically little or no impact to critical facilities, which are generally able to operate without disruption to services. The severity of the hail hazard in Mineral County is rated limited, meaning that minor injuries and minimal property damage are possible, with critical services disruptions of less than 24 hours.

Vulnerability Assessment

In agricultural areas, storms with large hail are capable of destroying crops, injuring livestock, and damaging glass and plastic structures. Although hail frequently results in extensive damage to property, **most losses are usually covered by homeowners' and automobile insurance policies** and the risks to public health and safety are minimal.

4.2.5 Lightning

Hazard Description

Lightning is one of the more dangerous weather hazards in Colorado. Each year, lightning is responsible for deaths, injuries, and property damage, including damage to buildings, communications systems, power lines, and electrical systems. According to the National Lightning Safety Institute (NLSI), Colorado ranks third in the nation in deaths due to lightning strikes with 39 fatalities recorded between 1990 and 2003 (behind only Florida and Texas). Over the same period, Colorado also ranks third nationally in deaths per million people (behind only Utah and Wyoming). Nationwide, estimates of property damage, increased operating costs, production delays, and lost revenue from lightning and secondary effects exceed \$8-10 billion per year.⁵

Cloud-to-ground lightning is the most damaging and dangerous type of lightning, though it is also less common. It frequently strikes away from the rain core, either ahead or behind the thunderstorm and can strike 5-10 miles from the storm in areas that most people do not consider to be a threat. According to the 2013 Colorado Natural Hazards Mitigation Plan,

⁵ National Lightning Safety Institute web page. Available at www.lightningsafety.com

Colorado averages 529,000 cloud-to-ground lightning strikes per year and deaths and injuries due to lightning occur on a regular basis.⁶

Geographic Location

Major lightning events can occur anywhere in Mineral County or the City of Creede.

Previous Occurrences

The table below identifies the number of deaths and injuries due to lightning over the last nine years in Colorado.

Table 4.9 Colorado Deaths and Injuries due to Lightning, 2008-2016

Year	Deaths	Injuries
2016	1*	2*
2015	1	13
2014	2	17
2013	0	25
2012	0	2
2011	0	9
2010	1	6
2009	1	14
2008	4	10

Source: Struckbylightning.org

* Through August 2016

Data collected from the National Centers for Environmental Information and SHEL DUS identified one deadly lightning event in Mineral County. On July 28, 2008, a shepherd and a mule were killed by lightning at the headwaters of Oso Creek near the Continental Divide, nine miles northwest of Creede. SHEL DUS identified four lightning events causing death or injury or damaging private and public property in Mineral County since 1950, as shown in the table below.

Table 4.10 Major Lightning Events in Mineral County, 1950-2016

Date	Location	Property/Crop Damages (ADJ 2014)	Deaths	Injuries
August 1, 1960	Mineral County	Minor Damages	0	0
August 5, 1964	Mineral County	0	0	0
July 1, 2008	Mineral County	0	0	0
July 28, 2008	Mineral County	0	1	0

Source: SHEL DUS

Probability of Future Occurrences

Lightning can occur anywhere there is a thunderstorm. The average number of lightning flashes by month is shown in Table 4.10. Over 4,000 lightning flashes are expected to occur on any given day during the months of July and August. The majority of lightning strikes that

⁶ Colorado Natural Hazards Mitigation Plan, December 2013, Colorado Division of Homeland Security and Emergency Management

result in casualties occur between the hours of noon and 5:00 pm, spiking between 2:00 and 4:00 pm.

Table 4.11 Average Lightning Flashes in Colorado per Day by Month

Month	Number of Lightning Strikes
January	1
February	4
March	39
April	225
May	1,203
June	2,621
July	4,035
August	4,215
September	1,457
October	261
November	11
December	1

Source: 2013 Colorado Natural Hazards Mitigation Plan

Most lightning occurs during the summer months, but it can also strike in the winter months during rare weather events known as thunder snowstorms. Pockets of lightning intensity are found in the mountains where the topography causes thunderstorms to form with regularity. The probability of lightning in Mineral County in the future is rated likely, with a recurrence interval of 10 years or less (10-100% chance in a given year).

Magnitude/Severity

People attending large outdoor gatherings (i.e., sporting events, concerts, fairs, festivals, etc.) are particularly vulnerable to death and injury from lightning strikes. Men are notably more likely to die from a lightning strike than women. According to the National Weather Service, during the period 2006-2015, male fatalities outnumbered female fatalities 246-63. Outdoor recreationists generally face a higher risk when hiking or camping in the lightning-prone high country. Wildfires and grassfires are frequently ignited by lightning strikes.

Buildings and equipment exposed to lightning strikes may be damaged and power surges can damage electronic equipment. Direct flash strikes near utility infrastructure can disrupt services. Many critical facilities are equipped with grounding systems. Most lightning events result in only personal property damage and do not significantly impact infrastructure or the delivery of critical services. Disruptions of electrical power due to lightning are generally short in duration (less than 24 hours). The Planning Team has rated the severity of the lightning hazard in Mineral County critical, meaning that isolated deaths/injuries; major or long-term impacts to property, infrastructure and critical services; and service disruptions of 24-72 hours are possible.

Vulnerability Assessment

The greatest threat that lightning presents to community assets is the risk of death or injury. Colorado is one of the most lightning-prone states in the nation. Outdoor recreationists and people attending large outdoor gatherings (i.e., sporting events, concerts, fairs, festivals,

etc.) are particularly vulnerable to death and injury from lightning strikes. In light of this vulnerability, prudent mitigation measures (e.g., building standards, grounding systems, preparedness, guidelines for outdoor events, lightning detection/warning systems) should be considered.

The preparation of site-specific emergency procedures for outdoor events by event organizers, response agencies and emergency management can help mitigate the public safety risk, especially when combined with technology that provides adequate early detection, monitoring, and warning of approaching thunderstorms.

4.2.6 Windstorm

Hazard Description

According to the 2013 Colorado Natural Hazards Mitigation Plan, windstorms are one of **Colorado's costliest hazards. Over the last 60 years, wind events have caused a reported \$367 million in property and crop damage.** Deaths and injuries are also a result of wind events in the state with 21 and 406 respectively between 1950 and 2010.⁷

Windstorms represent the most common type of severe weather. Often accompanying severe thunderstorms (convective windstorms), they can cause significant property and crop damage, threaten public safety, and disrupt utilities and communications. Straight-line winds are generally any wind not associated with rotation and in rare cases can exceed 100 miles per hour (mph). The National Weather Service defines high winds as sustained wind speeds of 40 mph or greater lasting for one hour or longer, or winds of 58 mph or greater for any duration. Windstorms are often produced by super-cell thunderstorms or a line of thunderstorms that typically develop on hot and humid days.

During blizzards, straight-line winds magnify the dangerous effects of cold temperatures and impede safe travel by reducing visibility. During dry periods, high winds can contribute to rapid fire growth in open spaces and other areas where natural grasses can grow tall and ultimately cure. High winds can also damage roofs and structures and cause secondary damages as a result of flying debris.

Geographic Location

Wind speed is correlated with elevation, so higher, more exposed areas within Mineral County are more susceptible to high winds, but all areas of the county are potentially vulnerable.

Previous Occurrences

High winds can occur as part of a seasonal climate pattern or in relation to other severe weather events such as thunderstorms. According to the National Centers for Environmental Information, 53 high wind events were reported in Mineral County between 1950 and 2016, 14 of which caused at least minor property damage. The table below identifies significant high wind events that have occurred in Mineral County since 1960 (damage amounts are not adjusted for inflation).

⁷ Colorado Natural Hazards Mitigation Plan (December 2013), Colorado Division of Homeland Security and Emergency Management, p. 3-96

Table 4.12 Significant High Wind Events in Mineral County, 1960-2016

Date	Property and Crop Damages
January 8, 1962	\$7,937
January 7, 1969	\$19,231
October 11, 1969	\$1,587
November 30, 1975	\$2,174
February 17, 1976	\$1,786
November 26, 1983	\$7,937
September 24, 1986	\$7,937
May 1, 1988	\$12,500
May 6, 1988	\$15,873

Source: National Centers for Environmental Information; SHELDUS

A number of more recent high wind events have been documented in the upper Rio Grande Valley, eastern San Juan mountains and La Garita range. High winds of at least 60 miles per hour were recorded in Mineral County on the following dates:

- April 18, 2004
- May 11, 2004
- June 6, 2007
- 2004 - 12 dates with recorded wind speeds in excess of 60 mph

There were no reports of damages from these events.

Probability of Future Occurrences

High wind events are a regular occurrence in Mineral County and the Planning Team has rated the probability of future events likely, with a recurrence interval of 10 years or less (10-100% chance in a given year).

Magnitude/Severity

According to the Colorado Natural Hazards Mitigation Plan, the physical impacts of high wind events can be compared to those of a weak tornado in terms of the severity of property damage, but with a more widespread area of impact. “Structural collapse, and damages caused by falling trees/limbs, can cause injury and impairment of the residential and commercial use of the affected properties. It is very common for winds to cause trees and their limbs to break **communication and power lines.**”⁸

Windstorms in Mineral County are rarely life threatening, but do disrupt agriculture and cause damage to buildings. Impacts of strong, straight line winds can be erosion, dryland farming seed loss, windblown weeds, and building damage. The Planning Team has rated the severity of the windstorm hazard as limited, meaning that minor injuries and minimal property damage are possible, with critical services disruptions of less than 24 hours.

Vulnerability Assessment

⁸ Colorado Natural Hazards Mitigation Plan (December 2013), Colorado Division of Homeland Security and Emergency Management, p. 3-95

In general, the height, rigidity, and surface area/weight ratio of objects are the primary indicators of their susceptibility to damage from windstorms. Trees, barns, mobile homes, high-profile vehicles, and power lines are at specific risk from either direct or indirect wind impacts. Roofs, windows, and wall assemblies of residential homes can be severely damaged as wind speeds increase.

In Mineral County, windstorms primarily damage structures, trees, utilities, and crops. Building codes are the greatest protection from wind. Damages are typically covered by private insurance.

Future residential or commercial buildings built to code should be less vulnerable to high winds. However, building standards can offer only limited protection. Increasing population growth and development increases vulnerability to windstorms.

4.2.7 Tornado

Hazard Description

The National Weather Service defines a tornado as *a violently rotating column of air touching the ground, usually attached to the base of a thunderstorm*. Tornadoes usually occur near the trailing edge of a thunderstorm and are often accompanied by hail and strong downburst winds. Tornadoes develop rapidly and dissipate quickly, with most on the ground for less than 15 minutes.

According to the 2013 Colorado Natural Hazards Mitigation Plan, tornadoes in Colorado are more likely to occur in the spring and early summer months when warm, moist air from the Gulf of Mexico collides with cold air from the Polar Regions to generate severe thunderstorms. “These thunderstorms often produce the violently rotating columns of wind known as funnel clouds. Colorado lies at the western edge of the nation’s primary tornado belt, which extends from Texas and Oklahoma through Kansas and Nebraska. In Colorado, the primary threat of tornado is east of the Continental Divide along the Front Range and across the Eastern Plains, although they have occurred statewide. Three counties, Adams, Weld, and Washington, have over 100 reported tornadoes reported between 1950 and 2013.”⁹

Tornado intensity is measured on the Enhanced Fujita Scale (see table below). The Enhanced Fujita Scale rates the intensity of a tornado based on damaged caused, not by its size.

Table 4.13 Enhanced Fujita Scale

EF Scale	Wind Estimates (mph)	Types and Intensity of Damage
EF0	65-85	Light damage: peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over.
EF1	86-110	Moderate damage: roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
EF2	111-135	Considerable damage: roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely

⁹ Colorado Natural Hazards Mitigation Plan (December 2013), Colorado Division of Homeland Security and Emergency Management, p. 3-105

		destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
EF3	136-165	Severe damage: entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.
EF4	166-200	Devastating damage: well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.
EF5	Over 200	Incredible damage: strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 m (109 yds.); high-rise buildings have significant structural deformation; incredible phenomena will occur.

Source: National Oceanic and Atmospheric Administration

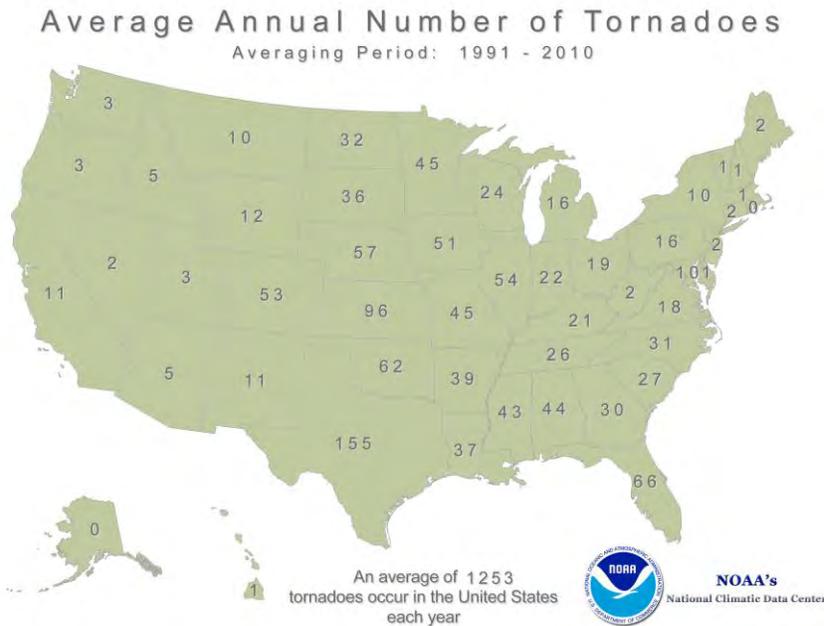
Most of **Colorado's tornadoes are relatively weak**, with wind speeds of less than 110 mph (EF0 and EF1 on the standardized Enhanced Fujita Scale). From 2000-2010; however, four EF3 category tornadoes and seven EF2 tornadoes were recorded.

Geographic Location

Increases in the number of reported tornadoes over the last decade can be attributed to advances in technology and reporting (Doppler radar coverage, Storm Spotter training programs).

The figure below shows how the State of Colorado compares with the rest of the U.S. in terms of average annual number of tornadoes between 1991 and 2010.

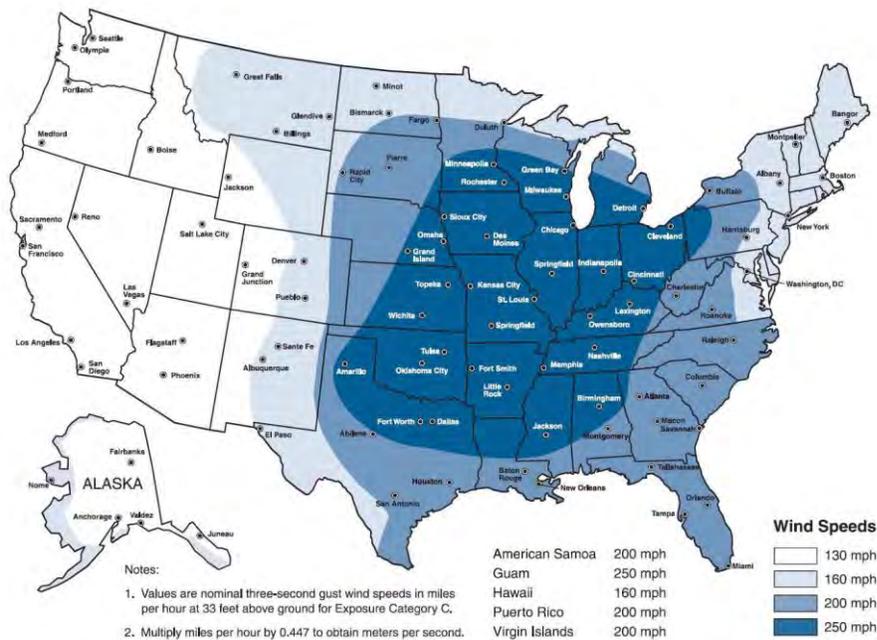
Figure 4.5 Average Annual Number of Tornadoes, 1991-2010



Source: National Centers for Environmental Information

Tornadoes can occur anywhere in Mineral County and pose a similar risk to all participating jurisdictions. FEMA's map of Wind Zones in the United States shows the San Luis Valley region located in Wind Zone II with tornado winds of up to 160 mph. Tornado Safe Room Design Speeds are illustrated in the figure below.

Figure 4.6 Tornado Safe Room Design Wind Speed Map



Source: <http://www.fema.gov/plan/prevent/saferoom/fema361>

Previous Occurrences

Only one tornado has been documented in Mineral County since 1950. On October 10, 1997, an F2 tornado touched down ten miles southeast of Creede on October 10, 1997. Although there were no deaths or injuries, the tornado caused \$10,000 of property damage. The tornado was reported to be a quarter-mile wide with a three-mile long track that extended from the northeast side of Fisher Mountain to Copper Mountain. Most remarkably, the track of the tornado ranged between altitudes of 10,500 and 11,500 feet. The tornado snapped and uprooted tens of thousands of spruce and pine trees and destroyed a horse trailer.

Probability of Future Occurrences

The climatic conditions that lead to the formation of tornadoes in and around the San Luis Valley will continue to occur or possibly even increase if the current warming trend continues. The probability of tornado events in Mineral County in the future is rated unlikely (occurs greater than once every 100 years, or less than 1% chance in next 100 years).

Magnitude/Severity

The severity of a tornado is based on wind speed and the amount of property damage incurred. Large tornadoes can injure and kill people and livestock and destroy structures, infrastructure, and crops. In a tornado it is common for tree branches and flying debris to cause serious damage. Typical damages from small tornado events include:

- roof, windows and exterior damage
- missing shingles
- bent, missing or damaged rain gutters
- broken, chipped or cracked windows

Tornadoes develop quickly and change direction rapidly, making response difficult, but most occur over open country and cause minimal damages. The tornado hazard in Mineral County is rated limited by the Planning Team, meaning that minor injuries and minimal property damage are possible, with critical services disruptions of less than 24 hours.

Vulnerability Assessment

Tornadoes can cause significant damage to structures, trees, utilities, crops, and have the potential to injure and kill people. Due to the erratic movement of tornadoes, destruction often appears random. Future residential or commercial buildings built to code should be less vulnerable to tornadoes. However, building standards can offer only limited protection.

