



## CITY COUNCIL ACTION FORM

DEPARTMENT	PRESENTED BY	DATE
Fire	Chief Doug Bess	June 7, 2022

### **ITEM**

Resolution 2022-23: Adoption of the Chaffee County Multi-Jurisdictional Hazard Mitigation Plan

### **BACKGROUND**

The existing hazard mitigation plan was developed in accordance with the Disaster Mitigation Act of 2000 which requires all local governments to develop a plan to assess their risks to hazards and identify actions that can be taken in advance to reduce future losses. Hazard mitigations plans are to be updated every five years in order to maintain eligibility for FEMA Hazard Mitigation Assistance Grants.

### **FISCAL NOTE**

None

### **STAFF RECOMMENDATION**

Staff recommends adoption of the Chaffee County Multi-Jurisdictional Hazard Mitigation Plan resolution.

### **SUGGESTED MOTION**

A Council person should make a motion "to approve Resolution 2022-??, a resolution of the City Council of the City of Salida, Colorado, approving the adoption of the Chaffee County Multi-Jurisdictional Hazard Mitigation Plan.

Followed by a second and a roll call and vote.

**RESOLUTION NO. 23**  
**(Series 2022)**

**A RESOLUTION OF THE CITY COUNCIL FOR THE CITY OF SALIDA, COLORADO TO  
ADOPT THE MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN 2022 – 2027.**

**WHEREAS**, the City of Salida, recognizes the threat that natural hazards pose to people and property within our community; and

**WHEREAS**, the City believes, undertaking hazard mitigation actions will reduce the potential for harm to people and property from future hazard occurrences; and

**WHEREAS**, an adopted Multi-Jurisdictional Hazard Mitigation Plan is required as a condition of future funding for mitigation projects under multiple FEMA pre- and post-disaster mitigation grant programs; and

**WHEREAS**, the City of Salida resides within the Planning Area, and fully participated in the mitigation planning process to prepare this Multi-Jurisdictional Hazard Mitigation Plan; and

**WHEREAS**, the Colorado Division of Homeland Security and Emergency Management and Federal Emergency Management Agency, Region VIII officials have reviewed the Chaffee County Multi-Jurisdictional Hazard Mitigation Plan and approved it contingent upon this official adoption of the participating governing body; and

**NOW, THEREFORE, BE IT RESOLVED**, that the City of Salida hereby adopts the Chaffee County Multi-Jurisdictional Hazard Mitigation Plan, as an official plan; and

**BE IT FURTHER RESOLVED**, Chaffee County Emergency Management will submit this adoption Resolution to the Colorado Division of Homeland Security and Emergency Management and Federal Emergency Management Agency, Region VIII officials to enable the Plan's final approval.

**RESOLVED, APPROVED, AND ADOPTED this 7<sup>th</sup> day of June, 2022.**

CITY OF SALIDA

By: \_\_\_\_\_  
Dan Shore, Mayor

[SEAL]

ATTEST: \_\_\_\_\_  
City Clerk/Deputy City Clerk



# **Chaffee County Multi-jurisdictional Hazard Mitigation Plan Update 2022 – 2027**



## Table of Contents

	Table of Contents .....	i
	Appendices.....	iv
1	Introduction .....	1-1
	1.1 Purpose .....	1-1
	1.2 Background and Scope.....	1-1
	1.3 Multi-Jurisdictional Planning .....	1-2
	1.4 Plan Organization.....	1-3
2	Planning Process .....	2-1
	2.1 Background on Mitigation Planning in Chaffee County.....	2-1
	2.1.1 What's New in the Plan Update.....	2-1
	2.1.2 2016 Plan Section Review and Analysis.....	2-1
	2.2 Local Government Participation .....	2-1
	2.3 Planning Process .....	2-2
	2.3.1 Phase 1: Organize Resources .....	2-3
	2.3.2 Phase 2: Assess Risks.....	2-9
	2.3.3 Phase 3: Develop the Mitigation Plan .....	2-9
	2.3.4 Phase 4: Implement the Plan and Monitor Progress.....	2-9
3	Community Profile and Capability Assessment.....	3-1
	3.1 Historical Overview .....	3-3
	3.2 Climate .....	3-4
	3.3 Geology and Soils .....	3-5
	3.4 Demographics .....	3-6
	3.4.1 Population Trends .....	3-7
	3.4.2 Age Distribution.....	3-8
	3.4.3 Disabled Populations .....	3-9
	3.4.4 Ethnic Population .....	3-9
	3.4.5 Incarcerated Population.....	3-9
	3.5 Economy .....	3-10
	3.5.1 Occupations and Industries.....	3-10
	3.6 Housing.....	3-11
	3.7 Government.....	3-12
	3.7.1 Chaffee County.....	3-12
	3.7.2 Town of Buena Vista.....	3-12
	3.7.3 Town of Poncha Springs.....	3-13
	3.7.4 City of Salida.....	3-13
	3.8 Future Trends in Development .....	3-13
	3.9 Capability Assessment.....	3-14
	3.9.1 Chaffee County.....	3-14
	3.9.2 City of Salida.....	3-17
	3.9.3 Town of Buena Vista.....	3-21
	3.9.4 Town of Poncha Springs.....	3-23
	3.9.5 State and Regional Partnerships .....	3-26
	3.9.6 Opportunities for Capability Enhancement .....	3-29
4	Hazard identification and Risk Assessment.....	4-1
	4.1 Identified Hazards of Concern and Prioritization .....	4-1
	4.1.1 Methodology and Results.....	4-2
	4.1.2 Disaster Declaration History.....	4-7



	4.1.3	Overview of Hazard Identification and Risk Assessment.....	4-8
4.2		Assets Summary .....	4-9
	4.2.1	Methodology .....	4-9
	4.2.2	Assets Exposure.....	4-9
4.3		Avalanche.....	4-19
	4.3.1	Hazard Profile .....	4-19
	4.3.2	Related Hazards .....	4-24
	4.3.3	Climate Change Considerations .....	4-25
	4.3.4	Vulnerability.....	4-25
	4.3.5	Development Trends.....	4-26
	4.3.6	Risk Summary.....	4-26
4.4		Dam Failure or Incident .....	4-27
	4.4.1	Hazard Profile .....	4-27
	4.4.2	Related Hazards .....	4-36
	4.4.3	Climate Change Considerations .....	4-36
	4.4.4	Vulnerability.....	4-36
	4.4.5	Development Trends.....	4-39
	4.4.6	Risk Summary.....	4-39
4.5		Drought and Extreme Heat .....	4-40
	4.5.1	Hazard Profile .....	4-40
	4.5.2	Related Hazards .....	4-49
	4.5.3	Climate Change Considerations .....	4-50
	4.5.4	Vulnerability.....	4-51
	4.5.5	Development Trends.....	4-53
	4.5.6	Risk Summary.....	4-54
4.6		Earthquake.....	4-55
	4.6.1	Hazard Profile .....	4-55
	4.6.2	Related Hazards .....	4-63
	4.6.3	Climate Change Considerations .....	4-63
	4.6.4	Vulnerability.....	4-63
	4.6.5	Development Trends.....	4-66
	4.6.6	Risk Summary.....	4-66
4.7		Erosion and Deposition, Expansive Soil, and Subsidence.....	4-67
	4.7.1	Hazard Profile .....	4-67
	4.7.2	Related Hazards .....	4-70
	4.7.3	Climate Change Considerations .....	4-70
	4.7.4	Vulnerability.....	4-70
	4.7.5	Development Trends.....	4-71
	4.7.6	Risk Summary.....	4-72
4.8		Flood .....	4-73
	4.8.1	Hazard Profile .....	4-73
	4.8.2	Related Hazards .....	4-82
	4.8.3	Climate Change Considerations .....	4-82
	4.8.4	Vulnerability.....	4-83
	4.8.5	Development Trends.....	4-86
	4.8.6	Risk Summary.....	4-87
4.9		Hail, Lightning, and Severe Wind.....	4-88
	4.9.1	Hazard Profile .....	4-88