4.2.8 Severe Winter Storm

Hazard Description

Heavy snow, ice, severe winter storms, and blizzards are common occurrences in Colorado. “Hazardous winter weather includes events related to heavy snow, blowing snow, ice, sleet or freezing rain, and extreme cold temperatures. Blizzards are severe winter storms that pack a combination of blowing snow and wind resulting in very low visibilities. While heavy snowfalls and severe cold often accompany blizzards, they are not required. Sometimes strong winds pick up snow that has already fallen, creating a blizzard.”¹⁰

Some winter storms are accompanied by strong winds, creating blizzard conditions with blinding wind-driven snow, severe drifting, and dangerous wind chills. Extreme cold often accompanies or follows a winter storm.

The National Weather Service Glossary defines common winter storm characteristics as follows:

- **Blizzard:** A blizzard means that the following conditions are expected to prevail for a period of 3 hours or longer:
 - Sustained wind or frequent gusts to 35 miles an hour or greater; and
 - Considerable falling and/or blowing snow (i.e., reducing visibility frequently to less than ¼ mile).
- **Heavy Snow:** This generally means:
 - snowfall accumulating to 4" or more in depth in 12 hours or less; or
 - snowfall accumulating to 6" or more in depth in 24 hours or less.
 - In forecasts, snowfall amounts are expressed as a range of values, e.g., "8 to 12 inches." However, in heavy snow situations where there is considerable uncertainty

¹⁰ Colorado Natural Hazards Mitigation Plan, Colorado Division of Homeland Security and Emergency Management, December 2013, p. 3-120

concerning the range of values, more appropriate phrases are used, such as "...up to 12 inches..." or alternatively **"...8 inches or more..."**

- Ice Storm: An ice storm is used to describe occasions when damaging accumulations of ice are expected during freezing rain situations. Significant accumulations of ice pull down trees and utility lines resulting in loss of power and communication. These accumulations of ice make walking and driving extremely dangerous. Significant ice accumulations are usually accumulations of ¼" or greater.¹¹

Geographic Location

All of Mineral County is subject to occasional blizzard, heavy snowfall and ice storm conditions. The size of events varies and may range from isolated (impacting only a portion of the area) to statewide. Most severe winter storms are widespread events, impacting multiple counties simultaneously and for extended time periods.

Previous Occurrences

According to the 2013 Colorado Natural Hazards Mitigation Plan, Mineral County experienced 45 winter storm events between 1960 and 2013, resulting in two deaths, one injury, \$100,000 in crop damages, and over \$1 million in property damages (for a total of \$1,166,111 damages during this period). According to the National Centers for Environmental Information (NCEI), there have been 280 winter storm events and 7 blizzard events in Mineral County from January 1, 1950 to May 31, 2016. Notable winter storm events are identified in the table below.

Table 4.14 Significant Winter Storms in Mineral County, 1950-2016

Year	Description of Impacts
1961	Early snow (September 2) caused approximately \$20,000 (ADJ 2014) in property and crop damages
1962	January storm with snow, wind and cold weather caused \$7,937 (ADJ 2014) in damages
1966	Spring snow and cold weather; damages: \$8,016 (ADJ 2014)
1982	Blizzard on December 23, 1982 caused more than \$800,000 damages (ADJ 2014)
1983	November snow and wind: damages: \$7,937 (ADJ 2014)
1989	February storm with heavy snow caused approximately \$158,730 (ADJ 2014) in damages.
1995	Heavy snow event on February 8, 1995 caused \$63,219 in damages (ADJ 2014)
1996	Spring storm produced heavy snow and caused approximately \$75,000 (ADJ 2014) in damages
1998	Winter storm on December 8, 1998 caused \$21,786 in damages (ADJ 2014)
2001	Late storm on May 3, 2001 caused \$21,429 in damages (ADJ 2014)
2008	Blizzard on Christmas with 70 mph winds also dropped 20-30 inches of snow
2010	Blizzard on November 21, 2010 with 70 mph winds dropped 8-18 inches of snow; avalanche during storm killed Wolf Creek Ski Area Director
2010	Blizzard conditions on November 24, 2010

¹¹ National Weather Service, National Weather Service Glossary Website, w1.weather.gov/glossary/

Source: SHELDUS; National Centers for Environmental Information

Probability of Future Occurrences

Atmospheric activity that produces winter weather conditions such as ice, snow, extreme cold, and high winds will continue to occur. Winter storms occur regularly in Mineral County and are considered likely to occur in the future, with a recurrence interval of 10 years or less (10-100% chance in a given year).

Magnitude/Severity

Heavy snow can immobilize a region by stranding motorists, stopping the flow of supplies, and disrupting emergency and medical services. Accumulations of snow can collapse roofs and tear down trees and power lines. Loss of power affects homes, businesses, and water, sewer, and other utility services operated by electric pumps. The cost of snow removal, damage repair, and business losses can have a tremendous impact.

Communications and power can be disrupted for days until damage can be repaired. Blowing snow can severely reduce visibility. Serious vehicle accidents can result with injuries and deaths. Prolonged exposure to the cold can cause frostbite or hypothermia and can become life-threatening; infants and the elderly are most at risk.

Extremely cold temperatures pose a risk to public safety and disrupt farm and ranch operations. According to the 2013 Colorado Natural Hazards Mitigation Plan, the coldest temperature ever recorded in Mineral County is -45 degrees below zero. The table below shows the average minimum and extreme minimum temperatures for Mineral County for the four coldest winter months (readings from closest station at San Luis Valley Regional Airport in Alamosa).

Table 4.15 Average Minimum Temperatures/Extreme Minimum Temperatures for Mineral County, 1996-2008

Month	Average Minimum Temperature (F)	Extreme Minimum Temperature (F)
November	12.5	-21 (November 30, 2006)
December	1.3	-33 (December 29, 2007)
January	0.2	-32 (January 17, 2008)
February	6.3	-26 (February 7, 2004)

Source: Western Regional Climate Center, www.wrcc.dri.edu/

The Planning Team has rated the severity of the winter storm hazard in Mineral County critical, meaning that isolated deaths/injuries; major or long-term impacts to property, infrastructure and critical services; and service disruptions of 24-72 hours are possible.

Vulnerability Assessment

The water content or weight of the snow often determines the level of damages to structures, trees and utility lines. Although winter weather in the San Luis Valley is generally mild and dry, severe winter storms can occasionally strand motorists, disrupt emergency and medical services, bring down trees and power lines, freeze water pipes, and damage homes.

Winter storms will continue to occur with frequency throughout the county and occasionally cause widespread impacts. The greatest threat is to public safety. The rural nature of the county and isolated stretches of roadway can create problems with stranded motorists and access to supplies and emergency services. In rural areas, vulnerable populations and livestock may be isolated for days or weeks. Power outages caused by snow, ice, and wind accompanied by cold temperatures create additional need for shelter. Other impacts are related to school and business closures, road closures, snow removal, and maintaining critical services.

Fortunately, structure damage is typically covered by property insurance. New structures and facilities built to code should be able to withstand snow loads associated with winter storms. Future development, particularly in more isolated areas, will create emergency access issues and increase demand on road crews and emergency services.

4.2.9 Drought

Hazard Description

According to the 2013 Colorado Drought Mitigation and Response Plan, “Drought is a complex and a gradual phenomenon in Colorado. Although droughts can be characterized as emergencies, they differ from other emergency events in that most natural disasters, such as floods or forest fires, occur relatively rapidly and afford little time for preparing for disaster response. Droughts typically occur slowly, over a multi-year period, and it is often not obvious or easy to quantify when a drought begins and ends.”¹²

Drought simply defined is a period of time where the amount of water available is insufficient to meet the demands on that water supply. Scientists and researchers also distinguish between the different types of drought:

- *Meteorological* drought is usually defined by a period of below average precipitation.
- *Agricultural* drought occurs when there is an inadequate water supply to meet the needs of agricultural operations, based on soil moisture deficiencies relative to water demands of crops and rangeland.
- *Hydrologic* drought refers to deficiencies in surface and subsurface water supplies and is measured as streamflow, snowpack, reservoir, and groundwater levels.
- *Socioeconomic* drought occurs when a drought impacts health, well-being, and quality of life, or when drought effects start to have an adverse economic impact on a region.¹³

There are also distinctions between drought mitigation planning and water conservation planning:

- drought mitigation planning identifies temporary responses to potential water supply shortages, such as mandatory restrictions on certain water uses, water allocation or the temporary use of an alternative water supply. These measures are intended to be temporary responses to water supply shortages

¹² Colorado Drought Mitigation and Response Plan, Colorado Water Conservation Board, August 2013, p. 19

¹³ Colorado Drought Mitigation and Response Plan, Colorado Water Conservation Board, August 2013, p. 19

- water conservation planning involves long-term improvements in water use efficiency, such as managing landscape irrigation, implementing conservation water rate structures, and replacing or retrofitting water fixtures.

Drought is a gradual phenomenon. Although droughts are sometimes characterized as emergencies, they differ from typical emergency events. Most natural disasters, such as floods or wildfires, occur relatively rapidly and afford little time for preparing for disaster response. Droughts occur slowly, over a multi-year period, and it is often not obvious or easy to quantify when a drought begins and ends.

Geographic Location

Drought is a regional phenomenon that affects all areas within the county equally. Drought impacts are most severe for agricultural and commercial interests that rely on an uninterrupted supply of water. The U.S. Drought Monitor provides online maps of the current drought status nationwide, updated weekly.

Previous Occurrences

Colorado has experienced seven multi-year droughts since 1893, with the most devastating taking place in the 1930s and 1950s. Historic dry and wet periods are shown in the table below.

Table 4.16 Historic Dry and Wet Periods in Colorado

Date	Dry	Wet	Duration (Years)
1893-1905	x		12
1905-1931		x	26
1931-1941	x		10
1941-1951		x	10
1951-1957	x		6
1957-1959		x	2
1963-1965	x		2
1965-1975		x	10
1975-1978	x		3
1979-1999		x	20
2000-2006	x		6
2007-2010		x	3
2010-2013	x		3

Source: 2013 Colorado Drought Mitigation and Response Plan (Colorado Water Conservation Board)

The most intense single year of drought in state history occurred in 2002, an extremely dry year imbedded in an extended dry period between 2000 and 2006. Drought conditions in 2002 resembled those of 1934, the worst of the Dust Bowl years between 1931 and 1941. The magnitude of drought conditions in 2002 was rated as “exceptional” by the U.S. Drought Monitor, making 2002 the most severe drought in the state since the 1930s.¹⁴ The 2011-2013

¹⁴ Colorado Natural Hazards Mitigation Plan, December 2013, Colorado Division of Homeland Security and Emergency Management, p. 3-22

drought was the result of minimal snowpack followed by a hot, dry summer, creating serious impacts for agriculture in Mineral County and around the state.

Since 2003, Mineral County has received four USDA Secretarial declarations for drought:

1. 2003 (S1843)
2. 2005-2006 (S2327)
3. 2012 (S3260)
4. 2013 (S3548)

Table 4.17 Significant Drought Periods Affecting Mineral County

Years	Location/Description	Cost	Data Source
1930-1940	Widespread, severe and long-lasting drought in Colorado	N/A	CWCB
1950-1956	Statewide extreme drought conditions; federal funds authorized to defray costs of transporting hay (13 counties)	\$40 million	NCEI
1976-1977	Statewide drought with driest winter on record on Western Slope and in high country	\$110 million	NCEI
2000-2003	Severe drought conditions over multiple years; entire state declared a drought disaster area	\$1.1 billion	CWCB
2006	USDA designated 59 of 64 counties (including Mineral County) for drought assistance	N/A	NCEI
2007-2008	Drought contributed to high number of wildfires human-bear conflicts (due to change in hibernation patterns)	N/A	NCEI
2011-2013	Major agricultural impacts result in USDA Secretarial Disaster designation for Mineral County each of the 3 years	N/A	CWCB

Source: Colorado Water Conservation Board (CWCB); National Centers for Environmental Information (NCEI)

Probability of Future Occurrences

Drought is a frequent occurrence in and around the San Luis Valley, where a prolonged drought develops approximately every 15-20 years. According to projections in the Colorado Natural Hazards Mitigation Plan (2013), drought is expected to persist or intensify throughout most of Colorado, including the San Luis Valley region. The Planning Team has rated the drought hazard in Mineral County highly likely, meaning a near-100 percent chance of occurrence next year or it happens every year.

Magnitude/Severity

Periods of drought are common occurrences in Colorado and can cause significant economic and environmental impacts. The severity of a drought depends on the degree of moisture deficiency, duration, and size of the affected area. Drought is a common natural phenomenon in Colorado, requiring continuous monitoring and foresight to lessen the drought-related impacts to agricultural and municipal users. The objective of drought mitigation planning is to identify actions for responding to a supply shortage before an actual water supply emergency occurs. The state Water Availability Task Force (WATF) monitors conditions that affect

Colorado's water supply (i.e., snowpack, precipitation, reservoir storage, streamflow and weather forecasts) and determines when there is a need to activate the Colorado Drought Mitigation and Response Plan to address physical, social and economic impacts due to drought. **The WATF is comprised of Colorado's water supply specialists, emergency management professionals, federal land managers, scientists and experts in climatology and weather forecasting.**¹⁵

According to the Colorado Natural Hazards Mitigation Plan, "Drought impacts are wide reaching and may come in different forms, such as economic, environmental, and/or societal. The most significant impacts associated with drought in Colorado are those related to water intensive activities such as agriculture, wildfire protection, municipal usage, commerce, tourism, recreation, and wildlife preservation. A reduction of electric power generation and water quality deterioration are also potential effects. Drought conditions can also cause soil to compact, decreasing its ability to absorb water, making an area more susceptible to flash flooding and erosion."¹⁶

Drought can also cause structural damage to dams and ditches (high sedimentation loads from pulling water from the bottom of reservoirs can damage dam works).

The Planning Team has rated the severity of the drought hazard critical, meaning that isolated deaths/injuries; major or long-term impacts to property, infrastructure and critical services; and service disruptions of 24-72 hours are possible.

Vulnerability Assessment

The most significant impacts from drought are related to water-intensive activities, such as agriculture (both crops and livestock), wildfire protection, municipal usage, commerce, recreation, and wildlife preservation, as well as a reduction of electric power generation and water quality deterioration. Secondary impacts of drought are wildfires, wind erosion, and soil compaction that can make an area more susceptible to flooding. Drought impacts increase with the length of a drought.

Drought does not usually present life safety issues or directly impact critical infrastructures such as roads, bridges, utilities, communications systems, or public safety resources. However, drought presents ongoing challenges for most Colorado communities, requiring sustained planning and conservation efforts to ensure a reliable water supply to meet current and future needs. Although entities in the Rio Grande River watershed have addressed conservation and water supply issues on a number of levels, the persistence of the hazard will require sustained mitigation efforts. Water supply planners must also be cognizant of the effects of climate change on the frequency and severity of future droughts.

The Drought Impact Reporter documented 88 drought impacts from drought conditions in Mineral County between March 2010 and May 2013. The highest number of impacts in Mineral County by far were related to agriculture, but impacts were also felt in a range of sectors

¹⁵ Colorado Water Conservation Board, cwcb.state.co.us/technical-resources/drought-planning-toolbox/

¹⁶ Colorado Natural Hazards Mitigation Plan, December 2013, Colorado Division of Homeland Security and Emergency Management, p. 3-26

such as business/industry, public health, tourism/recreation, water supply, wildlife, wildfire and emergency response.

The unincorporated areas of the county are most vulnerable to drought impacts related to agriculture and wells. The City of Creede is most vulnerable to losses related to water supply reliability, operations revenue, and system flexibility. The fire protection district is vulnerable to impacts related to increased wildfire risk and water supply for wildfire protection.

4.2.10 Dam Failure

Hazard Description

Dam failure floods result from a sudden uncontrolled release, or excessive controlled release, of water from an impounding structure. The release may be caused by damage to or failure of the structure, flood conditions unrelated to failure, or any condition that may affect the safe operation of the dam. Depending on dam conditions and the location of downstream development, a dam failure flood may present a danger for human life, downstream property, or the operation of the structure.¹⁷

Dams are manmade structures built for a variety of uses, including flood protection, power, agriculture, water supply, and recreation. Dams typically are constructed of earth, rock, concrete, or mine tailings. Two factors that influence the potential severity of a full or partial dam failure are the amount of water impounded and the density, type, and value of development and infrastructure located downstream. Dam failures can result from any one or a combination of causes, including prolonged periods of rainfall and flooding, improper design or maintenance, negligent operation, or internal erosion caused by embankment or foundation leakage, piping, or rodent activity.

Dams are classified based on the potential loss of life and property to the downstream area resulting from failure of the dam or facilities, not from the condition or probability of the dam failing

Dams are categorized into four classes. The 2013 Colorado Natural Hazards Mitigation Plan defines Class I (High Hazard) dams as structures that, in the event of a failure, would be expected to cause loss of life and/or significant property damage within the floodplain areas below the dams. Class II (Significant Hazard) dams as those rated based on expected significant damage, but not loss of human life. Significant damage refers to structural damage where humans live, work, or recreate; or to public or private facilities exclusive of unpaved roads and picnic areas. Damage refers to making the structures uninhabitable or inoperable. The other two classifications for dams are Low Hazard and NPH, or No Public Hazard.¹⁸

Privately-owned Class I and II dams are required by Colorado regulations to have Emergency Action Plans (EAPs) in place. Federally-owned Class I dams are also required to have EAPs by Federal Regulations. According to the 2013 State Hazard Mitigation Plan, all high-hazard dams

¹⁷ Federal Guidelines for Emergency Action Planning for Dams, FEMA P-64 (July 2013), Federal Emergency Management Agency (p. I-2)

¹⁸ Colorado Natural Hazards Mitigation Plan (December 2013), Colorado Division of Homeland Security and Emergency Management, p. 3-48

in Colorado have EAPs in place, which detail the emergency response procedures in the event of a dam emergency event. According to the Colorado Division of Water Resources, there are a total of 373 Class I dams in Colorado (federal and non-federal) and 333 Class II dams (federal and non-federal) in the state.¹⁹

Geographic Location

There are four Class I dams (High Risk) and five Class II dams (Significant Risk) in Mineral County, as shown in the table below.