4.9.2	Related Hazards .....	4-103
4.9.3	Climate Change Considerations .....	4-103
4.9.4	Vulnerability.....	4-103
4.9.5	Development Trends.....	4-105
4.9.6	Risk Summary.....	4-106
4.10	Landslide, Mud/Debris Flow, Rockfall .....	4-107
4.10.1	Hazard Profile .....	4-107
4.10.2	Related Hazards .....	4-112
4.10.3	Climate Change Considerations .....	4-112
4.10.4	Vulnerability.....	4-112
4.10.5	Development Trends.....	4-114
4.10.6	Risk Summary.....	4-115
4.11	Tornado.....	4-116
4.11.1	Hazard Profile .....	4-116
4.11.2	Related Hazards .....	4-119
4.11.3	Climate Change Considerations .....	4-119
4.11.4	Vulnerability.....	4-119
4.11.5	Development Trends.....	4-121
4.11.6	Risk Summary.....	4-121
4.12	Wildfire.....	4-122
4.12.1	Hazard Profile .....	4-122
4.12.2	Related Hazards .....	4-130
4.12.3	Climate Change Impacts.....	4-130
4.12.4	Vulnerability.....	4-131
4.12.5	Development Trends.....	4-145
4.12.6	Risk Summary.....	4-146
4.13	Winter Storm.....	4-147
4.13.1	Hazard Profile .....	4-147
4.13.2	Related Hazards .....	4-151
4.13.3	Climate Change Considerations .....	4-151
4.13.4	Vulnerability.....	4-151
4.13.5	Development Trends.....	4-152
4.13.6	Risk Summary.....	4-152
4.14	Pandemic/Epidemic.....	4-154
4.14.1	Hazard Profile .....	4-154
4.14.2	Related Hazards .....	4-157
4.14.3	Climate Change Considerations .....	4-157
4.14.4	Vulnerability.....	4-157
4.14.5	Development Trends.....	4-158
4.14.6	Risk Summary.....	4-158
4.15	Cyber Threats.....	4-160
4.15.1	Hazard Profile .....	4-160
4.15.2	Related Hazards .....	4-162
4.15.3	Climate Change Considerations .....	4-162
4.15.4	Vulnerability.....	4-162
4.15.5	Development Trends.....	4-163
4.15.6	Risk Summary.....	4-164
4.16	Hazardous Materials Incident .....	4-165

4.16.1	Hazard Profile .....	4-165
4.16.2	Related Hazards .....	4-169
4.16.3	Climate Change Considerations .....	4-169
4.16.4	Vulnerability.....	4-169
4.16.5	Development Trends.....	4-170
4.16.6	Risk Summary.....	4-170
5	Mitigation Strategy .....	5-1
5.1	Mitigation Strategy: Overview .....	5-1
5.1.1	Goals and Objectives .....	5-1
5.2	Identification and Analysis of Mitigation Actions .....	5-3
5.2.1	Prioritization Process.....	5-4
5.3	Mitigation Action Plan .....	5-5
5.3.1	Progress on Previous Mitigation Actions.....	5-5
5.3.2	Continued Compliance with the National Flood Insurance Program.....	5-7
5.3.3	Updated Action Plan .....	5-8
6	Plan Adoption and Maintenance.....	6-1
6.1	Plan Adoption.....	6-1
6.2	Plan Implementation .....	6-1
6.2.1	Role of the Hazard Mitigation Committee in Implementation and Maintenance.....	6-2
6.3	Plan Maintenance/Monitoring Strategy.....	6-2
6.3.1	Maintenance/Monitoring Schedule .....	6-2
6.3.2	Hazard Mitigation Planning Committee .....	6-3
6.3.3	Maintenance Evaluation Process – Annual Meeting and Progress Reporting .....	6-3
6.3.4	Continuing Public Involvement.....	6-4
6.3.5	Incorporation into Other Planning Mechanisms.....	6-4

## Appendices

Appendix A: Acronyms and Definitions

Appendix B: References

Appendix C: Planning Committee Members

Appendix D: Menu of Mitigation Alternatives

Appendix E: Planning Process Documentation

Appendix F: Plan Adoptions and Approval

Appendix G: Example Annual Meeting Agenda and Progress Report Template

# 1 Introduction

## 1.1 Purpose

Chaffee County, Colorado, the towns of Buena Vista and Poncha Springs, and the City of Salida, have prepared this local hazard mitigation plan to guide hazard mitigation planning to better protect people, property, and critical facilities/lifelines from the effects of hazard events. This plan demonstrates the community's commitment to reducing risks from hazards and serves as a tool to help decision makers direct mitigation activities and resources. This plan was also developed to make Chaffee County and the participating jurisdictions eligible for certain federal disaster assistance, specifically, the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Assistance (HMA) grants including the Hazard Mitigation Grant Program (HMGP), Flood Mitigation Assistance (FMA) and Building Resilient Infrastructure and Communities (BRIC) program, as well as to make the County and jurisdictions more disaster resistant. This plan demonstrates the County's commitment to reducing risks from hazards and serves as a tool to help decision makers direct mitigation activities and resources.

## 1.2 Background and Scope

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. These monies only partially reflect the true cost of disasters, because additional expenses to insurance companies and nongovernmental organizations are not reimbursed by tax dollars. Many disasters are predictable, and much of the damage caused by these events can be alleviated or even eliminated.

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." The results of a three-year, congressionally mandated independent study to assess future savings from mitigation activities provides evidence that mitigation activities are highly cost-effective. On average, each dollar spent on mitigation saves society an average of \$6 in avoided future losses in addition to saving lives and preventing injuries (Natural Hazard Mitigation Saves: 2017 Interim Report).

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. This plan documents Chaffee County's hazard mitigation planning process: identifies relevant hazards and risks and identifies the strategy the County and the participating jurisdictions will use to decrease vulnerability and increase resiliency and sustainability.

This plan underwent a comprehensive update in 2021 in fulfillment of the five-year update requirement. Several factors initiated this planning effort:

- Chaffee County is exposed to hazards that have caused past damage.
- Limited local resources make it difficult to be pre-emptive in reducing risk. Eligibility for federal financial assistance is paramount to promote successful hazard mitigation in the area.
- Chaffee County and its partners participating in this plan want to be proactive in preparing for the probable impacts of natural hazards.

This plan was originally prepared in 2016, pursuant to the requirements of the Disaster Mitigation Act of 2000 (Public Law 106-390) and the implementing regulations set forth by the Interim Final Rule published in the Federal Register on February 26, 2002 (44 CFR §201.6) and went through a plan update process in

2020. Hereafter, these requirements and regulations will be referred to collectively as the Disaster Mitigation Act, or DMA. While the act emphasized the need for mitigation plans and more coordinated mitigation planning and implementation efforts, the 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). Because the Chaffee County planning and response area is subject to many kinds of hazards, access to these programs is vital.

Information in this plan will be used to help guide and coordinate mitigation activities and decisions for local land use policy in the future. Proactive mitigation planning will help reduce the cost of disaster response and recovery to the community and its property owners by protecting critical community facilities, reducing liability exposure, and minimizing overall community impacts and disruption. The Chaffee County planning area has been affected by hazards in the past and is thus committed to reducing future disaster impacts and maintaining eligibility for federal funding.

This hazard mitigation plan identifies resources, information, and strategies for reducing risk from natural hazards. Elements and strategies in the plan were selected because they meet a program requirement and because they best meet the needs of the planning partners and their citizens. One of the benefits of multi-jurisdictional planning is the ability to pool resources and eliminate redundant activities within a planning area that has uniform risk exposure and vulnerabilities. FEMA encourages multi-jurisdictional planning under its guidance for the DMA. This plan will help guide and coordinate mitigation activities throughout the planning area. The plan was developed to meet the following objectives:

- Meet or exceed requirements of the DMA.
- Enable all planning partners to use federal grant funding to reduce risk through mitigation.
- Meet the needs of each planning partner as well as state and federal requirements.
- Create a risk assessment that focuses on Chaffee County hazards of concern.
- Create a single planning document that integrates all planning partners into a framework that supports partnerships within the county and puts all partners on the same planning cycle for future updates.
- Meet the planning requirements of FEMA's Community Rating System (CRS), allowing planning partners that may choose to participate in the CRS program to enhance their CRS classifications.
- Coordinate existing plans and programs so that high-priority initiatives and projects to mitigate possible disaster impacts are funded and implemented.

### **1.3 Multi-Jurisdictional Planning**

All citizens and businesses of Chaffee County are the ultimate beneficiaries of this hazard mitigation plan. The plan reduces risk for those who live in, work in, and visit the county. It provides a viable planning framework for all foreseeable natural hazards that may impact the county. Participation in development of the plan by key stakeholders in the county helps ensure that outcomes will be mutually beneficial. The resources and background information in the plan are applicable countywide, and the plan's goals and recommendations can lay groundwork for the development and implementation of local mitigation activities and partnerships.