Table 4.18 Dams in Mineral County

Dam Name	Year Built	Hazard Class	Stream	Storage (Acre Ft.)	EAP	Comments
Barrett #2, Upper	1985	Low	Cade Creek	14	No	
Barrett #1, Lower	1985	Low	Cade Creek	7	No	
Alberta Park	1953	High	Pass Creek	598	2016	Downstream: South Fork (17 mi.)
Shaw – North Dam	1895	Significant	Kitty Creek	42	2001	Downstream: South Fork (13 mi.)
Spruce Lake #1	1926	Low	S. Fork Rio Grande River	111	No	
Spruce Lake #2	1926	Low	S. Fork Rio Grande River	105	No	
La Gunita	N/A	Low	Pass Creek	50	No	
Big Meadows	1968	High	S. Fork Rio Grande River	2,436	2010	Downstream: South Fork (12 mi.)
Shaw – South Dam	1895	Significant	Kitty Creek	681	2002	Downstream: South Fork (15 mi.)
Goose Lake	1933	Low	Fisher Creek	223	No	
Metroz Park, Lower	1907	Significant	Decker Creek	395	2004	Downstream: South Fork (8 mi.)
Streams Lake	1948	NPH	Red Mountain Creek	30	No	
Jumper Creek	1940	Low	Jumper Creek	38	No	
Humphrey's	1926	High	Goose Creek	842	2013	Downstream: South Fork (18 mi.)
Hay Press Park #1	1922	Low	Goose Creek	200	No	
Hay Press Park #2	1922	Low	Goose Creek	200	No	
Soward #2	1910	NPH	Middle Creek	35	No	
Soward #3	1920	Low	Middle Creek	8	No	
Soward #4	1909	NPH	Middle Creek	45	No	
Spar City, Lower	1917	Low	Lime Creek	36	No	
Spar City, Middle	1930	NPH	Lime Creek	14	No	
Wee Ruby	1934	Low	Texas Creek	186	No	

¹⁹ State Engineer's 27th Annual Report on Dam Safety to the Colorado General Assembly, Colorado Division of Water Resources (April 2013)

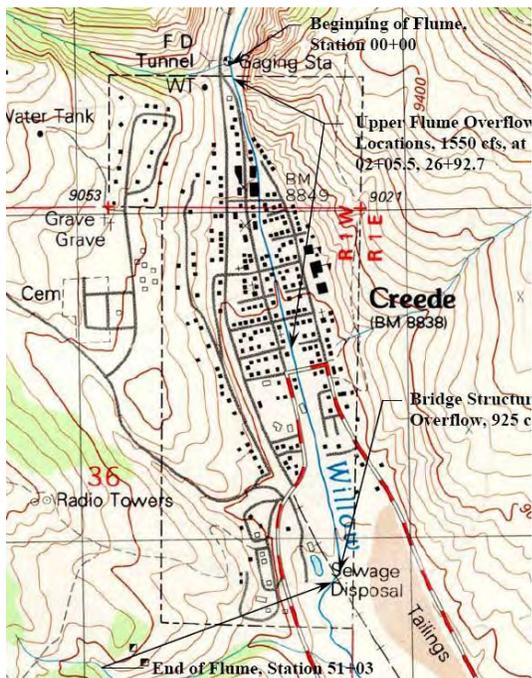
Meadow Lake	1940	NPH	Middle Creek	199	No	
Cliff Creek	N/A	NPH	Cliff Creek	110	No	
Bristol Head #1	1921	Low	Seepage Cr.	121	No	
Bristol Head #2	1928	Significant	Seepage Creek	305	2000	Downstream: South Fork (30 mi.)
Meadow Lake	1920	NPH	Spring Creek	50	No	
Spring Creek	1932	NPH	Spring Creek	70	No	
Santa Maria	1911	High	Boulder Creek	43,826	2008	Downstream: South Fork (41 mi.)
Broadacre Lake	1956	Significant	Shallow Creek	94	2000	Downstream: South Fork (20 mi.)

Source: Colorado Division of Water Resources

NPH = No Public Hazard

In addition to the many dams in Mineral County, there is a drainage channel that runs through the heart of the City of Creede. The United States Army Corps of Engineers (USACE) designed the Willow Creek Channel (or flume) through the City of Creede. It is a trapezoidal section with a bottom width of 8 feet and is approximately 5,527 feet in length. It was constructed in 1950 with grouted hand placed rock. The flume has degenerated over time and did not meet inspection requirements by the USACE to remain in the PL 84-99 program where the government would provide funding assistance should the flume need repairs following an event. The City of Creede contracted with a water engineering firm to prepare estimated costs of flume replacement/repair alternatives. In 2006, the cost for flume repairs consisting of concrete fill along the bottom between the sides and the bottom was estimated at nearly one million dollars. The City of Creede is currently pursuing funding options for the repairs in an attempt to regain the USACE designation of “active project” for the PL 84-99 program.

Figure 4.7 Willow Creek Flume (Creede Flume)



Source: USDA Natural Resources Conservation Service (NRCS), 2010

Previous Occurrences

There are no recorded dam failure incidents in Mineral County.

Probability of Future Occurrences

Dams are considered “high potential loss facilities” by FEMA/DHS and are also a critical part of the infrastructure system. The dams listed in the table above are routinely inspected, structurally sound and have emergency action plans in place. The probability of future occurrences is rated unlikely (less than 1 percent chance of occurrence in the next 100 years or it has a recurrence interval of greater than every 100 years).

Magnitude/Severity

Mineral County has 30 major dams that serve the county's residents and businesses. The consequences of a dam failure can range from localized street flooding with minor property damage to the need to evacuate populations to assure life safety. Roads, bridges, structures and other infrastructure are expected to be damaged during an event. In addition, human lives and livestock would be potentially endangered following a dam failure. The Planning Team has rated the severity of the dam failure hazard critical, meaning that isolated deaths/injuries; major or long-term impacts to property, infrastructure and critical services; and service disruptions of 24-72 hours are possible.

Vulnerability Assessment

The State of Colorado requires Emergency Action Plans (EAPs) for all High (Class I) and Significant (Class II) Hazard dams due to the potential for loss of life and/or property damage in the event of a dam failure. The EAP is a formal document that outlines possible emergency conditions at a dam, sets forth actions to minimize damages and danger, and includes a plan for the dam owner to moderate or alleviate the problems at the dam. The EAP contains inundation map exhibits to help emergency management authorities identify the critical areas for action in case of an emergency. Should an emergency arise, the dam owner should refer to preplanned EAP procedures for issuing an early warning and notifying downstream emergency management authorities of the situation.

The Creede Flume was designed for a capacity of 1800 cubic feet per/second (cfs), but at least one engineering study (2003) concluded that the 100-year design flow is 1073 cfs. A larger storm on Willow Creek however could overtop the banks of the flume, inundating parts of the City.

4.2.11 Avalanche

Hazard Description

According to the 2013 Colorado Natural Hazards Mitigation Plan, an avalanche is a mass of snow, ice, and debris flowing and sliding rapidly down a steep slope. Avalanches are also referred to as snow slides. Snow avalanches are defined in Colorado state statutes as a geologic hazard.

Deep snow deposits often become susceptible to avalanche based on the slope stability and the structure of the snow deposits through multiple storms. An avalanche occurs when the deposit reaches its breaking point, whether triggered naturally or by human intervention.

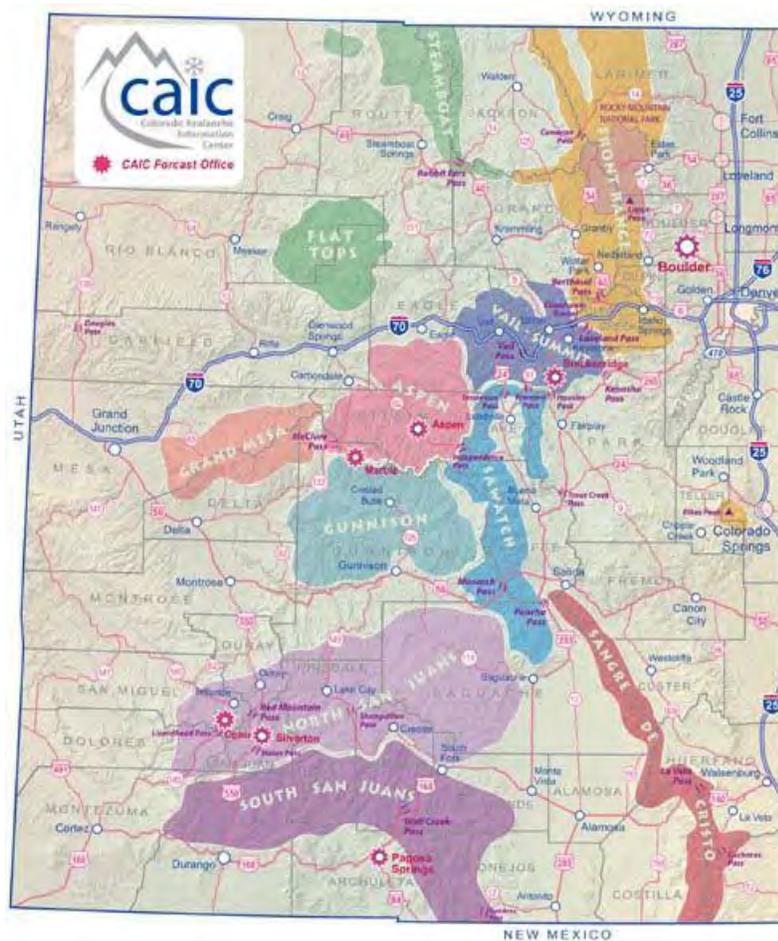
Avalanches can be naturally-triggered (by wind, snow, rain, etc.) or human-triggered (skiers, snowboarders, snowmobilers, climbers, etc.). There are more avalanche-related deaths in Colorado than any other state.

Slab avalanches are the most dangerous type of avalanche. They form when stronger snow overlies weaker snow. Often, human triggered slab avalanches are one to two feet deep, have an area about half the size of a football field, and can reach speeds over 20 mph within seconds.²⁰

Geographic Location

The Colorado Geological Survey (CGS) and the Colorado Avalanche Information Center (CAIC) **have mapped the State's areas susceptible to avalanche activity. The CAIC forecasts** backcountry avalanche and mountain weather conditions for 10 Zones in the mountains of Colorado.

Figure 4.8 Colorado Avalanche Zones



Source: Colorado Avalanche Information Center

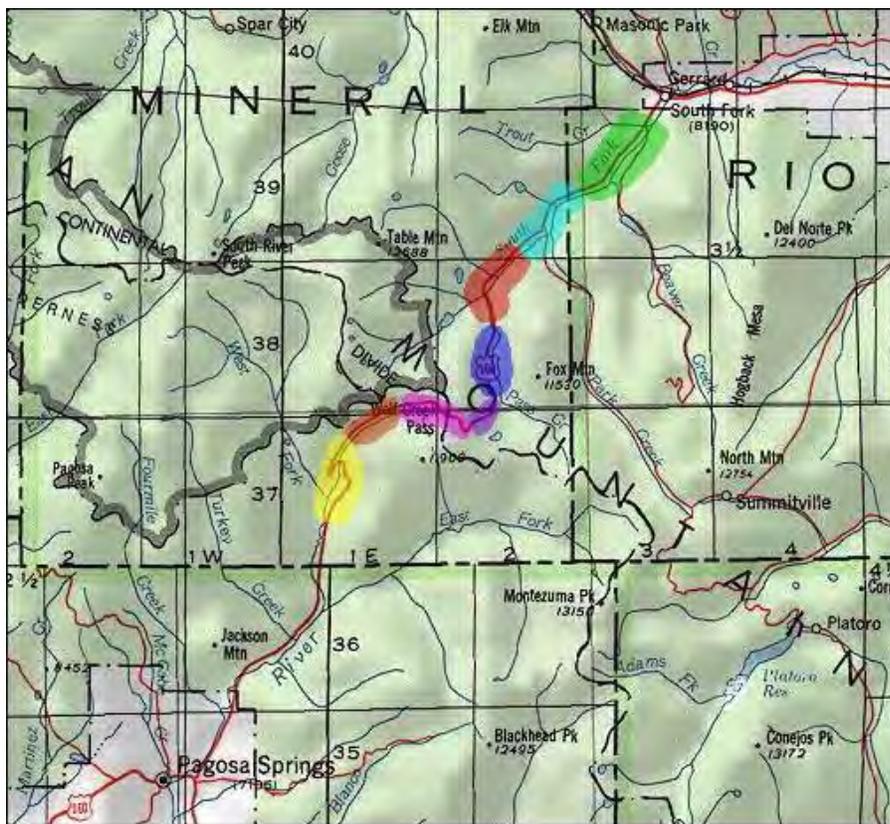
²⁰ Colorado Department of Transportation, www.codot.gov

The Colorado Department of Transportation (CDOT) has mapped avalanche corridors on the state highway system, and the approximate number of slide paths that CDOT and CAIC crews monitor and/or control on each. In the San Luis Valley region, CDOT conducts avalanche-mitigation operations at the following locations:

1. SH 17, Cumbres and La Manga Passes (15 slide paths) in Conejos County
2. US 160, Wolf Creek Pass (61 slide paths) in Rio Grande County
3. US 285 Poncha Pass (2) in Saguache County

Slopes in the South San Juan Mountains in Mineral County are susceptible to avalanche. The Wolf Creek Pass area is notorious for avalanche activity, where snowfall levels on average are among the highest in the state.

Figure 4.9 Wolf Creek Avalanche Zones



Source: Colorado Department of Transportation (CDOT)

Previous Occurrences

According to the Colorado Avalanche Information Center (CAIC), there were four deaths attributed to avalanche from 2010-2016 in the Wolf Creek Pass area. In 2010 (November 22), a ski patroller conducting avalanche control at the Wolf Creek Ski Area was killed by an avalanche within the ski area boundary. In 2012 (February 16), one backcountry skier was killed and another injured by an avalanche in the area of Lobo Overlook and Gibbs Creek near Wolf Creek Pass. On March 4, 2014, another ski patroller died after being buried by an avalanche outside of the boundary of the Wolf Creek Ski Area. On February 2, 2016, a

snowmobiler died after triggering a soft slab avalanche in the Lost Mine Creek area east of Wolf Creek Pass.

On March 19, 2010, two people were buried and killed in a building roof avalanche. The entire northeast-facing part of the metal roof suddenly avalanched under the weight of wet, heavy above-normal snowpack.

Probability of Future Occurrences

According to the 2013 Colorado Natural Hazards Mitigation Plan, it is difficult to determine the number of persons at risk from avalanche, but a half dozen can be expected every year in **Colorado**. “There is no way to determine the number of people caught or buried in avalanches each year, because non-fatal avalanche incidents are increasingly under reported. The American Institute for Avalanche Research and Education reports that 90 percent of avalanche victims die in slides triggered by themselves or a member of their group. Obtaining a better understanding of outdoor recreation in avalanche-prone areas may lead toward a **better understanding of future probability for this hazard.**”²¹

The likelihood of an avalanche increases with heavy accumulation of snow. The probability of future occurrence will depend on weather patterns and levels of recreational activity within known avalanche zones. The probability of avalanche events that cause death or injury in Mineral County in the future is rated likely, with a recurrence interval of 10 years or less (10-100% chance in a given year).

Magnitude/Severity

In an avalanche, the impact forces of the rapidly moving snow and debris and the burial of areas in the run out zone can result in the destruction of structures and anything else in its path. Areas prone to avalanche hazards in and around the San Luis Valley are generally not heavily populated. Avalanches causing death or injury are usually human-triggered in the backcountry and therefore can result in isolated injuries or fatalities. On rare occasions, roads, highways and railroads may be damaged and blocked by snow and debris, resulting in travel delays and costly efforts to clear and repair transportation routes. Otherwise, impacts to critical facilities and interruption of essential services are not expected. The avalanche hazard is rated critical by the Planning Team in light of the risk to public safety, meaning that isolated deaths/injuries; major or long-term impacts to property, infrastructure and critical services; and service disruptions of 24-72 hours are possible.

Vulnerability Assessment

According to the CAIC, avalanches have killed more people in Colorado than any other natural hazard since 1950, and Colorado accounts for one-third of all avalanche deaths in the United States. **Every year, snow avalanches kill and injure winter recreationists in Colorado’s high** country, including cross-country skiers, downhill skiers, snowshoers and snowmobilers. Private property losses are rare, due to local regulation of known avalanche zones, although lack of knowledge of avalanche run-out potential (the farthest reach of snow and debris) has occasionally resulted in damages to residences and private vehicles in Colorado.

²¹ Colorado Natural Hazards Mitigation Plan, December 2013, Colorado Division of Homeland Security and Emergency Management, p. 3-142

Avalanche-prone areas within the county are primarily accessible only by means of public trail systems. Snowmobilers, skiers, snowboarders, hikers, climbers, and snowshoers are all at risk when participating in activities near known avalanche zones. In particularly heavy snow years, the avalanche risk is greater. With prime conditions of wind or snow load, avalanches can be triggered easily.

According to the 2013 Colorado Natural Hazards Mitigation Plan, the avalanche hazard is localized in mountain regions: “Avalanche-prone areas are well known; avalanche chutes identify where they will likely occur again...the complex interaction of weather and terrain factors contributes to the location, size, and timing of avalanches. In the absence of detailed scientific observation, any accumulation of snow on a slope steeper than 20 degrees should be considered a potential avalanche hazard.”²²

4.2.12 Landslide

Hazard Description

The 2013 Colorado Natural Hazards Mitigation Plan defines landslides as the “downward and outward movement of slopes composed of natural rock, soils, artificial fills, or combinations thereof.” Landslides can damage infrastructure, destroy or destabilize structures, and cover rail and roadways, resulting in extended closures and temporary disruptions of utility services. Damage to oil and natural gas pipelines and electrical conduits may result in an interruption of services both in the affected areas and those further down the pipelines from affected areas. Landslides are most common in areas with steep slopes and grading, but may occur anywhere that natural or artificial materials may shift or slide.²³

There are various types of landslides, including slumps, rockslides, debris slides, lateral spreading, debris flows, earth flows, and soil creep. Rock falls are the falling of a detached mass of rock from a cliff or down a very steep slope. In general, areas prone to the landslide hazard are also susceptible to flows and rock falls.

Geographic Location

As noted in the 2013 Colorado Natural Hazards Mitigation Plan, movement related to landslides, mud and debris flows, and rock falls occurs naturally across Colorado on an ongoing basis. The landslide hazard occurs in all mountainous regions of the state, including the San Juan Mountain range. Factors that influence risk from landslides include elevation, slope, soil moisture and susceptibility.

Most of Mineral County lies within the San Juan Mountains in the Rio Grande and San Juan National Forests. The greatest potential risk for landslides is in southern Mineral County along the Continental Divide, on Wolf Creek Pass, and within the Weminuche Wilderness. There is a large amount of steep terrain in the southwestern corner of Mineral County.

²² Colorado Natural Hazards Mitigation Plan, December 2013, Colorado Division of Homeland Security and Emergency Management, p. 3-149

²³ Colorado Natural Hazards Mitigation Plan, December 2013, Colorado Division of Homeland Security and Emergency Management, p. 3-180

Previous Occurrences

There are several mapped landslides, debris flows, and rockfall areas along Wolf Creek Pass and the immediate vicinity. During the 1980s and 1990s, landslide activity intensified due to an extended period of higher than normal annual precipitation levels; however, there are no available documented damages due to landslide events in Mineral County.

Probability of Future Occurrences

The Colorado Geological Survey (CGS) has identified one vulnerable area in Mineral County that is particularly vulnerable to landslides, avalanches, and debris flows: Wolf Creek Pass and US Highway 160 east of the pass. Other than Wolf Creek Pass, landslides do not present an immediate risk to populated areas, transportation systems, public infrastructure or the economy. Geologic studies can determine the location of historic landslide paths and deposits and instruments can measure activity to determine whether movement is occurring. Due to the steep terrain throughout most of Mineral County, the Planning Team has rated the probability of future landslide occurrences likely, with a recurrence interval of 10 years or less (10-100% chance in a given year).

Magnitude/Severity

Saturated soils due to heavy precipitation or melting snowpack are often the determining factors in the frequency and magnitude and frequency of land movements. Landslides can also be triggered by loss of vegetation after a wildfire and erosion of the toe of the slope by rivers, earthquakes or land development activities.

As noted in the 2013 Colorado Natural Hazards Mitigation Plan, the potential for property and **infrastructure damages is considerable: “Landslides occur commonly throughout Colorado, and the annual damage is estimated to exceed \$3 million dollars to buildings alone.”**²⁴

Transportation infrastructure is typically the most impacted resource from landslides in Colorado although residential structures have also been impacted.

Figure 4.10 West Salt Creek Landslide (Mesa County)



Source: Colorado Geological Survey

²⁴ Colorado Natural Hazards Mitigation Plan, December 2013, Colorado Division of Homeland Security and Emergency Management, p. 3-185

Although rare, deaths and injuries can occur from landslides. On May 25, 2014 the longest **landslide in the state’s history occurred in Mesa County, six miles southeast of the town of Collbran**, resulting in the deaths of three local men. The landslide was 2.8 miles long and dropped approximately 2,100 feet in elevation, moving at speeds of up to 85 miles per hour. The landslide covered almost a square mile of West Salt Creek valley, stopping just short of active gas-production wellheads and irrigation ditches and ponds used by local farmers and ranchers.²⁵

More typically, landslide events are gradual movements in areas of steep topography and where the soil conditions contribute to the movement of the slope. Damages are often limited to cracks in foundations and damage to roads. Individual property owners may experience more or less damage depending on site specific movement. Rockfall, on the other hand, is a sudden movement, and could potentially result in significant damages, injuries, or death.

The Planning Team has rated the severity of the landslide hazard in Mineral County as limited, meaning that minor injuries and minor property damages are possible, with minimal disruptions to infrastructure and critical services.

Vulnerability Assessment

In Mineral County, most areas susceptible to landslides are publicly-owned and there is a relatively low risk for injury, loss of life, or damage to property. The most significant risk is likely along the highways, especially US 160 near Wolf Creek Pass. Several landslides and rockslides have occurred along the highways near Wolf Creek Pass and Wagon Wheel Gap. These events can shut down access for several hours, and could potentially cause damages and injury to passing automobiles and their passengers.

The conditions resulting in a landslide are site-specific. A major landslide could potentially destroy anything in its path. The vulnerability of individual structures can be assessed through detailed studies of buildings and infrastructure located within known landslide areas. Ongoing pressures for residential and business growth in areas highly impacted by landslides will continue as available land for development decreases in mountain communities. Future development in areas where landslide potential exists should undergo geotechnical studies to determine slope stability.

4.2.13 Earthquake

Hazard Description

An earthquake is caused by a sudden slip on a fault. Stresses in the earth’s outer layer push the sides of the fault together. Stress builds up and the rocks slip suddenly, releasing energy in waves that travel through the earth’s crust and cause the shaking that is felt during an earthquake. “Sudden movement on faults is responsible for earthquakes. An earthquake is simply the vibrations caused by the blocks of rock on either side of a fault rubbing against each other as they move in opposite directions. The bigger the movement, the bigger the earthquake. Because the mountains are still rising in Colorado, earthquakes will continue to accompany the faulting that enables them to grow.”²⁶

²⁵ Colorado Geological Survey, coloradogeologicalsurvey.org

²⁶ Colorado Geological Survey, dnrwebcomapp.state.co.us/CGSONline

Earthquake research in Colorado focuses on the thousands of faults in the state to determine whether they have moved in the recent geologic past and whether they are capable of moving again in the near future. Magnitude and intensity are used to describe seismic activity: magnitude is a measure of the total energy released (each earthquake has one magnitude) and intensity describes the effects of the earthquake at a particular place (intensity differs throughout the area). The Richter Scale is commonly used to measure magnitude and the Modified Mercalli Scale is used for intensity.

Table 4.19 Richter Scale

Magnitude	Typical Maximum Intensity
1.0 - 3.0	I
3.0 - 3.9	II - III
4.0 - 4.9	IV - V
5.0 - 5.9	VI - VII
6.0 - 6.9	VII - IX
7.0 and higher	VIII or higher

Source: Colorado Geological Survey

Intensity is an expression of the amount of shaking at any given location on the ground surface as felt by humans and defined in the Modified Mercalli Intensity scale below.

Table 4.20 Modified Mercalli Intensity (MMI) Scale

MMI	Felt Intensity
I	Not felt except by a very few people under special conditions. Detected mostly by instruments.
II	Felt by a few people, especially those on upper floors of buildings. Suspended objects may swing.
III	Felt noticeably indoors. Standing automobiles may rock slightly.
IV	Felt by many people indoors, by a few outdoors. At night, some people are awakened. Dishes, windows, and doors rattle.
V	Felt by nearly everyone. Many people are awakened. Some dishes and windows are broken. Unstable objects are overturned.
VI	Felt by everyone. Many people become frightened and run outdoors. Some heavy furniture is moved. Some plaster falls.
VII	Most people are alarmed and run outside. Damage is negligible in buildings of good construction, considerable in buildings of poor construction.
VIII	Damage is slight in specially designed structures, considerable in ordinary buildings, great in poorly built structures. Heavy furniture is overturned.
IX	Damage is considerable in specially designed buildings. Buildings shift from their foundations and partly collapse. Underground pipes are broken.

X	Some well-built wooden structures are destroyed. Most masonry structures are destroyed. The ground is badly cracked. Considerable landslides occur on steep slopes.
XI	Few, if any, masonry structures remain standing. Rails are bent. Broad fissures appear in the ground.
XII	Virtually total destruction. Waves are seen on the ground surface. Objects are thrown in the air.

Source: Federal Emergency Management Agency

Geographic Location

Colorado is considered a region of relatively minor earthquake activity. Geologic studies indicate there are more than 90 potentially active faults in Colorado with documented movement within the last 1.6 million years. Potentially active faults present the greatest earthquake hazard (those that have ruptured to the ground surface during the Holocene period, or about the last 15,000 years).

In Mineral County, the most significant faulting activity has occurred in the northwestern quadrant of the county in the San Juan Mountains. These faults are expected to be 130,000 to 2 million years old. The most significant fault in Mineral County is the Cannibal Fault. One of the three USGS operated permanent seismic stations in Colorado is located in northeastern Alamosa County.

Previous Occurrences

According to the Colorado Geological Survey, multiple earthquakes occurred in Creede in April and May of 1928, on May 3, 1957, and on January 23, 1966.

The most economically damaging earthquake in Colorado's history occurred on August 9, 1967 in the northeast Denver metropolitan area. The magnitude 5.3 earthquake, centered near Commerce City, caused more than a million dollars (approximately \$8 million in 2015 dollars) in damage in Denver and the northern suburbs. This earthquake is believed to have been triggered by the deep injection of liquid waste into a borehole at Rocky Mountain Arsenal.

Table 4.21 Colorado's Largest Earthquakes

Date	Location	Magnitude	Maximum Intensity
1870 (Dec 4)	Pueblo/Ft. Reynolds	N/A	VI
1871 (Oct)	Lily Park, Moffat County	N/A	VI
1880 (Sep 17)	Aspen	N/A	VI
1882 (Nov 7)	North Central Colorado	6.6	VII
1891 (Dec 1)	Axial Basin (Maybell)	N/A	VI
1901 (Nov 15)	Buena Vista	N/A	VI
1913 (Nov11)	Ridgway Area	N/A	VI
1944 (Sep 9)	Montrose/Basalt	N/A	VI
1955 (Aug 3)	Lake City	N/A	VI
1960 (Oct 11)	Montrose/Ridgway	5.5	V
1966 (Jan 5)	NE of Denver	5.0	V

1966 (Jan 23)	CO-NM border near Dulce, NM	5.5	VII
1967 (Aug 9)	NE of Denver	5.3	VII
1967 (Nov 27)	NE of Denver	5.2	VI
2011 (Aug 22)	Trinidad (Cokedale)	5.3	VII

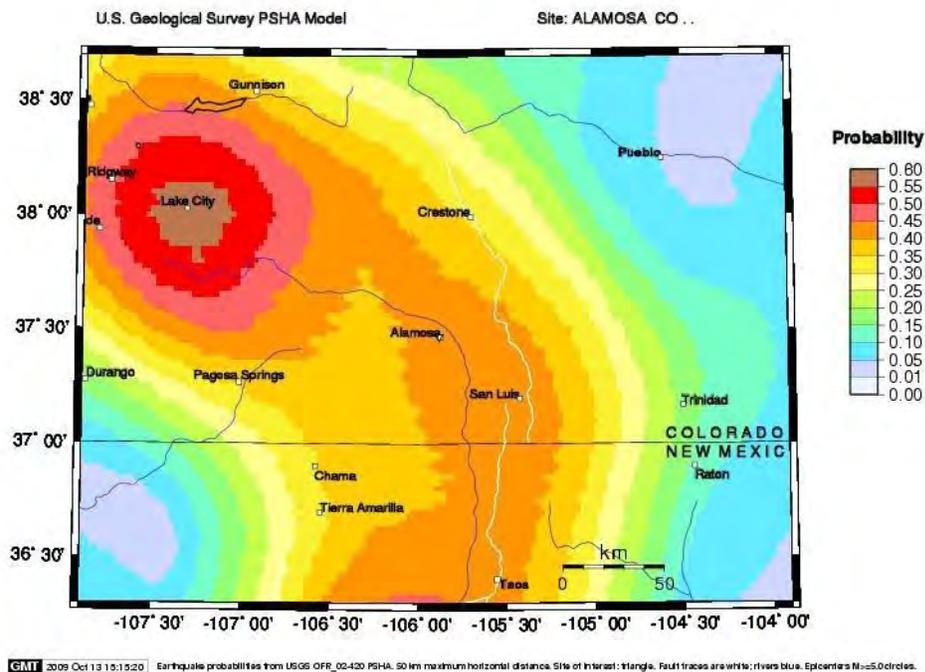
Source: Colorado Geological Survey

Probability of Future Occurrences

The occurrence of earthquakes is relatively infrequent in Colorado, and the historical earthquake record is short (only about 130 years). Given the short history of recorded events, it is impossible to accurately estimate the timing or location of future strong earthquakes in **Colorado**. **“Relative to other western states, Colorado’s earthquake hazard is higher than Kansas or Oklahoma, but lower than Utah and certainly much lower than Nevada and California.** Even though the seismic hazard in Colorado is low to moderate, it is likely that future damaging earthquakes will occur. Based on the historical earthquake record and geologic studies in Colorado, an event of magnitude 6.5 to 7.5 could occur somewhere in the state.”²⁷

The figure below illustrates the probability of a 5.0 or greater magnitude earthquake occurring within the San Luis Valley area in the next 150 years. This map shows a 35-45% probability of an earthquake of that magnitude in and around Mineral County in the next 150 years.

Figure 4.11 Probability of a 5.0 or Greater Magnitude Earthquake in next 150 years



Source: U.S. Geological Survey

²⁷ Colorado Geological Survey, coloradogeologicalsurvey.org/geologic-hazards/earthquakes-2/

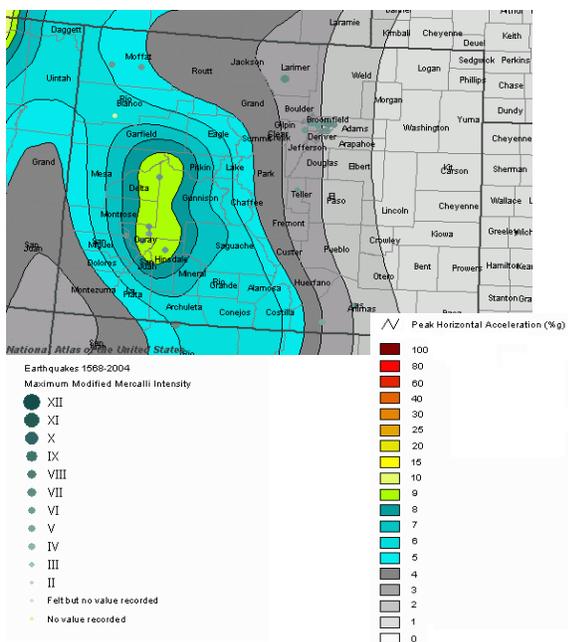
The Planning Team has rated the probability of future earthquake events occasional (occurs every 11-100 years, or a 1-10% chance per year).

Magnitude/Severity

According to the 2013 Colorado Natural Hazards Mitigation Plan, the seismic hazard in Colorado is rated low-to-**moderate, but the risk may have been underestimated.** “Colorado’s earthquake hazard and risk has historically been rated lower than most knowledgeable scientists in the state consider justified. As a result, local emergency managers are generally unaware of the size and consequences of an earthquake that could occur in the state. HAZUS 99 gave a probabilistic Annualized Earthquake Loss (AEL) of \$5.8 million which ranked Colorado 30th in the nation. In early 2013, the Colorado Geological Survey ran a series of deterministic scenarios for selected faults around the state using HAZUS MH. The earthquake magnitudes used for each fault **were the “Maximum Credible Earthquake” taken from the USGS Quaternary Fault and Fold Database or from the USGS National Earthquake Hazard Map.** The results demonstrate that the probabilistic AEL value of \$5.8 million does not begin to convey the size of the loss that would occur in the event of a strong earthquake on any of **these faults.**”²⁸

Earthquakes can cause structural damage, injury, and loss of life, as well as damage to public safety, health care and infrastructure facilities (e.g., water, wastewater, power, communication, and transportation). Seismic shaking is typically the greatest cause of losses to structures during earthquakes.

Figure 4.12 Colorado Seismic Hazard Map - 10% Probability of Exceedance in 50 Years



Source: U.S. Geological Survey

²⁸ Colorado Natural Hazards Mitigation Plan, December 2013, Colorado Division of Homeland Security and Emergency Management, p. 3-159

As shown in Figure 4.11, in Mineral County the shaking level, with a 10 percent chance of being exceeded over a period of 50 years, is 6-8 percent peak acceleration. Significant earthquake damage typically does not occur until peak accelerations are greater than 30 percent. Secondary impacts of earthquakes may include landslides, seiches, liquefaction, fires, and dam failure. The Planning Team has rated the seismic hazard in Mineral County limited, meaning that minor injuries and minimal property damage are possible, with critical services disruptions of less than 24 hours.

Vulnerability Assessment

In Mineral County, the overall vulnerability to earthquake hazards is low due to the low probability and magnitude and the low density of population and structures. All structures in Mineral County are potentially vulnerable to seismic ground shaking. The most vulnerable are historic buildings constructed of unreinforced masonry. Other critical facilities or infrastructure at risk are unknown; their construction determines their ability to withstand seismic shaking.

The Colorado Geological Survey (CGS) ran a series of deterministic scenarios for selected Colorado faults using HAZUS-MH to assess potential economic and social losses due to earthquake activity in Colorado. The earthquake magnitudes used for each fault were the **“maximum credible earthquake” as determined by the U.S. Geological Survey. There is only one known fault in Mineral County: the Cannibal Fault, and therefore the only fault analyzed for this assessment.** The greatest losses to Mineral County would likely result from a magnitude 7.0 earthquake or greater on the Cannibal Fault, which is predicted to cause more than \$23 million in economic loss.

The adoption and enforcement of building codes may provide the most effective local mitigation tool for substantially reducing the potential cost of damages to future structures from earthquakes. The magnitude and intensity of any earthquake will be the key determinant as to total damages.

4.3 Vulnerability Assessment

4.3.1 Vulnerability Assessment Methodology

This Vulnerability Assessment examines vulnerable community assets by describing the population, the rate of population growth, and a general description of growth and development trends. The Vulnerability Assessment also quantifies, to the extent possible, assets at risk to natural hazards and estimated potential losses.

According to the 2013 Colorado Natural Hazards Mitigation Plan, “Coloradans become vulnerable to hazards when they live, work, or visit an area where these events occur. Individuals and communities that prepare for the occurrence of a hazard are less vulnerable to its consequences than those that do not. The vulnerability of Colorado’s population is rooted in a relationship between the occurrence of hazard events, the proximity of people and property to these occurrences, and the degree that a community and its members are committed and prepared to cope with these occurrences and mitigate their effects.”²⁹

²⁹ Colorado Natural Hazards Mitigation Plan (December 2013), Colorado Division of Homeland Security and Emergency Management

4.3.2 Community Asset Inventory

The community asset inventory describes the assets at risk to natural hazards in Mineral County, including the total exposure of people and property; critical facilities and infrastructure; natural, cultural, and historic resources; and economic assets.

HAZUS was used to estimate the exposure of people and buildings in Mineral County. HAZUS estimates exposure to 993 individuals (2007 total population) and 1,565 structures (2000), with the assessed value of these structures totaling **\$131,000,000** (2000). Building counts and values (including building contents) were taken from HAZUS census block-level data. Land values were purposely excluded because land remains following Colorado disasters, and subsequent market devaluations are frequently short term and difficult to quantify. Additionally, state and federal disaster assistance programs generally do not address loss of land or its associated value.

According to the Mineral County Assessor, the total number of structures in the county in 2016 is 1,575, with a total assessed value of **\$25,147,376**.

Critical Facilities, Infrastructure, and Other Important Community Assets

A critical facility can be defined as one that if damaged would have devastating impacts on disaster response and recovery operations. Facilities that are commonly considered *critical* include law enforcement facilities, fire service facilities, health care facilities, government facilities, emergency operations centers, public shelters, transportation systems, water supply facilities, wastewater treatment facilities, agricultural production facilities, electrical power systems and other utilities. In addition, critical facilities are those that house vulnerable populations, such as schools and assisted living or senior housing.