The Chaffee County Hazard Mitigation Plan is a multi-jurisdictional plan that geographically covers everything within Chaffee County's jurisdictional boundaries (hereinafter referred to as the planning area). Unincorporated Chaffee County and the following communities and a special district participated in the 2021 update planning process:

- Chaffee County
- Town of Buena Vista



- City of Salida
- Town of Poncha Springs

## **1.4 Plan Organization**

The Chaffee County Hazard Mitigation Plan is organized as follows:

- Chapter 1: Introduction
- Chapter 2: Planning Process
- Chapter 3: Community Profile
- Chapter 4: Hazard Identification and Risk Assessment (HIRA)
- Chapter 5: Mitigation Strategy
- Chapter 6: Plan Adoption, Implementation and Maintenance
- Appendix A: Acronyms and Definitions
- Appendix B: References
- Appendix C: Planning Committee Members
- Appendix D: Mitigation Action Alternatives
- Appendix E: Planning Process Documentation
- Appendix F: Plan Adoptions and Approval
- Appendix G: Example Annual Progress Meeting Agenda and Report

## 2 Planning Process

### **DMA Requirements §201.6(b) and §201.6(c)(1):**

*An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:*

- (1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;*
- (2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia, and other private and non-profit interests to be involved in the planning process; and*
- (3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.*

*[The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.*

### **2.1 Background on Mitigation Planning in Chaffee County**

Chaffee County originally participated in the development of the Upper Arkansas Area HMP in 2003, which was a regionally focused plan. Chaffee County decided to develop a different plan to focus on the hazards and risks specific to Chaffee County and to better develop mitigation actions to address them. To achieve this, Chaffee County developed this Hazard Mitigation Plan (HMP) in 2015-2016. The plan underwent a comprehensive update in 2020-2021 to comply with the five-year update cycle required by the DMA 2000. The planning process and update of this plan was originally initiated in early 2020 under the coordination of the Chaffee County Emergency Manager. Funding was secured through a FEMA Pre-Disaster Mitigation planning grant to enable a consultant to be hired to facilitate the process and develop the plan. Wood Environment and Infrastructure Solutions Inc. (Wood) of Denver, Colorado contracted with the County to provide professional planning services during the development of the original plan. The update of the plan followed a structured planning process that involved various local government departments and other public and private stakeholders. The planning process is described further in this section and documented in Appendix E.

### 2.1.1 What's New in the Plan Update

#### **DMA Requirement §201.6(d)(3):**

*A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit it for approval within 5 years in order to continue to be eligible for mitigation project grant funding.*

The updated HMP complies with Federal Emergency Management Agency (FEMA) guidance for Local Hazard Mitigation Plans. The update followed the requirements noted in the Disaster Mitigation Act (DMA) of 2000 and FEMA's 2013 Local Hazard Mitigation Planning Handbook.

This HMP update involved a comprehensive review and update of each section of the 2016 plan and includes an assessment of the progress in evaluating, monitoring, and implementing the mitigation strategy outlined in the previous plan. The planning process provided an opportunity to review jurisdictional priorities related to hazard significance and mitigation action, and revisions were made where applicable to the plan. Only the information and data still valid from the 2016 plan was carried forward as applicable into this HMP update.

### 2.1.2 2016 Plan Section Review and Analysis

During the 2020-2021 update process, the Hazard Mitigation Planning Committee (HMPC) updated each section of the previously approved plan to include new information and improve the organization and formatting of the plan's contents. The HMPC and Wood analyzed each section using FEMA's local plan update guidance to ensure that the plan met the latest requirements. Upon review the HMPC and Wood determined that nearly every section of the plan would need some updates to align with the latest FEMA planning guidance and requirements. The overall format and structure of the plan changed to align the plan with modern hazard mitigation planning practices and to simplify the document from 21 chapters to six. The Risk Assessment in Chapter 4 was substantially revised to incorporate recent events and reflect recent development trends with an updated GIS-based risk assessment. Information within has been updated throughout the plan where appropriate. The mitigation strategy in Chapter 5 has been updated to reflect current priorities and mitigation actions moving forward from the 2016 plan.

## 2.2 Local Government Participation

The Disaster Mitigation Act (DMA) planning regulations and guidance stress that each local government seeking FEMA approval of their mitigation plan must participate in the planning effort in the following ways:

- Participate in the process as part of the Hazard Mitigation Planning Committee (HMPC),
- Detail areas within the planning area where the risk differs from that facing the entire area,
- Identify specific projects to be eligible for funding, and
- Have the governing board formally adopt the plan.

For the Chaffee County Hazard Mitigation Plan's HMPC, "participation" meant:

- Attending and participating in the HMPC meetings,
- Providing available data requested of the HMPC,
- Reviewing and providing comments on the plan drafts,
- Advertising, coordinating, and participating in the public input process, and
- Coordinating the formal adoption of the plan by the governing boards.

Chaffee County's Hazard Mitigation Plan is a multi-jurisdictional plan that geographically covers everything within Chaffee County, as described further in Chapter 3 Community Profile and Capability Assessment. Unincorporated Chaffee County, City of Salida, Town of Buena Vista, and Town of Poncha Springs participated in the planning process with the intent of seeking FEMA approval of this plan. The County and municipalities have the authority to regulate development.

## 2.3 Planning Process

Chaffee County and Wood worked together to establish the planning process for Chaffee County's plan update using the DMA planning requirements and FEMA's associated guidance. The original FEMA planning guidance is structured around a four-phase process:

1. Organize Resources
2. Assess Risks
3. Develop the Mitigation Plan
4. Implement the Plan and Monitor Progress

FEMA's March 2013 Local Mitigation Planning Handbook recommends a nine-step process within the original four phase process. Into this four-phase process, Wood integrated a more detailed 10-step planning process used for FEMA's Community Rating System (CRS) and Flood Mitigation Assistance programs. Thus, the modified 10-step process used for this plan meets the funding eligibility requirements of the Hazard Mitigation Assistance grants (including Hazard Mitigation Grant Program, Building Resilient Infrastructure and Communities grant, High Hazard Potential Dams grant, and Flood Mitigation Assistance grant), Community Rating System, and the flood control projects authorized by the U.S. Army Corps of Engineers (USACE). Table 2-1 summarizes the four-phase DMA process, the detailed CRS planning steps and work plan used to develop the plan and the nine handbook planning tasks from FEMA's 2013 Local Mitigation Planning Handbook. The sections that follow describe each planning step in more detail.

**Table 2-1 Mitigation Planning Process Used to Update the Plan**

FEMA’s 4-Phase DMA Process	Modified 10-Step CRS Process	FEMA Local Mitigation Planning Handbook Tasks
1) Organize Resources		
201.6(c)(1)	1) Organize the Planning Effort	1: Determine the planning area and resources
201.6(b)(1)	2) Involve the Public	2: Build the planning team - 44 CFR 201.6 (C)(1)
201.6(b)(2) and (3)	3) Coordinate with Other Departments and Agencies	3: Create an outreach strategy - 44 CFR 201.6(b)(1)
		4: Review community capabilities - 44 CFR 201.6 (b)(2)&(3)
2) Assess Risks		
201.6(c)(2)(i)	4) Identify the Hazards	5: Conduct a risk assessment - 44 CFR 201.6 (C)(2)(i) 44 CFR 201.6(C)(2)(ii)&(iii)
201.6(c)(2)(ii)	5) Assess the Risks	
3) Develop the Mitigation Plan		
201.6(c)(3)(i)	6) Set Goals	

FEMA’s 4-Phase DMA Process	Modified 10-Step CRS Process	FEMA Local Mitigation Planning Handbook Tasks
201.6(c)(3)(ii)	7) Review Possible Activities	6: Develop a mitigation strategy - 44 CFR 201.6(c)(3)(i); 44 CFR 201(c)(3)(ii) and 44 CFR 201.6(c)(3)(iii)
201.6(c)(3)(iii)	8) Draft an Action Plan	
4) Implement the Plan and Monitor Progress		
201.6(c)(5)	9) Adopt the Plan	7: Review and adopt the plan
201.6(c)(4)	10) Implement, Evaluate, and Revise the Plan	8: Keep the plan current
		9: Create a safe and resilient community - 44 CFR 201.6(c)(4)

### 2.3.1 Phase 1: Organize Resources

#### Planning Step 1: Organize the Planning Effort

Wood worked with the Chaffee County Emergency Manager to establish the framework and organization for the update of this Plan. Wood and the County Emergency Manager identified the key county, municipal, and other local government and initial stakeholder representatives. Invitations were emailed to invite them to participate as a member of the HMPC and to attend a kickoff meeting. Representatives from the following County and the departments and boards as well as special districts participated on the HMPC and the development of the plan:

#### ***Chaffee County***

- County Administration
- County Office of Emergency Management
- County Board of Commissioners
- County Planning
- County Public Health
- County Coroner's Office
- County Housing
- County EMS
- County Public Affairs
- County Assessor
- County Sheriff
- County Finance
- County Road & Bridge
- County Development
- County Environmental Health
- County Attorney
- CSU Extension

#### ***City of Salida***

- Fire
- Police
- Schools
- Administration



### ***Town of Buena Vista***

- Mayor
- Town Administrator
- Building Inspector

### ***Town of Poncha Springs***

- Town Administrator
- Town Marshal
- Fire Chief

A list of specific HMPC representatives is included in Appendix C. Other local, state, federal, and private stakeholders invited to participate in the HMPC are discussed under Planning Step 3.

During the plan update process, the HMPC communicated with a combination, online webinars, phone interviews, and email correspondence. Three planning meetings with the HMPC were held during the plan's development between November 2020 and August 2021. The meeting schedule and topics are listed in Table 2-2 below. The meetings were held via virtual webinars due to the global COVID-19 pandemic that required social distancing. The attendance logs and agendas for each of the meetings are included in Appendix E.

**Table 2-2      Schedule of Meetings**

HMPC Meeting	Meeting Topic	Meeting Date
1	Kickoff Meeting: Introduction to DMA Planning and overview of Update Process	November 11, 2020
2	Risk Assessment Summary/Goals Development	February 4, 2021
3	Mitigation Strategy Development	March 4, 2021

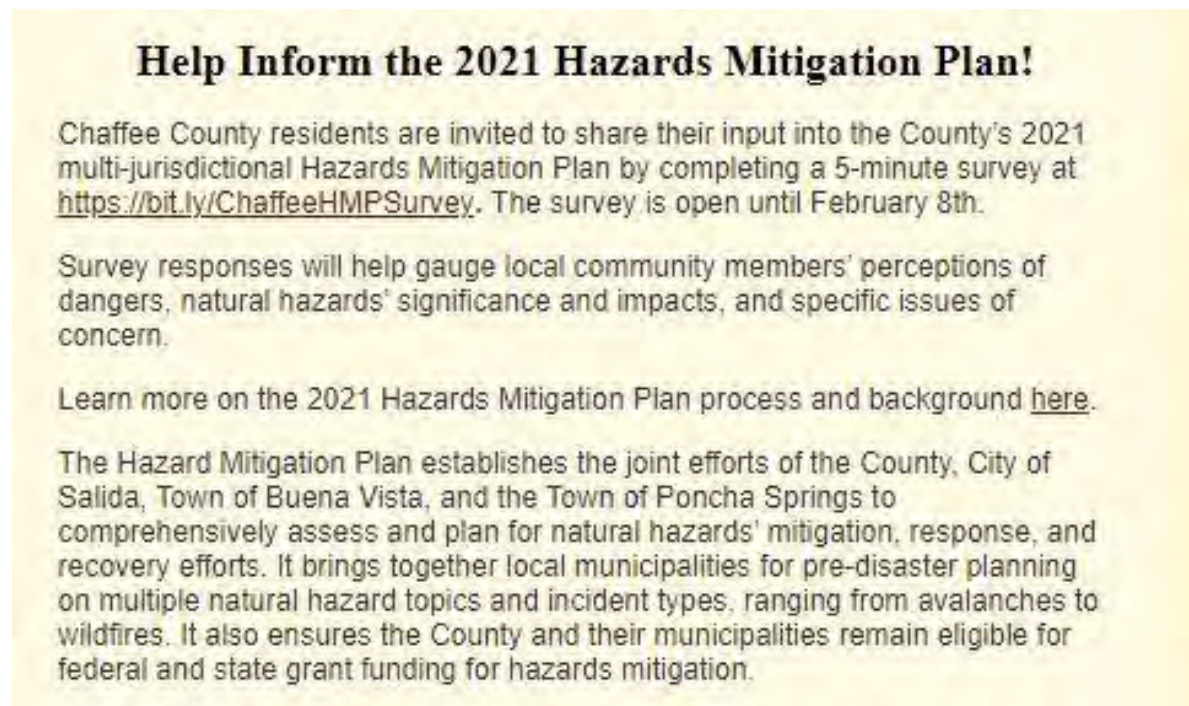
During the kickoff meeting, Wood presented information on the scope and purpose of the plan, participation requirements of HMPC members, and the proposed project work plan and schedule. A plan for public involvement (Step 2) and coordination with other agencies and departments (Step 3) was discussed. Wood also revisited the hazard identification section of the plan with the HMPC members.

In addition, the plan update was discussed at other meetings attended by the County Emergency Manager. This included meetings with Envision Chaffee County, the Chaffee County Planning Commission, a Salida City Council meeting, and a meeting with the Colorado Water Conservation Board in April 2021 to discuss Base Level Engineering flood mapping products under development with FEMA Risk MAP funding.

### **Planning Step 2: Involve the Public**

At the kickoff meeting, the HMPC discussed options for soliciting public input on the mitigation plan and developed an outreach strategy by consensus. Public and stakeholder input was done through a combination of a public meeting and an on-line survey. During the plan update's drafting stage, the HMPC provided links to a public survey via Microsoft Forms. The survey was advertised by the County and participating jurisdictions through social media and posted to the County's website.

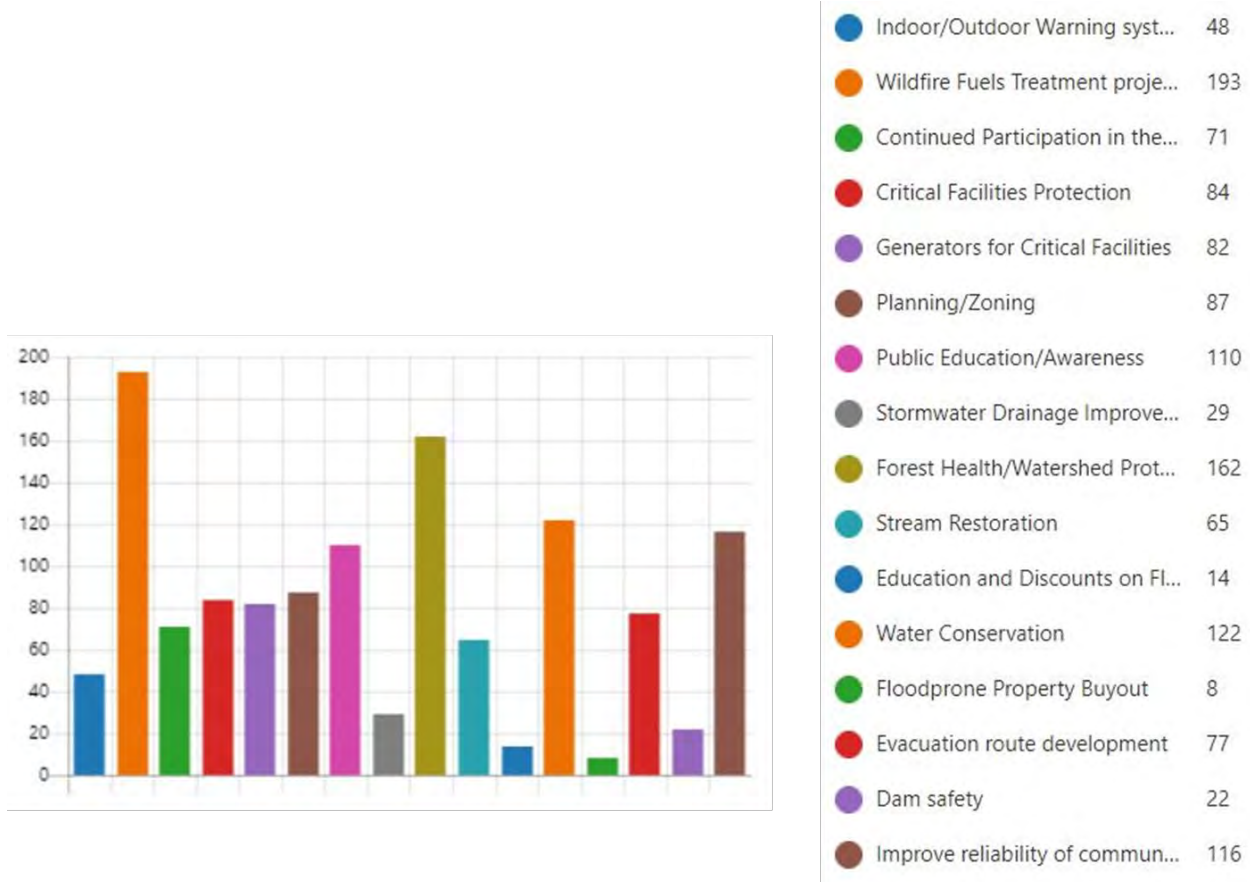
**Figure 2-1 Chaffee County Website Notice of Public Survey**



The survey provided an opportunity for public input during the planning process, prior to finalization of the plan update. The public survey received responses from 180 individuals. Responses reflect the public perception that the most significant hazards to be drought, followed by wildfire, severe winter storms, and severe wind.