Table 4.22 Critical Facilities in Mineral County

Facility Type	Facility Name	Facility Address	Estimated Replacement Value
Fire Station	Mineral County Fire Protection District	5 USFS Road 503	\$582,000
Police Station	Mineral County Sheriff's Department	1201 Main St.	\$1,358,000

Source: HAZUS-MH MR3 (2009) and Mineral County Hazard Mitigation Planning Team

Table 4.23 Critical Facilities in Creede

Facility Type	Facility Name	Facility Address	Estimated Replacement Value
Theater/Major Employer	Creede Repertory Theater	124 N. Main St.	N/A

Source: Mineral County Hazard Mitigation Planning Team

Natural, Historic and Cultural Resources

Assessing the vulnerability of Mineral County to disaster also involves inventorying the natural, historic, and cultural assets of the area. This step is important for the following reasons:

- The community may decide that these types of resources warrant a greater degree of protection due to their unique and irreplaceable nature and contribution to the overall economy.
- If these resources are impacted by a disaster, knowing this ahead of time allows for more prudent care in the immediate aftermath, when the potential for additional impacts are higher.
- The rules for reconstruction, restoration, rehabilitation, and/or replacement are often different for these types of designated resources.
- Natural resources can have beneficial functions that reduce the impacts of natural hazards, such as wetlands and riparian habitat, which help absorb and attenuate floodwaters.

Natural resources are important to include in benefit-cost analyses for future projects. They may be used to leverage additional funding for projects that contribute to other community goals as well. A number of natural resources exist in Mineral County, including wetlands and endangered species.

Wetlands are valuable because of their ability to improve water quality, limit erosion, protect wildlife and reduce flood peaks while slowly releasing floodwaters to downstream areas. Wetlands also provide drought relief in water-scarce areas where the relationship between water storage and streamflow regulation are vital.

An *endangered species* is any species of fish, plant life, or wildlife that is in danger of extinction throughout all or most of its range. A *threatened species* is a species that is likely to become an endangered species within the foreseeable future. Both endangered and threatened species are protected by law and any future hazard mitigation projects are subject to these laws. *Candidate species* are plants and animals that have been proposed as endangered or threatened but are not currently listed.

Endangered, threatened, and candidate species located in Mineral County are listed in Table 4.24 below.

Table 4.24 Rare Species in Mineral County

Common Name	Scientific Name	Type of Species	Status
Canada Lynx	<i>Lynx canadensis</i>	Mammal	Threatened
North American Wolverine	<i>Gulo gulo luscus</i>	Mammal	Candidate
Southwestern Willow Flycatcher	<i>Empidonax taillii extimus</i>	Bird	Endangered
Uncompahgre Fritillary Butterfly	<i>Boloria acronema</i>	Insect	Endangered
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	Bird	Threatened

Source: U.S. Fish and Wildlife Service

National and state historic inventories were reviewed to identify historic and cultural assets in Mineral County. **The National Register of Historic Places is the nation's official list of cultural resources worthy of preservation.** The Colorado State Register of Historic Properties **is a listing of the state's significant cultural resources worthy of preservation** for the future **education and enjoyment of Colorado's residents and visitors.** Table 4.25 lists the properties

in Mineral County that are on the Colorado State Register of Historic Properties. Those properties that are also on the National Register of Historic Places are indicated with an asterisk.

Table 4.25 Historic Properties and Districts on State and National Registers

Property Name	Location	Date Listed
Creede Branch, Denver & Rio Grande Western Railroad*	South Fork to Creede	11-27-2002
Creede Federal Fish Hatchery	1984 Forest Road 801A (Creede)	9-11-1996
Rio Grande Depot (Creede Museum)	201 Wall St. (Creede)	11-9-1994
Rio Grande Hotel	209 W. 2 nd St. (Creede)	6-14-1995
Sevenmile Bridge*	6 miles SW of Creede	7-11-1985
Wagon Wheel Gap Railroad Station*	SE of Creede	9-27-1976

Asterisk indicates properties on both the State and National Registers

Source: Directory of Colorado State Register Properties

According to the National Environmental Policy Act (NEPA), any property over 50 years of age is considered a historic resource and is potentially eligible for the National Register. As a result, alterations to listed properties must be evaluated under the guidelines set forth by NEPA. Structural mitigation projects are considered alterations for the purpose of this regulation.

Economic Assets

In addition to direct impacts and damages to critical facilities, major disasters can result in large amounts of debris, business interruptions, increased emergency response times and costs, loss of income for businesses and residents, increased demands for health services, and the need to replace roads, bridges and public buildings. After a disaster, economic recovery is the highest recovery priority, next to public health and safety. When major employers are unable to return to normal operations, long-term impacts may be felt throughout the community. Table 4.26 lists the top employers in Mineral County by number of employees.

Table 4.26 Top Employers in Mineral County

Employer Name	Location (City/Town)
50-100 Employees	
Wolf Creek Ski Area	Wolf Creek Pass
20-50 Employees	
Wilderness Ranch (Seasonal)	Creede
Creede Repertory Theater (Seasonal)	Creede
Creede School District	Creede
Mineral County Fire Protection District (Volunteers)	Creede
4UR Ranch (Seasonal)	Creede

Social Vulnerability

Certain demographic and housing characteristics affect overall vulnerability to hazards. These characteristics, such as age, race/ethnicity, income levels, gender, building quality, public infrastructure, all contribute to social vulnerability. Factors of social vulnerability hold many implications for disaster response and recovery and are important considerations when identifying and prioritizing mitigation goals and actions. *Age* can affect the ability of individuals to safely evacuate away from hazardous conditions. *Language and cultural barriers* can affect the communication of warning information and access to post-disaster information. *Low-income residents* generally have fewer resources available for mitigation, preparedness, and recovery and are more likely to live in vulnerable structures. Individuals and communities with greater wealth have more ability to absorb disaster impacts and losses, due to factors such as insurance and social safety nets.

Table 4.27 Social Vulnerability Indicators from U.S. Census, 2010-2014

Jurisdiction	Total Population	Housing Units	% Female	% 18 Yrs. and Under	% 65 and Over	% Non-English at Home	Individuals Below Poverty Level (%)
Mineral County	704	1,248	50.1	5.8	38.9	1.4	6.8
City of Creede	188	205	52.1	19.1*	25.0	3.8	19.1

Asterisk denotes U.S. Census 2000 data

Source: U.S. Census Bureau, American Community Service, 2010-2014 5-Year Population Estimate

4.3.3 Growth and Development Trends

This section provides a general description of land uses and development trends within the county and includes data on growth in population and housing units for both jurisdictions.

Table 4.28 Population Growth in Mineral County, 2010-2015

Jurisdiction	2010	2015 (Estimated)	Percent Change
Mineral County	712	726	1.97
City of Creede	290	294	1.38

Source: Department of Local Affairs, State Demography Office, www.dola.colorado.gov/dlg/demog

Table 4.29 below shows the rate of growth in housing units for Mineral County and Partner Jurisdictions between 2010-2014.

Table 4.29 Growth in Housing Units in Mineral County, 2010-2014

Jurisdiction	2010	2014	Percent Change
Mineral County	1,201	1,248	3.91
City of Creede	275	205	-25.45

Source: Department of Local Affairs, State Demography Office, www.dola.colorado.gov/dlg/demog

Between 2010 and 2015, Mineral County issued an average of 7 building permits per year.

According to the State Demography Office, Mineral County is projected to grow at a slow rate (approximately 0.5%-1.0%) between 2000 and 2050.

Table 4.30 Projected Population Growth in Mineral County, 2000-2050

	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
Pop.	836	806	705	702	723	769	800	824	854	880	911
Percent Change		-0.7	-2.6	-0.1	0.6	1.2	0.8	0.6	0.7	0.6	0.7

Source: Department of Local Affairs, State Demography Office, www.dola.colorado.gov/dlg/demog

4.4 Capability Assessment

Mitigation capabilities refer to the programs and policies currently in place to reduce hazard impacts, principally through the identification and implementation of cost-effective hazard mitigation measures. Capabilities can take the form of regulatory requirements (e.g., building codes or hazard-specific zoning ordinances), plans (e.g., hazard mitigation plans or stormwater master plans), certification programs (e.g., *StormReady* or the Community Rating System), personnel (e.g., floodplain administrators and community planners), insurance (e.g., National Flood Insurance Program), and structural projects that protect critical facilities and other property. Hazard awareness and public education programs are also proven measures for preparing citizens to cope with hazard events that cannot be avoided.

This capability assessment is divided into three sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, and fiscal mitigation capabilities.

Regulatory Mitigation Capabilities

The political jurisdictions within Mineral County enforce a range of regulations that support mitigation goals and principles by restricting development in areas prone to natural hazards. The existing regulatory tools and planning mechanisms for Mineral County and other jurisdictions are summarized in Table 4.31 below.

Table 4.31 Regulatory Mitigation Capabilities

Regulatory Capability	Mineral County	City of Creede
Comprehensive or Master Plan	No	Yes
Emergency Operations Plan	Yes	Yes (County EOP)
Economic Development Plan	No	No
Capital Improvements Plan	No	No
Community Wildfire Protection Plan	Yes	Yes
Building Code	No	Yes
Building Code Year	N/A	2003
Floodplain Ordinance	No	No
Zoning Ordinance	Yes	Yes
Subdivision Ordinance	Yes	Yes
Stormwater Ordinance	No	No
Site Plan Review Requirements	Yes	Yes

National Flood Insurance Program	Yes	Yes
Community Rating System (CRS)	No	No

Administrative and Technical Mitigation Capabilities

Table 4.32 below identifies the personnel responsible for activities related to mitigation and loss prevention in Mineral County and other jurisdictions.

Table 4.32 Administrative and Technical Capabilities

Administrative and Technical Resources	Mineral County	City of Creede
Planner/Engineer (with knowledge of land development practices)	Yes	Yes
Engineer/Professional (trained in construction practices related to buildings/infrastructure)	No	Yes
Planner/Engineer/Scientist (with understanding of natural hazards)	No	No
GIS Capabilities	Yes	Yes
Full-Time Building Official	Part-Time	No
Floodplain Administrator	Yes	No
Emergency Manager	Yes	Yes (County)
Grant Writer	Yes	Yes
Warning Systems/Services	Yes	Yes

Fiscal Mitigation Capabilities

Table 4.33 Fiscal Mitigation Capabilities

Financial Resources	Mineral County	City of Creede
Authority to Levy Taxes for Specific Purposes	Yes	Yes
Fees for Water, Sewer, Gas or Electric Services	No	Yes
Impact Fees for New Development	Yes	
Incur Debt through General Obligation Bonds	No	
Incur Debt through Special Tax Bonds	No	
Withhold Spending in Hazard-Prone Areas	No	

Chapter Five

Mitigation Strategy

This chapter describes the mitigation strategy developed by the Mineral County Hazard Mitigation Planning Team (Planning Team), based on the risk assessment that was updated by the Planning Team at both planning meetings. The Planning Team developed goals and mitigation actions according to the following definitions:

- Goals are general guidelines that explain what the Plan means to achieve. Goals are defined before considering how to accomplish them so that they are not dependent on the means of achievement. They are meant to be achieved over the long term and typically consist of broad policy statements.
- Mitigation Actions are specific actions that implement the objective and provide clear direction towards fulfilling the goals.

5.1 Plan Goals

At the second planning meeting on September 23, 2016, the Planning Team validated the goals for the 2016 plan update, based on: (1) an updated analysis of significant hazards, (2) an updated vulnerability assessment that estimates the potential impacts of the hazards identified, (3) an updated capability assessment that identifies efforts currently in place to reduce potential hazard impacts, and (4) a mitigation strategy and action plan intended to reduce risks in the future. For the 2016 update, the Planning Team reaffirmed the goals established in the previous plan:

1. Reduce the loss of life and personal injury caused by natural hazards
2. Reduce damage to critical facilities, personal property, and other community assets caused by natural hazards
3. Minimize economic losses associated with natural hazards.

5.2 Incorporation of 2010 Plan into Other Planning Mechanisms

The 2010 Mineral County Hazard Mitigation Plan encouraged the incorporation of recommended mitigation actions into other local government planning mechanisms, such as master or comprehensive land-use plans, when appropriate. Due to the broad scope and general nature of many of the recommended actions, the initiatives outlined in the 2010 plan were not completely incorporated; however, progress with integration into other planning mechanisms has been made and will continue to be a priority.

As indicated in the Capability Assessment (Section 4.4), Mineral County and the City of Creede enforce a range of regulations that support mitigation goals and principles by restricting development in areas prone to natural hazards. The primary local planning mechanisms that support hazard mitigation include comprehensive plans, site plan review requirements, zoning ordinances, subdivision regulations, and regulations related to floodplain and stormwater management.

The 2016 update of this plan provides additional opportunities for improving integration with other local plans and programs. Multiple disciplines are reflected in Planning Team membership, broadening opportunities for identifying and supporting meaningful mitigation

actions. Outside of formal meetings, Planning Team members can promote mitigation plan goals by (1) attending other planning/program meetings, (2) participating in other planning processes, and (3) remaining cognizant of outreach opportunities to engage stakeholders. The Mineral County Office of Emergency Management will be responsible for incorporating an annual hazard mitigation plan review to assess progress and identify opportunities for implementing recommended actions.

5.3 Identification of Mitigation Action Alternatives

At the second planning team meeting on September 23, 2016, the Planning Team reviewed the types and categories of mitigation actions, as identified in the table below.

Table 5.1 Types of Mitigation Actions

Mitigation Type	Description	Examples
Local Plans and Regulations	These actions include government authorities, policies, or codes that influence the way land and buildings are developed and built.	<ul style="list-style-type: none"> •Comprehensive plans •Land use ordinances •Subdivision regulations •Development review •Building codes/enforcement •NFIP Community Rating System •Capital improvement programs •Open space preservation •Stormwater management plans and regulations
Structure and Infrastructure Protection	These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.	<ul style="list-style-type: none"> •Acquisition/removal of structures in hazard-prone areas •Utility undergrounding •Structural retrofits •Floodwalls and retaining walls •Detention/retention structures •Culverts •Safe rooms
Natural Systems Protection	These are actions that minimize damage and losses and also preserve or restore the functions of natural systems.	<ul style="list-style-type: none"> •Sediment and erosion control •Stream corridor restoration •Forest management •Conservation easements •Wetland restoration and preservation
Education and Awareness Programs	These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs,	<ul style="list-style-type: none"> •Radio or television spots •Websites with maps and information •Real estate disclosure •Presentations to school groups or neighborhood organizations

	<p>such as <i>StormReady</i> or <i>Firewise</i> Communities. Although this type of mitigation reduces risk less directly than structural projects or regulation, it is an important foundation. A greater understanding and awareness of hazards and risk among local officials, stakeholders, and the public is more likely to lead to direct actions.</p>	<ul style="list-style-type: none"> •Mailings to residents in hazard-prone areas •StormReady Communities •Firewise Communities
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Source: Local Mitigation Planning Handbook, FEMA (March 2013)

Mineral County and the City of Creede currently participate in the National Flood Insurance Program (NFIP). These jurisdictions will continue participation in and compliance with the NFIP. Specific activities that the jurisdictions will undertake to continue compliance include the following:

- Attend NFIP training sponsored by the State
- Update floodplain regulations throughout the county
- Work with FEMA to update county DFIRMs.

5.4 Prioritization of Mitigation Actions

The Planning Team discussed a wide range of possible mitigation actions, and employed the STAPLEE methodology endorsed by FEMA to evaluate and prioritize each proposed action. For each recommended action, the Planning Team developed a project summary that included a description of the action, the department or agency responsible for implementing it, and an estimated timeframe for completion.

The STAPLEE evaluation tool was used as the primary method for evaluating the effectiveness of each action item. STAPLEE considers social, technical, administrative, political, legal, economic, and environmental constraints and benefits of a proposed activity.

- Social: Does the measure treat people fairly?
- Technical: Will it work? Does it solve the problem? Is it feasible?
- Administrative: Is there capacity to implement and manage the project?
- Political: Who are the stakeholders? Did they get to participate? Is there public support? Is political leadership willing to support the project?
- Legal: Does your organization have the authority to implement? Is it legal? Are there liability implications?
- Economic: Is it cost-beneficial? Is there funding? Does it contribute to the local economy or economic development? Does it reduce direct property losses or indirect economic losses?
- Environmental: Does it comply with environmental regulations or have adverse environmental impacts?

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STAPLEE Method for Evaluating Potential Mitigation Actions	Yes	No
1. Is the action socially acceptable (compatible with community values)?		
2. Is the strategy technically feasible?		
3. Does the community have the capacity to implement and maintain the action?		
4. Is there public support to implement and maintain the action?		
5. Does the community have the legal authority to implement the strategy?		
6. Is the action cost-effective?		
7. Is the strategy consistent with environmental policies and goals?		

1-2 yes = low priority

3-4 yes = medium priority

5-6 yes = high priority

5.5 Status of 2010 Mitigation Actions

Table 5.2 below provides a report on the status of Mitigation Actions identified in the previous 2010 version of this plan.