Figure 2-2 below displays the results from Question 4, which asked respondents to consider potential mitigation actions and to indicate which types of actions should have the highest priority in the updated County Mitigation Strategy. These results were considered during the planning process and in the development of new mitigation actions. As indicated by the survey excerpt below, the highest priority action items should include wildfire fuels treatment projects (193 responses), forest health/watershed protection (162 responses), water conservation (122 responses), and improving reliability of communications systems (116 responses). Further results of the public survey are provided in Appendix E.

**Figure 2-2 Chaffee County Public Survey Results, Question 4**



The public was given an opportunity to review and comment on the draft plan in July 2021. Chaffee County made copies of the plan available on the County website. A public input comment form was available with the online plan. The plan was advertised by the County and participating jurisdictions through their social media ( Facebook,) and the County website. The public was given a two-week period to review and provide comments. In total two individuals responded to the online public input form and left comments. As a result of the review and comments the Erosion and Deposition and Landslide vulnerability assessments were updated with additional information related to vulnerability of County Rd 371, and some minor typos were corrected. Records of public advertisements and public input can be found in Appendix E.

### Planning Step 3: Coordinate with Other Departments

There are numerous organizations whose goals and interests' interface with hazard mitigation in Chaffee County. Coordination with these organizations and other community planning efforts is vital to the success of this plan update. The Chaffee County Office of Emergency Management invited other local, state, and federal agencies to the kickoff meeting to learn about and participate in the hazard mitigation planning initiative. Many of the agencies participated throughout the planning process in meetings described in Step 1: Organize the Planning Effort. In addition, the HMPC developed a list of neighboring communities and local and regional agencies involved in hazard mitigation activities, as well as other interested parties to keep informed on the plan update process.

Stakeholders included local and regional agencies involved in hazard mitigation activities or those beyond the County and local government that have the authority to regulate development. Stakeholders could participate in various ways, either by contributing input at HMPC meetings, being aware of planning activities through an email group, providing information to support the effort, or reviewing and commenting on the draft plan. Representatives from the following agencies and organizations were invited to participate as stakeholders in the process; an asterisk indicates they attended HMPC meetings.

***State and Federal Agencies***

- Colorado Department of Transportation
- Colorado Department of Local Affairs
- Colorado Division of Homeland Security and Emergency Management
- Colorado Division of Fire Prevention & Control
- Colorado Division of Water Resources – Dam Safety
- Colorado State Patrol
- Colorado State Forest Service
- Colorado Parks and Wildlife
- Colorado State University Extension Office
- US Bureau of Land Management
- National Weather Service
- US Department of Agriculture – Fire Service
- US Forest Service
- Environmental Protection Agency

***Non-profit***

- American Red Cross
- Ark-Valley Humane Society
- Central Colorado Conservancy
- Chaffee County Search and Rescue - North
- Chaffee County Search and Rescue - South
- Chaffee County Economic Development Corporation
- Colorado Economic Development Corporation
- Envision Chaffee County
- Southern Colorado Economic Development

***Utilities***

- Sangre de Cristo Electric Association
- Xcel Energy

***Neighboring Jurisdictions***

- Buena Vista Schools
- Chaffee County Fire Protection District
- Upper Arkansas Water Conservancy District
- Salida Schools
- Salida Schools R-32-J
- Lake County
- Fremont County
- Gunnison County
- Park County

### **Private/Other**

- Del Corazon Consulting
- Heart of the Rockies RMC

### **Integration with Other Community Planning Efforts and Hazard Mitigation Activities**

Coordination with other community planning efforts is also paramount to the success of this plan. Hazard mitigation planning involves identifying existing policies, tools, and actions that will reduce a community's risk and vulnerability from natural hazards. Chaffee County uses a variety of comprehensive planning mechanisms, such as master plans and ordinances, to guide growth and development. Integrating existing planning efforts and mitigation policies and action strategies into this plan establishes a credible and comprehensive plan that ties into and supports other community programs. **Error! Reference source not found.** Table 2-3 below provides a summary of the key existing plans, studies, and reports that were reviewed during the update process. Information on how they informed the update are noted where applicable.

**Table 2-3 Summary of Key Plans, Studies, and Reports**

<b>Plan, Study, Report Name</b>	<b>How Plan, Study or Report Informed the HMPC</b>
Chaffee County Community Wildfire Protection Plan (2020)	Reviewed information on past wildfires, mitigation actions, and wildfire risk to inform the risk assessment and mitigation strategy
Colorado State Hazard Mitigation Plan (2018 Update)	Reviewed information on past hazard events and hazard risk information to inform the risk assessment Reviewed State goals and objectives
Colorado Drought Mitigation and Response Plan (2018 Update)	Reviewed information on past droughts and their impacts on the planning area. Incorporated information into the risk assessment
Colorado Flood Mitigation Plan (2018 Update)	Reviewed information on past flood events and risk analysis for the planning area to inform the risk assessment
Colorado State Demographer Community Demographic Profiles (ACS 5-Year Estimates 2015-2019)	Provide demographic data and trends for Chaffee County and incorporated jurisdictions.
FEMA Flood Insurance Study for Chaffee County and Incorporated Jurisdictions. (2017)	Provided flood risk data for specific hazard areas located within the County; mapping provided the basis for GIS-based risk analysis.
Comprehensive Plans: Chaffee County (2020), City of Salida (2013), Town of Buena Vista (2015), Town of Poncha Springs (2011)	Informed the Community Profile and capability assessments.
The Chaffee County Times, Buena Vista	The local newspaper located in the Town Buena Vista provided background information on past hazard events.
USDA Risk Management Agency Crop Indemnity Reports (2007-2019)	Provided data related to crop losses due to drought and hail.

### **Integration of 2016 Plan into Other Planning Mechanisms**

In addition, the 2016 Hazard Mitigation Plan was cross referenced in other County plans updated since then, including the County's Emergency Operations Plan (EOP) and County's 2020 Community Wildfire



Protection Plan (CWPP). The plan was also acknowledged in the 2018 City of Salida Source Water Protection Plan.

### **2.3.2 Phase 2: Assess Risks**

#### **Planning Steps 4 and 5: Identify the Hazards and Assess the Risks**

Chapter 4 Hazard Identification and Risk Assessment is the result of a comprehensive effort to identify and document all the hazards that have, or could, impact the planning area. This section was updated to reflect recent hazard events and current assets within the County and jurisdictions. Where data permitted, Geographic Information Systems (GIS) were used to display, analyze, and quantify hazards and vulnerabilities. The HMPC conducted a capability assessment update to review and document the planning area's current capabilities to mitigate risk and vulnerability from natural hazards. By collecting information about existing government programs, policies, regulations, ordinances, and emergency plans, the HMPC can assess those activities and measures already in place that contribute to mitigating some of the risks and vulnerabilities identified. A more detailed description of the risk assessment process and the results are included in Chapter 4. The capability assessment is included in Chapter 3 Community Profile and Capability Assessment.

### **2.3.3 Phase 3: Develop the Mitigation Plan**

#### **Planning Steps 6 and 7: Set Goals and Review Possible Activities**

Wood facilitated a brainstorming and discussion session with the HMPC during their second webinar to update the goals and objectives from the 2016 plan. An online form was provided after the meeting to allow HMPC members to provide further input on suggested revisions to the goals and objectives. During the third HMPC webinar/meeting Wood facilitated a discussion session with the HMPC around a comprehensive range of mitigation alternatives, and a method of selecting and defending recommended mitigation actions using a series of selection criteria. This included a review of progress on each action identified in the 2016 plan. Some new mitigation actions resulted from this process that were added to the plan in 2021. This process and its results are described in greater detail in Chapter 5.

#### **Planning Step 8: Draft an Action Plan**

Based on input from the HMPC regarding the draft risk assessment and the goals and activities identified in Planning Steps 6 and 7, Wood produced a complete first draft of the plan. This complete draft was shared electronically for HMPC review and comment. Other agencies were invited to comment on this draft as well. HMPC and agency comments were integrated into the second draft, which was advertised and distributed to collect public input and comments. Wood integrated comments and issues from the public, as appropriate, along with additional internal review comments and produced a final draft for the Colorado Division of Homeland Security and Emergency Management (DHSEM) and FEMA Region VIII to review and approve, contingent upon final adoption by the governing boards of each participating jurisdiction.

### **2.3.4 Phase 4: Implement the Plan and Monitor Progress**

#### **Planning Step 9: Adopt the Plan**

To secure buy-in and officially implement the plan, the plan was adopted by the governing boards of each participating jurisdiction on the dates included in the adoption resolutions in Appendix F.

#### **Planning Step 10: Implement, Evaluate, and Revise the Plan**

The HMPC developed and agreed upon an overall strategy for plan implementation and for monitoring and maintaining the plan over time. A discussion on the progress with implementation is included in

Chapter 5. Each recommended action includes key descriptors, such as a lead agency and possible funding sources, to help initiate implementation. An overall plan implementation strategy is described in Chapter 6.

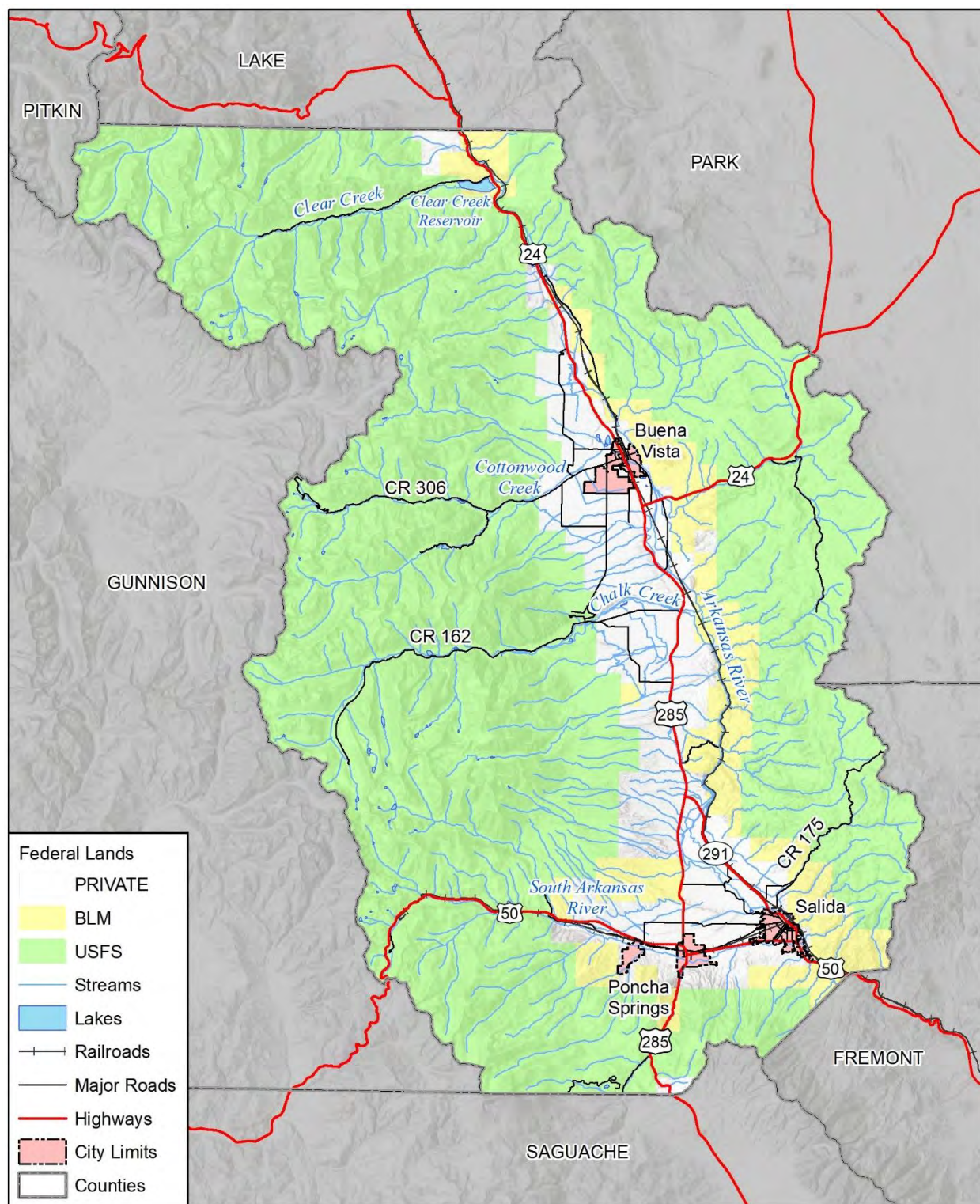
Finally, there are numerous organizations within the Chaffee County planning area whose goals and interests' interface with hazard mitigation. Coordination with these other planning efforts, as addressed in Planning Step 3, is paramount to the ongoing success of this plan and mitigation in Chaffee County and is addressed further in Chapter 6. An updated overall implementation strategy and maintenance and a strategy for continued public involvement are also included in Chapter 6.

### **3 Community Profile and Capability Assessment**

Chaffee County covers approximately 1,013 square miles of land area and is located on the eastern slope of the Rocky Mountains in central Colorado. The county is in the Upper Arkansas Valley on the eastern slope of the Continental Divide, nestled between the Sawatch Range to the west and the Mosquito Range forming the eastern county line. Between the ranges and at the heart of the county is the Arkansas River, which meanders through the length of the county. Chaffee County shares borders with Lake County to the north, Park County to the northeast, Fremont County to the southeast, Saguache County to the south, Gunnison County to the west, and Pitkin County northwest (see Figure 3-1). Elevation ranges from 7,000 feet above mean sea level to 14,427 feet on its highest peak.

The county is ranked 26th out of Colorado's 64 counties by population, with an estimated 2019 population of 19,557. The population is split near evenly between the incorporated Towns of Buena Vista, Poncha Springs, and the City of Salida; and the unincorporated county. The City of Salida is the county seat and largest municipality. The county is served by three major highways: U.S. 24, 50 and 285. U.S. Highway 50 is the primary east/west link connecting to Interstate 25 in the east at Pueblo to points in western Colorado. U.S. Highways 285 and 24 are the primary north/south links, providing access for most motorists from Denver and Colorado Springs. The county is home to the Central Colorado Regional Airport (AEJ) only one mile from the center of the Town of Buena Vista, as well as the Harriet Alexander Field located two miles west of the City of Salida. Comprehensive health care services are available at the Heart of the Rockies Regional Medical Center in Salida, in the center of a hospital district that covers all of Chaffee County as well as portions of adjacent jurisdictions. The Heart of the Rockies Regional Medical Center, along with Chaffee County Emergency Medical Services (CCEMS), Chaffee County OEM, Chaffee County Sheriff's Office and numerous fire and police departments provide emergency services in the county.

**Figure 3-1 Chaffee County, Colorado**



**wood** Map compiled 6/2021;  
intended for planning purposes only.  
Data Source: Chaffee County, CDOT,  
HIFLD

0 5 10 Miles





Chaffee County is primarily a rural county. Of Chaffee County's roughly 649,746 acres (approximately 1,013 square miles) a large majority is managed by various federal, state and local government entities, including the U.S. Forest Service (USFS), the Bureau of Land Management (BLM), the State Land Board, and the state Divisions of Wildlife and Corrections. According to the USFS, Salida Ranger District, nearly 80% of Chaffee County lands are managed by federal and state agencies as "public lands." The main corridor of the Arkansas River is managed by Colorado State Parks and the BLM. The USFS manages most forested and high elevation portions of the valley including Browns Canyon National Monument, Buffalo Peaks Wilderness, and portions of Collegiate Peaks Wilderness and San Isabel National Forest, and the Colorado State Forest Service manages designated state lands throughout the rest of the county (USFS Date Unknown).

Excluding the incorporated municipalities of Salida, Buena Vista and Poncha Springs, there are approximately 120,000 acres of privately owned land in Chaffee County. Farmers own a significant amount of the private land in the county – a total of 77,665 acres as of the 2012 Census of Agriculture – but only have a modest impact on the local economy. Agricultural sales in the county are mostly comprised of livestock (cattle and calves); aquaculture; nursery, greenhouse, floriculture, and sod; and other crops and hay. The county's economy relies on the strength of its tourism industries, which generate the most income in the summer season but are also very strong during the winter ski season. Seasonal recreation increases county and town retail sales tax revenue collections and county lodging tax collections.

The vast differences in altitude in the county allow for diverse habitats enabling has abundant number of wildlife species to live in this area. The major species include elk, mule deer, black bear, cottontail, jackrabbit, snowshoe hare, blue grouse, mourning dove, wild turkey, ptarmigan, and ducks. The county also has a large number of mountain lion and is renowned as a destination for blue-ribbon trout fishing on the Arkansas River. Several other species of cold-water fish are found in the streams, lakes, and ponds, including rainbow trout, brown trout, brook trout, lake trout, and kokanee salmon (USDA 1975).

### **3.1 Historical Overview**

Chaffee County was established in 1879 only days after the Colorado legislature renamed Lake County as Carbonate County, then divided that area, renaming each portion – the southern portion becoming Chaffee County and the northern portion returning to its original moniker of Lake County. The county seat originated in Granite, but eventually rested in Salida. The county was named for Jerome B. Chaffee, Colorado's first United States Senator from 1876-1879.