Table 5.2 Status of 2010 Mitigation Actions

2010 Mitigation Actions			
#	Description/Benefits	Lead Agency	Status
Mineral County			
1	Attend NFIP training program sponsored by the State	Mineral County OEM	County will seek NFIP training when new DFIRM's are complete
2	Work with FEMA to update floodplain maps	Mineral County OEM	Continuing
3	Study the capacity of existing local warning systems to reach the population at various times of the day and replace components that are ineffective and/or add components so that the system will warn at least 90% of residents of impending severe winter weather, wildfire, or landslide	Mineral County OEM	Continuing (Mineral County will evaluate EverBridge and other systems)
4	Engage area students in mitigation studies and in implementing mitigation actions	Mineral County OEM	Discontinued due to lack of staff/sponsor
5	Work with outdoor recreation facilities/rental shops to increase public awareness of steps to take to protect themselves from harm caused by natural hazards that may occur during periods of recreation	Mineral County OEM	Continuing (Mineral County has started the process of partnering with recreational retailers)
6	Promote the sale of the CORSAR (Colorado Outdoor Recreation Search and Rescue) card	Mineral County OEM	In process and ongoing

7	Develop and implement a hazard-specific public awareness program	Mineral County OEM	Ongoing activity to be combined with 2016 Mitigation Action #3
8	Work with local officials to identify high-capacity sources of water for fighting fire and develop a plan to overcome obstacles to access to these sources of water	Mineral County OEM	Partially accomplished (1 well drilled and 2 nd well to be located/drilled)
9	Identify vulnerable populations and develop a plan for reaching them after a storm to ensure that they have necessities	Mineral County OEM	Ongoing effort of OEM, Public Health & partners (not mitigation action)
10	Develop trailhead/campground signage warnings for natural hazards	Mineral County OEM	Complete
11	Retrofit historic structures to increase possibility of withstanding earthquakes	Mineral County OEM	Planning Team has determined the action to be infeasible (beyond local capability)
12	Develop/implement fire restrictions related to periods of drought	Mineral County OEM	Complete (USFS restrictions in place)
13	Reduce fuels and create defensible space within existing subdivisions	Mineral County OEM	Ongoing, high priority activity
14	Work with state officials to update information about conditions of dams within Mineral County	Mineral County OEM	Responsibility of dam owners and State Division of Water Resources
15	Provide information on county website regarding natural hazards and actions that residents and businesses can implement to reduce risk and damage potential	Mineral County OEM	Ongoing effort partially accomplished with regional preparedness web page (SLVemergency.org)
City of Creede			
16	Attend NFIP training sponsored by the State	City of Creede	County will seek NFIP training when new DFIRM's are complete
17	Fund repairs to the flume	City of Creede	Incomplete (highest priority for City of Creede)
18	Provide avalanche training sessions in Creede	City of Creede	Complete
19	Work with outdoor recreation facilities/rental shops to increase public awareness of steps to take to protect themselves from harm caused by hazards that may occur during periods of recreation	City of Creede	Responsibility of Mineral County OEM
20	Promote the sale of the CORSAR (Colorado Outdoor Recreation Search and Rescue) card	City of Creede	Responsibility of Mineral County Sheriff

5.6 2016 Mitigation Actions

The Planning Team ranked proposed mitigation actions high, medium, or low based on the **County's goals**. The results of this effort are summarized in Table 5.3 below, including a description of each mitigation action, **the action's priority, and the lead agency**.

Table 5.3 Mitigation Action Matrix, 2016 Mitigation Actions

2016 Mitigation Actions			
#	Description/Benefits	Lead Agency	Priority
Mineral County			
1	Work with FEMA to update floodplain maps	Mineral County OEM	High
2	Continue to expand capacity of existing local warning systems to reach the population at various times of the day and evaluate EverBridge and other systems for use in Mineral County	Mineral County OEM	High
3	Partner with recreation entities and retailers to promote safety and increase public awareness of natural hazards outdoors and in the backcountry	Mineral County OEM	Medium
4	Promote the sale of the CORSAR (Colorado Outdoor Recreation Search and Rescue) card	Mineral County OEM	Medium
5	Identify one additional high-capacity source of water for fighting wildfire, including procedures for emergency access	Mineral County OEM	High
6	Reduce fuels and create defensible space within existing subdivisions	Mineral County OEM	High
7	Provide information on county website regarding natural hazards and actions that residents and businesses can implement to reduce risk	Mineral County OEM	Medium
8	Identify appropriate facility for public shelter and seek funding assistance to purchase generator for the facility	Mineral County OEM	High
9	Work with the State of Colorado and the National Weather Service to identify funding and support for the placement of a Doppler radar tower in the area to improve weather predictions and warnings	Mineral County OEM	High
10	Evaluate benefits of participating in Colorado Certified Burner program endorsed by the Colorado Division of Fire Prevention and Control to increase awareness of wildfire red flag warnings	Mineral County Sheriff; Fire Protection Districts	High
City of Creede			
11	Assess repair and maintenance needs for the Willow Creek Funnel (Flume) and identify potential partners and funding sources.	City of Creede	High

5.7 Mitigation Funding Sources

The Colorado Division of Homeland Security and Emergency Management (DHSEM) Mitigation Team is the primary state entity responsible for coordinating and facilitating technical assistance for local hazard mitigation planning. The mission of the Mitigation Team is to promote community resiliency and sustainability for the people of Colorado by fostering partnerships and maximizing the availability of mitigation and recovery resources.

Federal Programs

Federal mitigation programs serve as critical funding sources to reduce the risk of natural **hazards to Colorado's** people, property, environment, and economy. Colorado and its mitigation partners attempt to maximize the application of federal funding from FEMA, USDA, USACE, HUD, SBA, and other agencies each year. Mitigation money from FEMA supports several mitigation projects each year. The State will continue to apply for mitigation grants through the Hazard Mitigation Assistance (HMA) Program, specifically its Hazard Mitigation Grant Program (HMGP) and Pre-Disaster Mitigation (PDM) grants, as the availability of funds is

announced. These grants support the development of local hazard mitigation plans as well as construction activities.

Education projects, outreach programs, repeater sites, early detection and warning/notification systems, generators for backup power, and chippers for slash and mulch projects are very popular in Colorado. Local communities are constantly seeking sources of funding to maintain programs and install or upgrade systems. Unfortunately, funds for these types of projects are limited and the need strongly outweighs the availability. In spite of this, Colorado communities have made great strides and progress in prevention and preparedness activities and continue to do more each year by taking advantage of limited opportunities.

State Programs

The state has loan and grant programs for which mitigation activities are eligible. Funding sources traditionally used have been energy impact funds, gaming funds, general funds, and severance tax funds. Many state agencies have grant programs, including, but not limited to, DHSEM, Colorado State Forest Service and the Departments of Agriculture, Local Affairs, and Natural Resources.

State agencies continually work to identify new strategies for implementing mitigation projects, including new funding sources. The DHSEM Mitigation Team works with local communities to expand the number of FEMA HMA programs for which communities are eligible to qualify.

Chapter 6

Plan Adoption, Maintenance and Evaluation

6.1 Formal Plan Adoption

Following approval by the Mineral County Hazard Mitigation Planning Team (Planning Team), the next step in the process of local adoption is the submission of the final draft document to the Colorado Division of Homeland Security and Emergency Management (CDHSEM) for state-level review and recommended changes prior to FEMA review. FEMA then reviews the plan and, pending any further recommended changes, issues a notice that the plan is Approved Pending Adoption (APA) by the governing body of each participating jurisdiction. The plan must be formally adopted by participating jurisdictions within one calendar year of receiving notice of APA status.

6.2 Plan Maintenance and Evaluation

Regular maintenance of this plan will help maintain a focus on hazards that pose the greatest risks and on the recommended measures for reducing future potential hazard losses. The Mineral County Emergency Manager will serve as the primary point of contact and will coordinate all local efforts to monitor, evaluate, and update this plan. Participating jurisdictions and individual departments are responsible for implementing their specific mitigation actions and reporting on the status of these actions to the Emergency Manager.

Plan maintenance involves an ongoing effort to monitor and evaluate the implementation of identified action items in the plan, and to update the plan as progress, opportunities, obstacles, or changing circumstances are encountered.

The Planning Team will convene at least once each year to review and update the status of recommended mitigation actions. The Emergency Manager will schedule these meetings and invite members of the Planning Team to attend. At this review meeting, the Planning Team will review new hazards data or studies, discuss new capabilities or changes in capabilities, consider any input received from the public, evaluate the effectiveness of existing mitigation actions, and modify or add mitigation actions.

The results of the formal review meeting will be captured by the Emergency Manager and summarized in an annual progress status report. These progress status reports will guide and inform future five-year plan updates. Throughout the year, the Emergency Manager will monitor the progress of mitigation efforts through site visits, phone calls and/or emails with the agencies responsible for mitigation actions.

Updates to this plan will follow the most current FEMA and CDHSEM planning guidance. The Emergency Manager will initiate a five-year plan update process within the time necessary to ensure that the current plan does not expire before the updated plan is approved. The

schedule should allow time for contracting of technical or professional services, state and FEMA reviews, revisions based on FEMA review comments, and the formal adoption process.

6.3 Mitigation Actions and Other Plans and Programs

Mitigation is most successful when it is incorporated within the day-to-day operations of land use planning, road and bridge/public works, public health and other mainstream functions of local government. Multi-objective projects that mutually benefit partners and stakeholders are usually more cost-effective and more-broadly supported. Many other local plans present opportunities to address hazard mitigation in a way that can support multiple community objectives.

Ideally, identified mitigation actions should be implemented through existing plans and policies, which already have support from the community and policy makers. The incorporation of elements of this plan into existing planning mechanisms requires coordination between the Emergency Manager and the staff of each department responsible for implementing specific mitigation actions.

The Emergency Manager, with support and guidance provided by the Planning Team, will work with the responsible agencies to incorporate this Plan into the following **existing planning mechanisms**:

- City of Creede Comprehensive Plan
- Mineral County Emergency Operations Plan
- Current/future master plans of the other participating jurisdictions
- Zoning, subdivision, and **floodplain ordinances**
- Capital improvement plans and county and municipal budgets
- Other plans and policies outlined in the capability assessment

The Risk Assessment (Chapter 4) included in this plan provides data, analysis, and maps that can be integrated into other plans to inform policies and decision-making. Considering hazard information in land use plans, zoning and subdivision codes, and the development review process is a proven method for guiding future development away from identified hazard areas. This information can also be used to design and site future public facilities to minimize exposure to hazards.

6.4 Continued Public Involvement

In order to provide an ongoing opportunity to raise community awareness of natural hazards, this plan will be posted on the County web page and public comments can be addressed to the Emergency Manager at the contact information provided. The five-year update process provides an opportunity to build public support by publicizing success stories related to implementation of mitigation actions.

All stakeholders in the planning process will be invited to participate in the next five-year update of this plan and additional participation will be solicited from the public, partner agencies, new entities and community groups in the future. The plan maintenance and update process will include continued opportunities for public and stakeholder involvement and input through attendance at open public meetings, web postings, and press releases to local media.

In addition, the Emergency Manager and other members of the Planning Team will identify opportunities to raise community awareness, including attendance and provision of materials at county, municipal, and school-sponsored events, activities of the fire protection districts, and through the American Red Cross and public mailings.

All public comments received about the plan will be collected by the Emergency Manager, incorporated into mitigation progress status reports, and considered in future plan updates.

Chapter 7

Regional Coordination

7.1 Tradition of Regional Cooperation

The natural hazards profiled in this plan are common throughout the region and are the same 12 hazards profiled in the updated plans of each of the partner counties.

Natural hazards affect all of these counties without respect for political boundaries. As a result, these five counties routinely share resources during emergencies and maintain a strong tradition of cooperative planning. The 2016 update of these plans further demonstrates the **region's commitment to reducing** risks from natural hazards. Regional cooperation allows counties to stretch resources, share best practices, and potentially implement more mitigation actions.

Mineral County and its partner counties in the San Luis Valley cooperatively obtained a federal grant to develop 2016 updates to county-level hazard mitigation plans concurrently. In addition, the five Emergency Managers and other stakeholders met collectively to identify opportunities for collaborating on regional mitigation efforts in the San Luis Valley. The results of the most recent (2015) regional Threat Hazard Identification and Risk Assessment (THIRA) were discussed to determine where potential mitigation actions in this plan might dovetail with priorities identified in the THIRA.

For the 2016 update of this plan, priority risks identified in the THIRA, specifically wildfires and long-term power disruptions, were considered in the risk assessment process and in the development of new mitigation actions. As a result, two of the four regional mitigation actions identified in this chapter address these cross-cutting concerns. Through regional collaboration, the San Luis Valley is taking advantage of shared resources, engaging regional expertise, and preventing duplication of efforts to ensure that communities in the Valley continue building resiliency to natural disasters.

7.2 Regional Hazard Events Since 2010

Several significant natural hazard events have occurred since the last update of this plan, most notably the West Fork Fire Complex in June 2013, a federally-declared fire emergency that cost more than \$31 million to contain. The West Fork Complex Fire burned 109,615 acres, making it the second largest wildfire in modern Colorado history. The fire demonstrated extreme behavior as a result of dead fuels, primarily pine- and spruce-beetle killed trees, high winds and drought conditions. Although the fire threatened a number of neighborhoods and caused the evacuation of the Town of South Fork for several days, there were no fatalities as a result of the event and no structures were lost. Information about that event, as well as other smaller-scale events, is provided in the table below.

Table 7.1 Significant Regional Events, 2010-2016

Incident	Date(s)	Location	Impacts
Streams Lake Fire	May 31-June 2, 2013	Mineral County	Approximately 100 acres of forest burned
West Fork Fire Complex	June 5-July 31, 1013	Mineral County	109,615 acres burned; FEMA PA Grant: \$7.9 million
Flood-Crestone	May 4-June 16, 2015	Saguache County, Town of Crestone	Federally declared for Public Assistance (DR-4229); >\$100,000 damage to roads and bridges
High Water Event	June 8, 2015	Conejos County	County bridge on CR 13 damaged and closed for several days
Ice Jam Flood	December 28, 2015	Conejos County	Ice dam at CR H and CR 13 caused water to approach homes; 3-day effort by Road/Bridge to clear ice
Beaver Park Dam Incident	February 24-March 20, 2016	Rio Grande County	Depressions on dam embankment triggered drawdown of reservoir until stabilization work completed

Source: After-Action Reports 2010-2016, Colorado Division of Homeland Security and Emergency Management

As a result of prolonged drought conditions in and around the San Luis Valley, forests and grasslands have been and continue to be extremely dry, leading to regular recurrence of wildfire incidents. Communities in the Valley are also vulnerable to severe weather events and loss of power as a result of unique conditions related to Doppler radar coverage and the lack of a reliable backup source of electricity. Finally, local land use decisions about development in and near floodplains are hampered by old, outdated flood maps.

7.3 Regional Mitigation Actions

The regional mitigation actions presented in this chapter are also included as county mitigation actions and have been identified as high priority actions by the SLV Steering Committee. The purpose of highlighting these four actions is to draw attention to recommended actions, engage potential partners, and hopefully improve opportunities for financial assistance from government and the private sector. By emphasizing the importance of these mitigation actions to the entire region, the intent is to improve opportunities for implementation through strength in numbers.

Regional Mitigation Action #1 - Improve Wildfire Awareness and Public Compliance with Burn Restrictions

- Priority: High
- Problem
 - The combination of an extended drought in the Valley and extensive pine- and spruce-beetle kill in the forests has resulted in unprecedented fuel accumulation, or fuel loads, that allows wildfires and grassfires to ignite more easily, spread quickly and burn more intensely.
- Proposed Action
 - (1) Develop county-level plans to support information-sharing during Red Flag warnings;

- (2) Adopt Colorado Certified Burner Program (CBP) endorsed by the Colorado Division of Fire Prevention and Control and increase awareness of existing wildfire Red Flag warnings for ditch burns.
- Potential Partners/Funding Sources
 - Fire Protection Districts, Colorado Division of Fire Prevention and Control, Colorado State Forest Service, County Sheriff and Emergency Management, Colorado Division of Homeland Security and Emergency Management

Regional Mitigation Action #2 - Improve Doppler Radar for Region

- Priority: High
- Problem
 - Insufficient weather radar coverage in wide area including the San Luis Valley and Four Corners area (including the three bordering states), resulting in challenges for warning coordination meteorologists in providing timely warning and watch information related to severe weather events, including flash flooding, hail and lightning.
- Proposed Action
 - Obtain funding and support to place another Doppler radar tower in the SLV area to improve weather predictions and warnings.
- Potential Partners/Funding Sources
 - National Weather Service, Colorado Division of Homeland Security and Emergency Management, local funds

Regional Mitigation Action #3 - Plan for Power Grid Disruptions and Failure

- Priority: High
- Problem
 - **There is no “loop” in the grid to provide an alternate power source in the Valley** -- in a prolonged power outage, electricity, communications, normal emergency services, fuel, sanitation, food, medications and public transportation may all be unavailable.
- Proposed Action
 - Continue to support the efforts of public health, emergency management and nonprofit organizations to expand awareness of natural hazards, strengthen family and business emergency preparedness, identify and equip public shelters, and identify and support the needs of people with disabilities and other vulnerable population groups.
- Potential Partners/Funding Sources
 - SLV Emergency Preparedness and Response (EPR), County Public Health, American Red Cross

Regional Mitigation Action #4 - Flood Mapping/Seek Updated DFIRMs

- Priority: High
- Problem
 - A common issue with many communities in the San Luis Valley is outdated flood maps that make it difficult to make informed decisions on the ground by local land use staff.

- Proposed Action
 - (1) Determine process for requesting updated flood maps and whether a schedule exists for modernizing local maps;
 - (2) Identify state and/or agencies to direct requests for updated mapping and procedures for petitioning the agencies to expedite mapping;
 - (3) Determine benefits if any to coming together to make a joint, multi-county request.
- Potential Partners/Funding Sources
 - Colorado Water Conservation Board (CWCB), FEMA, Colorado Division of Homeland Security and Emergency Management

Facilitation, monitoring and implementation of these regional mitigation actions will be the responsibility of the San Luis Valley Hazard Mitigation Steering Committee and other agencies and individuals that participate in collaborative planning within the San Luis Valley All-Hazards Region.