The area was originally inhabited by the Ute Indians, for whom many of the local mountain peaks are named. Explorer Zebulon Pike and his handful of soldiers came to the region in 1806 under a mission to explore the headwaters of the Arkansas River. Prospectors in the fur trade arrived in the area soon thereafter, and in 1811 a group of Missouri Fur Company trappers were sacked by a hostile group of Native Americans. This incident aside, the beaver trade flourished for the next three decades, and trappers exploring the reaches of the Arkansas River watershed gained the intimate knowledge of the land needed to open the way for later pioneers to follow and settle in the Arkansas River Valley.

Settlers were first drawn to the Buena Vista area in 1864 due to abundant water and fertile land suitable for agriculture. By 1880, the town became the seat of the newly established Chaffee County, but by 1928 county operations relocated again to the larger and more economically robust City of Salida. Residents of Buena Vista benefited by modern conveniences such as electricity, telephone service, streetlights, parks and schools as early as 1894, and were looked in upon by speculators and miners traveling by stagecoach up the Arkansas Valley towards Leadville. The installment of a railroad depot in the 1890s made regional travel even more convenient (BVCCVC 2013).



The City of Salida was established in 1880. Like many others in the region, Salida was originally a railroad town and was a significant link in the Denver and Rio Grande Western Railroad. Railroad operations slowed after World War II, and Salida residents either transitioned to local ranching jobs or commuted north to Leadville to work at the Climax Molybdenum Company.

Like many Colorado counties, the population of Chaffee County has fluctuated with “Boom and Bust” economies. However, the valley’s agricultural economy made the area more resistant to the tumultuous economic cycle of mining towns. Population growth stagnated and even declined slightly in the county between the 1930s and 1950s, and again in the 1980s, before regaining momentum in 1989 and growing steadily ever since.

### 3.2 Climate

Chaffee County is often referred to by Coloradans as the “banana belt” thanks to its relatively mild climate, despite its mountain valley location. Typically, temperatures in Salida are 5 to 10 degrees cooler than Denver throughout the year, despite an altitude difference of over 2,000 feet. The annual growing season in Salida and Poncha Springs is 112 days. Buena Vista is generally a few degrees cooler than the other communities and has an annual growing season of about 95 days.

The average high temperature in Salida is 84 degrees in July and 43 degrees in January; in Buena Vista it is 81 degrees and 39 degrees respectively; and Poncha Springs is similar with high temperatures in the 80’s during summer months and in the 40’s during the winter. The county only receives about 9 to 11 inches of precipitation annually at lower elevations, much of it in the form of snow (around 3 to 4 feet annually in Salida and Buena Vista). Humidity in the county stays low much of the year.

According to the Town of Poncha Spring’s Comprehensive Plan (2011), the town averages 5 inches of rain per year. While the Town of Buena Vista gets 9.8 inches of rain per year, less than one third of the national average rainfall of 37 inches per year. Salida averages 10.8 inches of total precipitation per year. Snowfall average is approximately 41.2 inches in Buena Vista, and 48 inches in Salida. Typically, Buena Vista has 59 days per year of any measurable precipitation and, on average, one day per year with precipitation greater than 1 inch. At higher elevations, such as Monarch Ski and Snowboard Area, the annual precipitation is much higher due to heavy snowfalls. The majority of snowfall occurs during February and March.

The Western Regional Climate Center reports data from the Buena Vista weather station in Chaffee County. Table 3-1 contains temperature summaries for the station. Figure 3-2 graphs the daily temperature averages and extremes and Figure 3-3 graphs average monthly precipitation totals

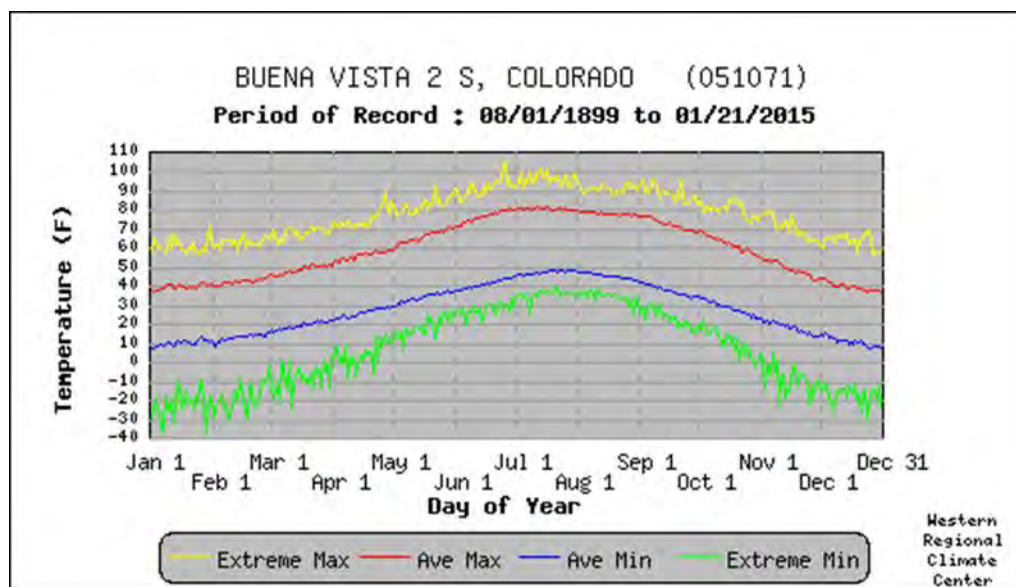
**Table 3-1 Chaffee County Temperature Summaries Buena Vista Station**

Period of record	1899 to 2016
Winter <sup>a</sup> Average Minimum Temperature	11.0 F
Winter <sup>a</sup> Mean Temperature	25.7 F
Summer <sup>a</sup> Average Maximum Temperature	78.1 F
Summer <sup>a</sup> Mean Temperature	61.2 F
Maximum Temperature	105• F, June 25, 1927
Minimum Temperature	-37• F, January 6, 1913
Average Annual # Days >90• F	2.8
Average Annual # Days <32• F	213

- a. Winter: December, January, February; Summer: June, July, August  
F Degrees Fahrenheit

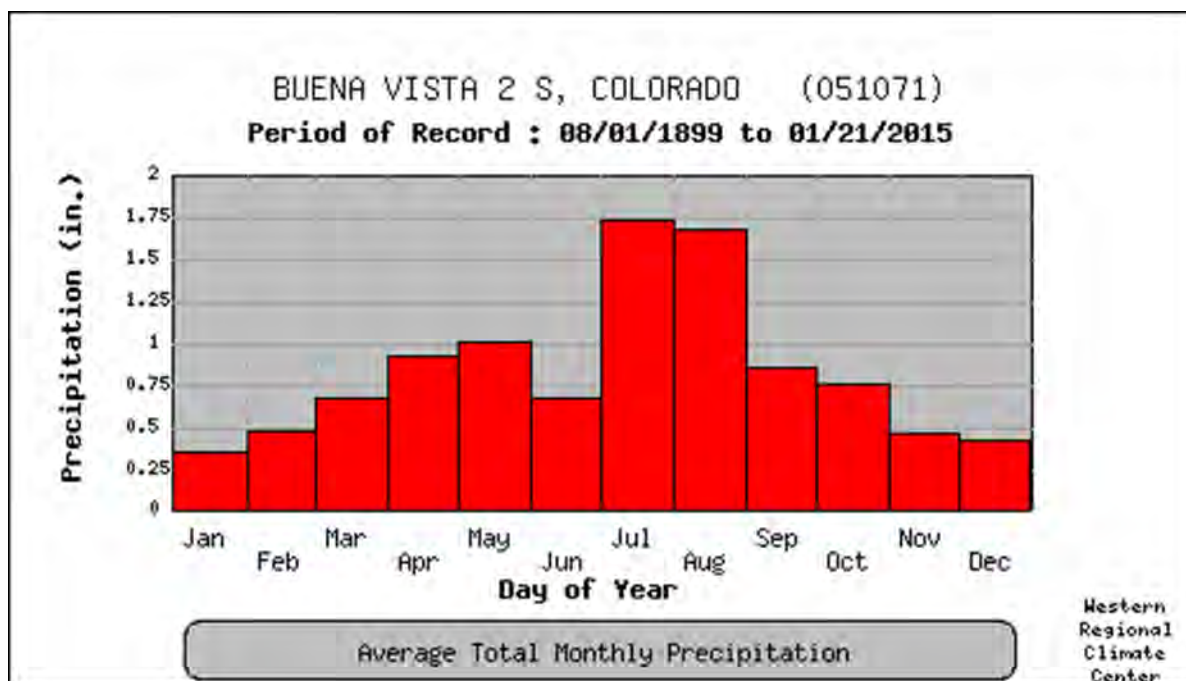
Source: Western Regional Climate Center, <http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?co1071>

**Figure 3-2 Buena Vista Station Monthly Temperature Data (8/1/1899-1/21/2015)**



Source: Western Regional Climate Center, [www.wrcc.dri.edu/](http://www.wrcc.dri.edu/)