West Fork Fire Complex, Mineral County, June 2013

Appendices

- A. Acronyms
- B. Plan Participants
- C. References and Resources
- D. Documentation of the Planning Process
- E. Disaster Mitigation Act of 2000 (DMA 2000) Summary
- F. FEMA Plan Review Tool (Pending)
- G. Record of Adoption (Pending)

Appendix A

Acronyms

ARC	American Red Cross
BFE	Base Flood Elevation (The 100-year-flood, the 1% event)
CDHSEM	Colorado Division of Homeland Security and Emergency Management
CDOT	Colorado Department of Transportation
CGS	Colorado Geological Survey
CDPHE	Colorado Department of Public Health & Environment
CRS	Community Rating System
CSFS	Colorado State Forest Service
CSP	Colorado State Patrol
CWCB	Colorado Water Conservation Board
DFIRM	Digital Flood Insurance Rate Map
DFPC	Division of Fire Protection and Control (Department of Natural Resources)
DHS	U.S. Department of Homeland Security
DMA	Disaster Mitigation Act (2000)
DNR	Department of Natural Resources
DOLA	Department of Local Affairs
DWR	Division of Water Resources (Department of Natural Resources)
DWSA	Drought & Water Supply Assessment
EAP	Emergency Action Plan
EOC	Emergency Operations Center
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FHBM	Flood Hazard Boundary Map
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
GIS	Global Information System

HMGP	Hazard Mitigation Grant Program
LEOP	Local Emergency Operations Plan
LOMR	Letter of Map Revision
NCEI	National Centers for Environmental Information (formerly the National Climatic Data Center)
NFIP	National Flood Insurance Program
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resource Conservation Service
NWS	National Weather Service
PDM	Pre-Disaster Mitigation (Program)
RMIIA	Rocky Mountain Insurance Information Association
SBA	Small Business Administration
SDO	State Demographic Office
SFHA	Special Flood Hazard Area
SHPO	State Historic Preservation Officer
SLV EPR	San Luis Valley Emergency Preparedness and Response
SLV RETAC	San Luis Valley Regional Emergency Trauma Advisory Council
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USGS	United States Geological Survey
WUI	Wildland Urban Interface

Appendix B

Plan Participants

Mineral County Hazard Mitigation Planning Team

Participant	Position	Jurisdiction/ Department	Email Address
Jimmy Adelman	Assistant Coroner	Mineral County	
Betty Jo Bell	Public Health	Mineral County	bjominco@gmail.com
Jean Borrego	HS Coordinator	CDHSEM	slvhls5@gmail.com
Paul Duarte		USFS	paul.duarte@state.co.us
Don Dustin	Director	Mineral County EMS	dondustin1@aol.com
Bill Fairchild		MCSO	719-625-2600
Jody Fairchild		USFS	jfairchild@fs.fed.us
Jim Felmlee	Emergency Manager	Saguache County	jfelmlee@saguachecounty-co.gov
Patricia Gavelda	Mitigation Program Mgr.	CDHSEM	patricia.gavelda@state.co.us
Rick Hernandez	Emergency Manager	Hinsdale County	seasonsofwood@yahoo.com
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Adam Moore	District Forester	CSFS	adam.moore@colostate.edu
Rodney Nogg		CSP	rodney.nogg@state.co.us
David Osborn	SLV Field Manager	CDHSEM	david.osborn@state.co.us
Jim Pomeroy	Search & Rescue Board	Mineral County	jpomeroy000centurytel.net
Chris Rodriguez	Emergency Manager	Costilla County	chris.rodriguez@costillacounty-co.gov
Robert Schlough	Public Works	City of Creede	creedepwmaintenance@gmail.com
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Francis Song	Emergency Manager	Alamosa County	fsong@alamosacounty.org
Buck Stroh		Creede Schools	buck@creedek12.net
Amy Thompson		Search and Rescue	amythompsoncreede@gmail.com
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Jim Van Ry	Dispatch	Mineral County	jim.mineral628@gmail.com
Ramona Weber	Commissioner	Mineral County	ramona102261@hotmail.com
Terry Wetherill	Emergency Manager	Mineral County	mincoemc@gmail.com

Appendix C

References and Resources

Colorado Department of Local Affairs, www.dola.colorado.gov

Colorado Department of Public Health and Environment, www.colorado.gov/pacific/cdphe

Colorado Department of Transportation, www.codot.gov

Colorado Division of Homeland Security and Emergency Management, www.coemergency.com

Colorado Drought Mitigation and Response Plan, August 2013, Colorado Water Conservation Board

Colorado Flood Hazard Mitigation Plan, November 2013, Colorado Water Conservation Board

Colorado Geological Survey (CGS), coloradogeologicalsurvey.org

Colorado Natural Hazards Mitigation Plan, December 2013, Colorado Division of Homeland Security and Emergency Management

Colorado State Demography Office, www.dola.colorado.gov/dlg/demog

Colorado State Forest Service, csfs.colostate.edu/wildfire-mitigation

Colorado Water Conservation Board (CWCB), cwcb.state.co.us

Department of Homeland Security, www.ready.gov

Federal Emergency Management Agency, www.fema.gov

Federal Guidelines for Emergency Action Planning for Dams, FEMA P-64, July 2013, FEMA

Local Mitigation Planning Handbook, March 2013, FEMA

Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards, January 2013, FEMA

National Centers for Environmental Information (formerly National Climatic Data Center), www.ncdc.noaa.gov

National Lightning Safety Institute, www.lightningsafety.com

National Institute of Building Sciences, Multihazard Mitigation Council, www.nibs.org

National Oceanic and Atmospheric Administration (NOAA), National Weather Service, www.nws.noaa.gov

Rocky Mountain Insurance Information Association (RMIIA), www.rmiiia.org

Spatial Hazard Event and Losses Database for the United States (SHELDUS), University of South Carolina

State Engineer's 27th *Annual Report on Dam Safety to the Colorado General Assembly*, Division of Water Resources (April 2013)

The Geological Society of America, geology/gsapubs.org

Threat Hazard Identification and Risk Assessment, San Luis Valley Region, April 2015

Understanding Your Risks: Identifying Hazards and Estimating Losses, August 2001, FEMA

U.S. Census Bureau

Appendix D

Documentation of the Planning Process

Contents

Kickoff Meeting Summary

Information Collection Tool

Mid-Project Progress Report

Press Release

Public Comment/Feedback Form

Mitigation Action Workshop Meeting Summary

Identifying and Prioritizing Mitigation Actions

Letters of Intent (Under Separate Cover)

Planning Team Meeting Sign-In Sheets (Under Separate Cover)

2016 Mineral County Hazard Mitigation Plan Update
 Kickoff Meeting
 June 1, 2016, 5:00-7:00

Meeting Summary

The initial planning meeting to update the Mineral County Hazard Mitigation Plan was conducted on June 1, 2016, 5:00-7:30, in Creede, Colorado. Twenty-one attendees participated in the kickoff meeting, including all three members of the Mineral County Board of County Commissioners, Mineral County Sheriff, Mineral County Fire Chief, Mineral County Administrator, Mineral County EMS Director and Mineral County OEM. Other participants included representatives from Creede Schools, Mineral County Public Health, Mineral County Dispatch, Mineral County Ambulance Board, San Luis Valley RETAC, Colorado Division of Homeland Security & Emergency Management, Colorado State Patrol, and U.S. Forest Service.

Emergency Managers from Alamosa, Costilla, Hinsdale and Saguache Counties also attended. The meeting agenda included an overview of the plan update process, a discussion of potential mitigation projects and funding sources, and a discussion of risks associated with natural hazards in Mineral County.

Project Overview

Terry Wetherill, Mineral County Emergency Manager, welcomed the group, led introductions, and provided an overview of the project. By participating in the plan update process, Mineral County and its local government partners remain eligible for federal hazard mitigation grants, including Pre-Disaster Mitigation (PDM), Hazard Mitigation Grant Program (HMGP), and Flood Mitigation Assistance (FMA) grants from the Federal Emergency Management Agency (FEMA). The process of updating the previous (2010) plan will take approximately six months, culminating in September 2016.

To assist in completing plan updates, Mineral County partnered with four neighbors (Alamosa, Conejos, Rio Grande and Saguache Counties) to obtain a federal grant and hire a planning consultant.

Project Team

- Project Manager: Terry Wetherill, Emergency Manager
- Mineral County Planning Team
- **Consultant: Robert “Bob” Wold**

Technical Planning Assistance

- San Luis Valley Hazard Mitigation Steering Committee (Emergency Managers from Alamosa, Conejos, Mineral, Rio Grande and Saguache Counties)
- Patricia Gavelda, Local Hazard Mitigation Planning Program Manager, Colorado Division of Homeland Security and Emergency Management
- David Osborn, San Luis Valley Regional Field Manager, Colorado Division of Homeland Security and Emergency Management

Hazard Mitigation Overview

Mr. Wold provided an overview of hazard mitigation concepts, benefits, projects, and the requirements for local participation as per the Disaster Mitigation Act of 2000 (DMA 2000). Mr. Wold reviewed the types of projects that are eligible for grant-funding and that have been

funded to address flood, wildfire, geologic and other natural hazards in Colorado. During the period 2011-present, 105 projects totaling \$85,473,423 were approved for funding in Colorado for a range of flood reduction, wildfire mitigation, landslide stabilization, planning grants and other types of projects.

Hazard Mitigation Plan Update Process

Mr. Wold outlined the key steps, timelines, and federal requirements for meeting deadlines related to state review and FEMA approval. The process includes an opportunity for the public to comment on the plan prior to federal approval and local plan adoption. An open public meeting will be conducted in October 2016 and a draft of the updated plan will be posted online to allow citizens to submit comments.

The updated plan will identify opportunities for reducing risks and mitigating future losses from natural hazard events. Mr. Wold discussed the step-by-step process for updating the plan, including determining current risks, vulnerabilities and capabilities and identifying opportunities for implementing specific mitigation actions. Mineral County Planning Team members will support the process by attending planning meetings, assisting with data acquisition, and reviewing and approving the final draft before submittal to the State and FEMA.

Risk Assessment

Meeting participants discussed the 12 natural hazards profiled in the previous 2010 plan in terms of probability and potential consequences. Based on this discussion, hazard ratings related to probability and magnitude/severity were revised for a number of hazards (concurrence on hazard ratings will be finalized at the next County Planning Team meeting). The updated Risk Assessment Worksheet is attached.

To clarify distinctions between commonly-used hazard assessment terms, the following **definitions are provided from FEMA's Local Mitigation Planning Handbook (2013):**

Hazard Assessment Terminology

Natural hazard - source of harm or difficulty created by a meteorological, environmental, or geological event

Community assets - the people, structures, facilities, and systems that have value to the community

Vulnerability - characteristics of community assets that make them susceptible to damage from a given hazard

Impact - the consequences or effects of a hazard on the community and its assets

Risk - the potential for damage, loss, or other impacts created by the interaction of natural hazards with community assets

Hazard assessment - product or process that collects information and assigns values to risks for the purpose of informing priorities, developing or comparing courses of action, and informing decision making

Threat or human-caused incident - intentional actions of an adversary, such as a threatened or actual chemical or biological attack or cyber event.

Potential Mitigation Actions

At the next Mineral County Planning Team meeting, Mitigation Actions established in the previous (2010) version of the plan will be reviewed to determine which were accomplished, which are in process, which are ongoing and which should be removed because they are no longer feasible. The County Planning Team will also attempt to identify new Mitigation Actions that can be implemented in the next five-year period. For example, one possible new Mitigation Action is to improve weather predictions and warnings in Mineral County and surrounding counties by obtaining a new Doppler radar tower for the San Luis Valley region.

Future Planning Team Meetings/Next Steps

The Emergency Manager and/or contractor will reach out to County Planning Team members as needed for help in acquiring data or other information needed to update the plan. One additional County Planning Team meeting will be conducted in August-September to finalize the risk assessment and identify 2016 mitigation actions. In October, a final meeting will be held to discuss the final draft document and provide an opportunity for citizens to attend and offer input.

Information Collection Tool Mineral County

1. Demographic Information
2. Vulnerability Assessment
3. Capability Assessment
4. Status of 2010 Mitigation Actions

1. Demographic Information

Demographic Information			
	County	Towns	Others
Facts and Figures			
Latitude			
Longitude			
Land Area (Square Miles)			
Elevation			
Population (2010)			
Population 2014 (ACS 5-Year Estimated)			
Population (2015 Estimated)			
Population Characteristics			
Median Age			
Population 65 Years and Over			
Female Population			
Male Population			
Average Household Size (2010)			
Average Family Size (2010)			
Percent of Total Population with Disabilities			
Residents w/Disabilities less than 18 Years Old			
Residents with Disabilities 18-64 Years Old			
Residents with Disabilities over 65 Years Old			
Residents with Health Insurance Coverage			
Percent of Residents with High School Degree			
Percent of Residents with Bachelor's Degree			
Economic and Housing Statistics			
Median Household Income			
Percent of Total Population that is Unemployed			
Percent of Families Living below Poverty Level			
Percent of People Living below Poverty Level			
Total Housing Units			
Vacant Housing Units			
Homeowner Vacancy Rate			
Rental Vacancy Rate			
Net Building Permits			

2. Vulnerability Assessment

Vulnerability Assessment			
	County	City	Town
Number of Structures			
Value of Structures			
Number of Companies			
New Critical Facilities (since 2010)			
New Major Employers (since 2010)			
Population Growth 2010-2015			
Growth in Housing Units 2005-2010			
Population Density 2010 (per Square Mile)			
Housing Density 2010 (per Square Mile)			
Projected Population Growth 2000-2050			

3. Capability Assessment

Capability Assessment			
	County	City	Town
Regulatory Mitigation Capability			
Comprehensive or Master Plan			
Emergency Operations Plan			
Economic Development Plan			
Capital Improvements Plan			
Community Wildfire Protection Plan			
2012 International Fire Code			
Building Code			
Building Code Year			
Floodplain Ordinance			
Zoning Ordinance			
Subdivision Ordinance			
Stormwater Ordinance			
Growth Management Ordinance			
Site Plan Review Requirements			
Erosion/Sediment Control Program			
Stormwater Management Program			
Flood Insurance Rate Maps (FIRMs)			
National Flood Insurance Program Participant			
Community Rating System (CRS) Participant			
Administrative and Technical Resources			
Planner/Engineer (with knowledge of land development practices)			
Engineer/Professional (trained in construction practices related to buildings/infrastructure)			
Planner/Engineer/Scientist (with understanding of natural hazards)			
GIS Capabilities			
HAZUS Analysis			
Full-Time Building Official			

Floodplain Administrator
Emergency Manager
Grant Writer
Warning Systems/Services
Financial Resources
Community Development Block Grants
Capital Improvements Project Funding
Authority to Levy Taxes for Specific Purposes
Fees for Water, Sewer, Gas or Electric Services
Impact Fees for New Development
Incur Debt through General Obligation Bonds
Incur Debt through Special Tax Bonds
Withhold Spending in Hazard-Prone Areas

4. Status of 2010 Mitigation Actions

Status of 2010 Mitigation Actions		
Mitigation Action	Responsible Agency	Status
County		
City		
Town		

Progress Report
SLV Hazard Mitigation Plan Updates
June 29, 2016

The overall process of updating the five County plans can be broken down into three categories of activity: research, planning tasks and document preparation. Highlighted sections are the tasks where help from Emergency Managers is needed; in a nutshell:

- Nail down 2016 “participating jurisdictions” (cities, towns, special districts)
- Assist with collection of needed information to help fill in the plan details
- Determine current status of 2010 Mitigation Actions
- Schedule 2nd County Planning Team meeting and final open public meeting
- Review final draft for accuracy and completeness.

Research

Research	Status/Estimated Completion Date
Review 2010 county hazard mitigation plans	Complete
Identify elements (text and graphics) from each 2010 plan where the information is valid/current for inclusion in 2016 updates	Complete
Research census and other demographic data to update population, housing and economic statistics for each county	Complete
Develop Hazard Worksheets for each county to facilitate updates to hazard profiles concerning hazard location, probability and severity	Complete
Collect and review after-action reports, studies and other information related to hazard events/incidents occurring 2010-2016	July 31, 2016
Review national data sets (i.e., FEMA, NOAA NCEI, SHELUDS) to update information on natural hazard events and impacts	July 31, 2016
Review latest state and federal guidance (e.g., 2013 Colorado Natural Hazards Mitigation Plan) to incorporate most current hazard data/statistics and ensure 2016 plan updates conform to standards	July 31, 2016
Collect information from participating jurisdictions to complete the Vulnerability and Capability Assessment sections of Chapter 4	August 31, 2016

Tasks

Tasks	Status/Estimated Completion Date
Conduct Initial Planning Meeting – SLV Steering Committee	Complete
Schedule/conduct County-Level Kickoff Meetings	Complete
Validate new and continuing Participating Jurisdictions (cities, towns, special districts) and identify and reach out to stakeholders as needed (e.g., RWEACT, Rio Grande Water Conservancy District)	July 31, 2016
Schedule and conduct a planning meeting with the SLV Hazard Mitigation Steering Committee to discuss content and mitigation actions of the regional element of each plan	August 31, 2016

Establish dates, times and locations for 2 nd County Planning Team meetings	July 31, 2016
Develop invitation, agenda, handouts and slides for 2 nd round of County Planning Team meetings	July 31, 2016
Determine status of 2010 Mitigation Actions (i.e., accomplished, complete, incomplete, ongoing, withdrawn)	August 10, 2016
Conduct 2 nd round of County Planning Team Meetings to review progress and identify 2016 mitigation actions	August 31, 2016
Schedule and conduct a planning meeting with the SLV Hazard Mitigation Steering Committee to discuss content and mitigation actions of the regional element of each plan	August 31, 2016
Establish dates, times and locations for open public meeting during the month of October to solicit public comment and input	August 31, 2016
Complete press release and public comment form and provide to EMs with final draft to post on web sites and release to media, as appropriate	September 30, 2016
Provide final draft document to County Planning Teams for review, comment, and recommended changes	September 30, 2016
Conduct one open public meeting in each county to provide a formal opportunity for public comment	October 28, 2016
Complete County Planning Team review and incorporate edits and recommended changes	October 14, 2016
Submit final draft to Colorado DHSEM for review/comment prior to submission to FEMA	October 17, 2016

Document Preparation

The primary document preparation task is to complete final drafts by the end of the grant performance period September 30, 2016 and forward to each County Planning Team member for review and comment. (Note: contractor remains responsible for incorporating all changes recommended by County Planning Teams, Colorado DHSEM, and FEMA after the end of the grant performance period).

Plan Updates	Status/Estimated Completion Date
Frame document shell (format, organization, style, contents, headings, headers/footers, captions, bibliography)	Complete
Executive Summary	Complete
Chapter 1, Introduction	July 15, 2016
Chapter 2, Community Profile	July 31, 2016
Chapter 3, Planning Process	July 31, 2016
Chapter 4, Risk Assessment	September 16, 2016
Chapter 5, Mitigation Strategy	September 30, 2016
Chapter 6, Plan Maintenance	August 15, 2016
Chapter 7, Regional Element	September 30, 2016
Appendix Information	September 23, 2016
Bibliography	September 30, 2016

PRESS RELEASE

_____ County Emergency Management

Date: _____

PUBLIC MEETING SCHEDULED FOR REVIEW OF DRAFT _____ COUNTY HAZARD MITIGATION PLAN

Contact: Name, Emergency Manager
 Phone
 Email

A public meeting to discuss the current updates to the Mineral County Hazard Mitigation Plan (Plan) is scheduled for _____, 2016 at _____. The purpose of the meeting is to review the final draft of the Plan and to give citizens an opportunity to make comments or suggestions. All comments received from the public will be documented and considered for inclusion in the Plan.

The purpose of the Plan is to protect people and property in Mineral County from the effects of natural hazards by identifying and implementing measures for reducing and eliminating losses from hazard events. This plan provides local officials with a tool to guide policies and actions that can be implemented over the long term to reduce risk and future losses from natural hazards. Formal approval of this plan by the Federal Emergency Management Agency (FEMA) also assures that _____ County and the Cities/Towns of _____ will remain **eligible for federal grant funding under FEMA's Hazard Mitigation Assistance grant programs.**

A public comment form is available for citizens to provide feedback on the draft plan. Comments must be submitted by October 20, 2016.

2016 _____ County Hazard Mitigation Plan Update
Public Involvement Comment Form

_____ County is currently engaged in a planning process to become less vulnerable to disasters resulting from natural and human-caused hazards, and your participation is important to us!

_____ County, in cooperation with its partners and stakeholders, is now preparing a five-year update of the local hazard mitigation plan. The purpose of this Plan is to identify and assess natural hazards and determine how to best minimize or manage associated risks. Upon completion, the Plan will provide _____ County with a comprehensive hazard mitigation strategy.

This survey public comment form provides an opportunity for you to share your opinions and participate in the mitigation planning process. The information you provide will help us better understand your hazard concerns and can lead to mitigation activities that lessen the impact of future hazard events.

Please help us by completing this comment form and returning it no later than October 20, 2016 to:

Emergency Manager: Name

Address:

Phone:

Email:

If you have comments regarding this plan, please fill them in below. All comments will be reviewed and considered by the Mineral County Hazard Mitigation Planning Team.

Do you have specific comments, recommendations or corrections related to the 2016 draft of the _____ *County Hazard Mitigation Plan* (please note chapter and page number)?

In your opinion, what are some steps your local government could take to reduce or eliminate the risk of future hazard damages in your neighborhood or community?

Are there any other issues regarding the reduction of risk and loss associated with natural hazards or disasters in the community that you think are important?

THANK YOU FOR YOUR PARTICIPATION!

This survey may be submitted anonymously, however if you provide us with your name and contact information below we will have the ability to follow up with you to learn more about your ideas or concerns (optional):

Name:

Address:

Phone:

E-mail:

Mineral County Hazard Mitigation Plan Update
Mitigation Actions Workshop
September 23, 2016

Meeting Summary

The second and final meeting of the Mineral County Hazard Mitigation Planning Team was conducted on September 23, 2016, 5:00-7:00 PM, at the Elk's Lodge in Creede. The purpose of the meeting was to update the Planning Team on progress to date and to identify and discuss potential hazard mitigation actions to include in the updated plan. At the meeting, the Planning Team reviewed and evaluated a range of specific mitigation actions and projects to reduce the impacts of the hazards identified in the risk assessment.

Participants provided updates on mitigation actions identified in the 2010 plan and weighed the pros and cons of those and other proposed mitigation actions, ranking the highest priority actions for implementation. The results of the discussion at the workshop are shown in the two tables below. Table 1 provides a report on the status of each of the 2010 Mitigation Actions. Table 2 identifies the 2016 Mitigation Actions, lead agencies and priority rankings.

Table 1. Status of 2010 Mitigation Actions

2010 Mitigation Actions			
#	Description/Benefits	Lead Agency	Status
Mineral County			
1	Attend NFIP training program sponsored by the State	Mineral County OEM	County will seek NFIP training when new DFIRM's are complete
2	Work with FEMA to update floodplain maps	Mineral County OEM	Continuing
3	Study the capacity of existing local warning systems to reach the population at various times of the day and replace components that are ineffective and/or add components so that the system will warn at least 90% of residents of impending severe winter weather, wildfire, or landslide	Mineral County OEM	Continuing (Mineral County will evaluate EverBridge and other systems)
4	Engage area students in mitigation studies and in implementing mitigation actions	Mineral County OEM	Discontinued due to lack of staff/sponsor
5	Work with outdoor recreation facilities/rental shops to increase public awareness of steps to take to protect themselves from harm caused by natural hazards that may occur during periods of recreation	Mineral County OEM	Continuing (Mineral County has started the process of partnering with recreational retailers)
6	Promote the sale of the CORSAR (Colorado Outdoor Recreation Search and Rescue) card	Mineral County OEM	In process and ongoing
7	Develop and implement a hazard-specific public awareness program	Mineral County OEM	Ongoing activity to be combined with 2016 Mitigation Action #3
8	Work with local officials to identify high-capacity sources of water for fighting fire and develop a plan to overcome obstacles to access to these sources of water	Mineral County OEM	Partially accomplished (1 well drilled and 2 nd well to be located/drilled)

9	Identify vulnerable populations and develop a plan for reaching them after a storm to ensure that they have necessities	Mineral County OEM	Ongoing effort of OEM, Public Health & partners (not mitigation action)
10	Develop trailhead/campground signage warnings for natural hazards	Mineral County OEM	Complete
11	Retrofit historic structures to increase possibility of withstanding earthquakes	Mineral County OEM	Planning Team has determined the action to be infeasible (beyond local capability)
12	Develop/implement fire restrictions related to periods of drought	Mineral County OEM	Complete (USFS restrictions in place)
13	Reduce fuels and create defensible space within existing subdivisions	Mineral County OEM	Ongoing, high priority activity
14	Work with state officials to update information about conditions of dams within Mineral County	Mineral County OEM	Responsibility of dam owners and State Division of Water Resources
15	Provide information on county website regarding natural hazards and actions that residents and businesses can implement to reduce risk and damage potential	Mineral County OEM	Ongoing effort partially accomplished with regional preparedness web page (SLVemergency.org)
City of Creede			
16	Attend NFIP training sponsored by the State	City of Creede	County will seek NFIP training when new DFIRM's are complete
17	Fund repairs to the flume	City of Creede	Incomplete (highest priority for City of Creede)
18	Provide avalanche training sessions in Creede	City of Creede	Complete
19	Work with outdoor recreation facilities/rental shops to increase public awareness of steps to take to protect themselves from harm caused by hazards that may occur during periods of recreation	City of Creede	Responsibility of Mineral County OEM
20	Promote the sale of the CORSAR (Colorado Outdoor Recreation Search and Rescue) card	City of Creede	Responsibility of Mineral County Sheriff

Table 2. Proposed 2016 Mitigation Actions

2016 Mitigation Actions			
#	Description/Benefits	Lead Agency	Priority
Mineral County			
1	Work with FEMA to update floodplain maps	Mineral County OEM	High
2	Continue to expand capacity of existing local warning systems to reach the population at various times of the day and evaluate EverBridge and other systems for use in Mineral County	Mineral County OEM	High
3	Partner with recreation entities and retailers to promote safety and increase public awareness of natural hazards outdoors and in the backcountry	Mineral County OEM	Medium
4	Promote the sale of the CORSAR (Colorado Outdoor Recreation Search and Rescue) card	Mineral County OEM	Medium
5	Identify one additional high-capacity source of water for fighting wildfire, including procedures for emergency access	Mineral County OEM	High
6	Reduce fuels and create defensible space within existing subdivisions	Mineral County OEM	High

7	Provide information on county website regarding natural hazards and actions that residents and businesses can implement to reduce risk	Mineral County OEM	Medium
8	Identify appropriate facility for public shelter and seek funding assistance to purchase generator for the facility	Mineral County OEM	High
9	Work with the State of Colorado and the National Weather Service to identify funding and support for the placement of a Doppler radar tower in the area to improve weather predictions and warnings	Mineral County OEM	High
10	Evaluate benefits of participating in Colorado Certified Burner program endorsed by the Colorado Division of Fire Prevention and Control to increase awareness of wildfire red flag warnings	Mineral County Sheriff; Fire Protection Districts	High
City of Creede			
11	Assess repair and maintenance needs for the Willow Creek Funnel (Flume) and identify potential partners and funding sources.	City of Creede	High

The Planning Team also adjusted the probability and severity ratings of the 12 hazards, revising the probability of drought from Unlikely to Highly Likely, the probability of dam failure from Likely to Unlikely, the probability of earthquakes from Likely to Occasional, and the severity of the hail hazard from Critical to Limited. The results are shown in the matrix below.

Probability-Severity Matrix

Severity > Probability v	Catastrophic	Critical	Limited	Negligible
Highly Likely	Wildfire	Drought		
Likely		Avalanche Lightning Winter Storm	Hail Landslide Windstorm	
Occasional			Earthquake Flood	
Unlikely		Dam Failure	Tornado	

Identifying and Prioritizing Potential Mitigation Actions

I. Types of Mitigation Actions

Local Plans and Regulations

These actions include government authorities, policies, or codes that influence the way land and buildings are developed and built.

- Comprehensive plans
- Land use ordinances
- Subdivision regulations
- Development review
- Building codes and enforcement
- NFIP Community Rating System
- Capital improvement programs
- Open space preservation
- Stormwater management regulations and master plans

Structure and Infrastructure Projects

These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards. Many of these types of actions are projects eligible for funding through the FEMA Hazard Mitigation Assistance program.

- Acquisitions and elevations of structures in flood prone areas
- Utility undergrounding
- Structural retrofits
- Floodwalls and retaining walls
- Detention structures
- Culverts
- Safe rooms

Natural Systems Protection

These are actions that minimize damage and losses and also preserve or restore the functions of natural systems.

- Sediment and erosion control
- Stream corridor restoration
- Conservation easements
- Wetland restoration and preservation

Emergency Services

These are actions that improve public health and safety.

- Warning systems

- Critical facilities protection

Education and Awareness Programs

These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as StormReady or Firewise Communities. Although this type of mitigation reduces risk less directly than structural projects or regulation, it is an important foundation. A greater understanding and awareness of hazards and risk among local officials, stakeholders, and the public is more likely to lead to direct actions.

- Radio or television spots
- Websites with maps and information
- Real estate disclosure
- Presentations to school groups or neighborhood organizations
- Mailings to residents in hazard-prone areas.

II. STAPLEE Method

Social
 Technical
 Administrative
 Political
 Legal
 Economic
 Environmental

STAPLEE Method for Evaluating Potential Mitigation Actions	Yes	No
1. Is the action socially acceptable (compatible with community values)?		
2. Is the strategy technically feasible?		
3. Does the community have the capacity to implement and maintain the action?		
4. Is there public support to implement and maintain the action?		
5. Does the community have the legal authority to implement the strategy?		
6. Is the action cost-effective?		
7. Is the strategy consistent with environmental policies and goals?		

1-2 yes = low priority
 3-4 yes = medium priority
 5-6 yes = high priority

Appendix E

Disaster Mitigation Act of 2000 (DMA 2000) Summary

SUMMARY

Title I: Predisaster Hazard Mitigation - Amends the Robert T. Stafford Disaster Relief and Emergency Assistance Act (the Act) to authorize the President to establish a program of technical and financial assistance to States and local governments to assist in the implementation of pre-disaster hazard mitigation measures that are cost-effective and are designed to reduce injuries, loss of life, and property damage and destruction, including damage to critical services and facilities under the jurisdiction of the States or local governments. Authorizes the President to provide technical and financial assistance from the National Predisaster Mitigation Fund (established under this Act) to each State and local government that has identified all natural disaster hazards in its jurisdiction and has demonstrated its ability to form effective public-private disaster hazard mitigation partnerships.

Directs that such assistance be used by States and local governments principally to implement pre-disaster hazard mitigation measures that are cost-effective and that are described in proposals approved by the President under this title. Authorizes such assistance to be used to: (1) support effective public-private partnerships; (2) improve the assessment of a community's natural hazards vulnerabilities; or (3) establish a community's mitigation priorities.

Requires the President, in determining whether to provide technical and financial assistance to a State or local government, to take into account: (1) the extent and nature of the hazards to be mitigated; (2) the degree of commitment of the State or local government to reduce damages from future natural disasters; (3) the degree of commitment by the State or local government to support ongoing non-Federal support for the hazard mitigation measures to be carried out using the assistance; (4) the extent to which the hazard mitigation measures carried out contribute to the mitigation goals and priorities established by the State; (5) the extent to which such assistance is consistent with other assistance provided under this Act; (6) the extent to which prioritized, cost-effective mitigation activities that produce meaningful and definable outcomes are clearly identified; (7) the extent to which the activities identified are consistent with any State or local mitigation plan submitted; (8) the opportunity to fund activities that maximize net benefits to society; (9) the extent to which assistance will fund mitigation activities in small impoverished communities; and (10) such other criteria as the President establishes in consultation with State and local governments.

Authorizes the President to establish the National Predisaster Mitigation Fund.

Requires the President to report to Congress recommending a process for transferring to capable States greater authority and responsibility over such assistance program.

(Sec. 103) Directs the President to establish an interagency task force to coordinate the implementation of predisaster hazard mitigation programs administered by the Federal Government.

(Sec. 104) Requires State, local, or tribal governments, as a condition of receipt of an increased Federal share for hazard mitigation measures, to develop and submit for approval to the President a mitigation plan that outlines processes for identifying the natural hazards, risks, and vulnerabilities of the area under government jurisdiction.

Authorizes the President to increase the Federal share of hazard mitigation measures to 20 percent if at the time of the declaration of a major disaster a State has in effect an approved mitigation plan. Directs the President, in determining whether to increase the maximum percentage, to consider whether the State has established: (1) eligibility criteria for property acquisition and other types of mitigation measures; (2) requirements for cost effectiveness that are related to the eligibility criteria; (3) a system of priorities related to the criteria; and (4) a process by which an assessment of the effectiveness of a mitigation action may be carried out after the mitigation action is complete.

Revises provisions of the Act concerning standards for repair and construction financed with disaster loans or grants. Permits the President to require safe land use and construction practices. Directs the President to increase the maximum percentage under the Act for hazard mitigation from 15 to 20 percent for any major disaster in Minnesota for which assistance is being provided as of the date of this Act's enactment, with a cap of \$6 million for additional assistance. Requires that the mitigation measures assisted be related to losses in that State from straight line winds.

Title II: Streamlining and Cost Reduction - Amends the Act to define "management cost" to include any indirect cost, administrative expense, and other expense not directly chargeable to a specific project under a major disaster, emergency, or disaster preparedness or mitigation activity or measure. Directs the President to: (1) establish management cost rates for grantees and sub-grantees that shall be used to determine contributions under the Act for management costs; and (2) review the management cost rates established within three years after the date of their establishment and periodically thereafter.

Makes the Act applicable to major disasters declared under the Act on or after the date of this Act's enactment. Grants interim authority with respect to the establishment of management cost rates.

Requires the President to provide for public notice and opportunity for comment before adopting any new or modified policy that: (1) governs implementation of the public assistance program administered by the Federal Emergency Management Agency (FEMA) under the Act; and (2) could result in a significant reduction of assistance under the program.

(Sec. 204) Authorizes a State to apply to the President for delegation of the authority to administer the hazard mitigation grant program under the Act.

(Sec. 205) Rewrites Act provisions regarding assistance to repair, restore, reconstruct, or replace damaged facilities to place limitations on the "associated expenses" incurred by a person that owns or operates a private nonprofit facility damaged or destroyed by a major disaster for which such person may be reimbursed. Defines such term to include: (1) the costs of mobilizing and employing the National Guard for performance of eligible work; (2) the costs of using prison labor to perform eligible work; and (3) base and overtime wages for the employees and extra hires of a State, local government, or person that performs eligible work, plus certain fringe benefits.

Authorizes the President to make contributions to a private nonprofit facility only if: (1) the facility provides "critical services" in the event of a major disaster; or (2) the owner or operator of the facility has applied for a disaster loan under the Small Business Act (SBA) , and has been determined to be ineligible for such a loan or has obtained such a loan in the maximum amount for which the SBA determines the facility is eligible. Defines "critical services" to include power, water, sewer, wastewater treatment, communications, and emergency medical care.

Revises provisions regarding the minimum Federal share and regarding large in lieu contributions to limit the Federal share under specified circumstances. Directs the President, acting through the Director of FEMA, to establish an expert panel to develop recommendations concerning: (1) procedures for estimating the cost of repairing, restoring, reconstructing, or replacing a facility consistent with industry practices; and (2) ceiling and floor percentages of estimated costs. Requires the President to review the procedures and percentages. Requires the expert panel to report periodically to Congress.

(Sec. 206) Rewrites provisions regarding temporary housing assistance to authorize the President, in accordance with this section and in consultation with the Governor of a State, to provide financial assistance and, if necessary, direct services to individuals and households in the State who, as a direct result of a major disaster, have necessary expenses and serious needs and are unable to meet such expenses or needs through other means.

(Sec. 207) Prohibits major disaster community loans from exceeding \$5 million. Prohibits further assistance to a community that is in arrears on payments under a previous loan.

(Sec. 208) Requires: (1) the President to submit to Congress a report describing the results of the State Management of Small Disasters Initiative; and (2) the Director of the Congressional Budget Office to complete a study estimating the reduction in Federal disaster assistance that has resulted and is likely to result from the enactment of this Act.

Title III: Miscellaneous - Amends the Act to expand the definition of: (1) "local government" to include a municipality, township, local public authority, school district, special district, intrastate district, council of governments (regardless of whether incorporated as a nonprofit corporation under State law), regional or interstate government entity, or agency or instrumentality of a local government; and (2) "private nonprofit facility" to include private nonprofit irrigation facilities.

(Sec. 303) Authorizes the President to provide assistance to State and local governments (currently, only States) for the mitigation, management, and control of any fire (currently, fire suppression) on public or private forest land or grassland which threatens destruction that would constitute a major disaster.

(Sec. 304) Prohibits any administrative action to recover payment made to a State or local government for disaster or emergency assistance under the Act from being initiated beyond three years after the date of transmission of the final expenditure report for the disaster or emergency, except where there is evidence of fraud. Specifies that: (1) in any dispute arising beyond the three year period, there shall be a presumption that accounting records were maintained that adequately identify the source and application of funds provided for financially assisted activities; and (2) a State or local government shall not be liable for reimbursement or any other penalty for any payment made under this Act if the payment was authorized by an approved agreement specifying the costs, the costs were reasonable, and the purpose of the grant was accomplished.

(Sec. 305) Amends the Omnibus Crime Control and Safe Streets Act of 1968 to make FEMA employees and employees of State, local, or tribal emergency management or civil defense agencies who perform official duties relating to a major disaster that are determined to be hazardous duties eligible for public safety officers' death benefits.

(Sec. 306) Prohibits funds authorized under this Act from being expended by an entity not in compliance with the Buy American Act. Provides for debarment of persons convicted of fraudulent use of "made in America" labels.

(Sec. 307) Directs that specified real property located in the Maple Terrace subdivisions of the city of Sycamore, DeKalb County, Illinois, shall not be considered to be, or to have been, located in any area having special flood hazards.

(Sec. 308) Requires the Director of FEMA to conduct a study of participation by Indian tribes in emergency management, and to report to Congress.

Source: Library of Congress, <https://www.congress.gov/bill/106th-congress/house-bill/707>

Appendix F

FEMA Plan Review Tool

(Pending)

Appendix G

Record of Adoption

(Pending)