**Figure 3-3 Average Monthly Precipitation for Chaffee County (1899-2015)**



### 3.3 Geology and Soils

Chaffee County varies in elevation from about 6,900 feet to the 14,420 feet peak of Mount Harvard, the highest summit of the Collegiate Peaks and the fourth highest summit in the contiguous United States. Part of the Rocky Mountains of North America, the Collegiate Peaks Wilderness of San Isabel National

Forest is 11.7 miles northwest by west of the Town of Buena Vista and is part of the Sawatch Range. There are reportedly more 14,000-foot peaks in Chaffee County than in any county in the United States (Fremont County Emergency Services Division 2003). Most of the county has slopes of over 10% and over one-third has slopes in excess of 25%. Chaffee County has a diverse range of soils. According to a Soil Survey of the Chaffee-Lake Area, soils found in the extreme northern part of Chaffee County include Troutville-Leadville association, characterized by gently sloping to steep, deep, gravelly soils formed in glacial outwash and glacial till at elevations of 8,200 to 10,000 feet and Rock land-Rock outcrop association, which are mainly outcrops of granite and very shallow soils on steep and very steep mountain slopes east of the Arkansas River. Dominion-San Isabel association soils predominate in the north-central part of Chaffee County, mostly west of the Arkansas River. These soils are nearly level to steep, deep, and somewhat excessively drained with a surface layer of gravelly sandy loam and in some cases a subsoil of gravelly sandy loam over gravel, cobbles, stones, and boulders. Rough broken land-Badland association soils are in the south-central part of the county west of the Arkansas River. These soil materials are mixed and stratified, consisting of silts and clays in which there are lenses of sand, gravel, and cobbles of the Dry Union Formation. Finally, soils in the southern part of the county, north of U.S. Highway 50 extending from Salida to Maysville, generally fall under the St. Elmo-Manhattan association, characterized by well-drained, calcareous, deep, and limy soils (USDA 1975).

Potential geologic hazards in the county include ground subsidence, landslides, erosion and deposition, rockfalls, mudslides and avalanches.

### 3.4 Demographics

Information on current and historic population levels and future population projections is needed for making informed decisions about future planning. Population directly relates to land needs such as housing, industry, stores, public facilities and services, and transportation. Population changes are useful socio-economic indicators, as a growing population generally indicates a growing economy, and a decreasing population signifies economic decline.

Some populations are at greater risk from hazard events because of decreased resources or physical abilities. Elderly people, for example, may be more likely to require additional assistance. Research has shown that people living near or below the poverty line, the elderly (especially older single men), the disabled, women, children, ethnic minorities and renters all experience, to some degree, more severe effects from disasters than the general population. These vulnerable populations may vary from the general population in risk perception; living conditions; access to information before, during and after a hazard event; capabilities during an event; and access to resources for post-disaster recovery. Indicators of vulnerability—such as disability, age, poverty, and minority race and ethnicity—often overlap spatially and often in the geographically most vulnerable locations. Detailed spatial analysis to locate areas where there are higher concentrations of vulnerable community members would assist the county in extending focused public outreach and education to these most vulnerable citizens. Select U.S. Census 2015 to 2019 demographic and social characteristics for Chaffee County are shown in Table 3-2.

**Table 3-2 Chaffee County 2019 Demographic And Social Characteristics**

	Chaffee County	Buena Vista	Poncha Springs	Salida
<b>Gender/Age</b> (% of Total Population)				
Male	53.6%	45.2%	49.6%	48.8%
Female	46.4%	54.8%	50.4%	51.2%
Under 5 years	3.8%	6.1%	4.0%	4.8%
65 years and over	25%	19.7%	30.3%	24.5%
<b>Race/Ethnicity</b> (% of Total Population)				

	Chaffee County	Buena Vista	Poncha Springs	Salida
White	84.9%	97.7%	83.7%	74.6%
American Indian/Alaska Native	0.4%	0.0%	0.0%	0.0%
Asian	1.4%	0.0%	1.5%	3.8%
Black or African American	1.7%	0.0%	0.0%	0.1%
Hawaiian or Pacific Islander	0.0%	0.0%	0.0%	0.0%
Other Race	0.2%	0.0%	0.0%	0.0%
Two or More Races	1.3%	0.0%	0.0%	4.2%
Hispanic or Latino (of any race)	10.0%	2.3%	14.8%	17.3%
<b>Education</b> (% of Total >25 Population)				
High school graduate or higher	93.5%	98.7%	85.5%	90.1%
Source: U.S. Census Bureau, 2015-2019 5-Year American Community Survey, <a href="https://www.census.gov/acs/www/data/data-tables-and-tools/data-profiles/2019/">https://www.census.gov/acs/www/data/data-tables-and-tools/data-profiles/2019/</a>				

### 3.4.1 Population Trends

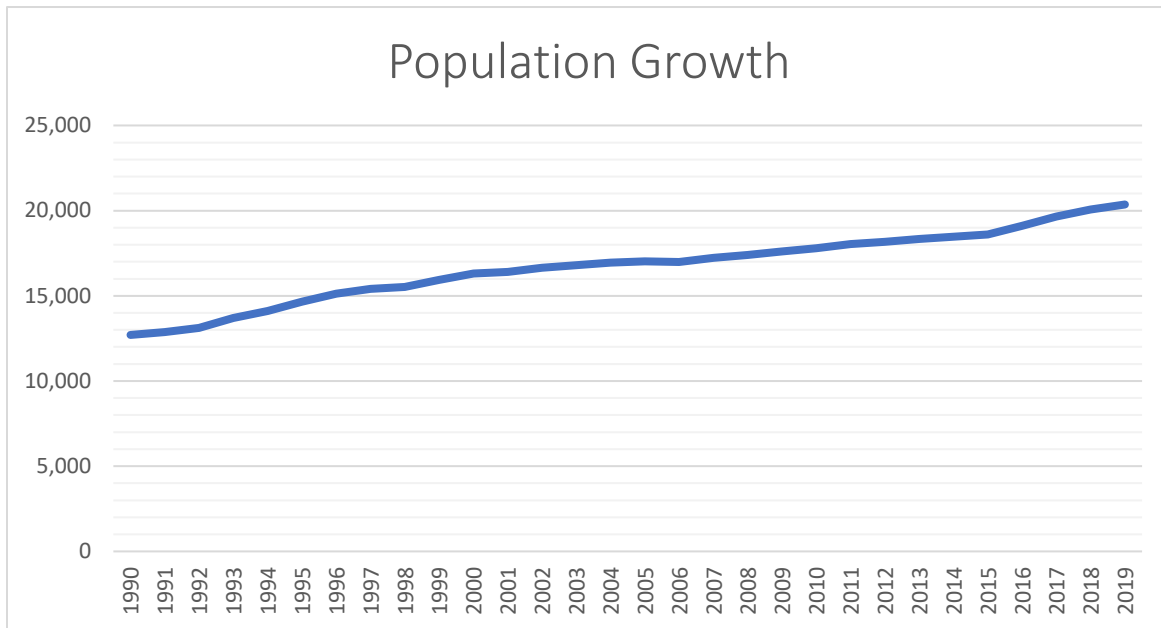
Chaffee County's population is ranked 26th out of Colorado's 64 counties. The United States Census Bureau estimated the county population to be at 19,557 as of July 2019. Table 3-3 shows planning area population data from 1990 through 2019. The total Chaffee County population increased 54% from 1990 to 2019.

**Table 3-3 Chaffee County Population (1990-2019)**

Total Population							
	1990	1995	2000	2005	2010	2014	2019
Buena Vista	1,752	1,989	2,202	2,437	2,615	2,725	2,782
Poncha Springs	244	355	490	644	737	764	607
Salida	4,737	5,215	5,586	5,211	5,233	5,416	5,791
Unincorporated Areas*	5,951	7,097	8,034	8,730	9,212	9,549	10,377
County Total	12,684	14,656	16,312	17,022	17,797	18,454	19,557
Sources: U.S. Census Bureau, 2009-2019 5-Year American Community Survey, <a href="http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml">http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml</a>							
* Includes unincorporated communities							

As shown in the table above, more than half of the population lives in the unincorporated areas of the county, though trends within the last three decades show greater population growth in the incorporated communities. In 1990, 77% of the planning area's residents lived in the unincorporated areas. In 2019, approximately 53% of the population lived in the unincorporated areas. Figure 3-4 shows the population change in the planning area from 1990 to 2019. Between 1990 and 2019, Colorado's population grew by 74.8% while the planning area's population increased by 54%.

**Figure 3-4 Chaffee County Population Growth, 1990 - 2019**



### 3.4.2 Age Distribution

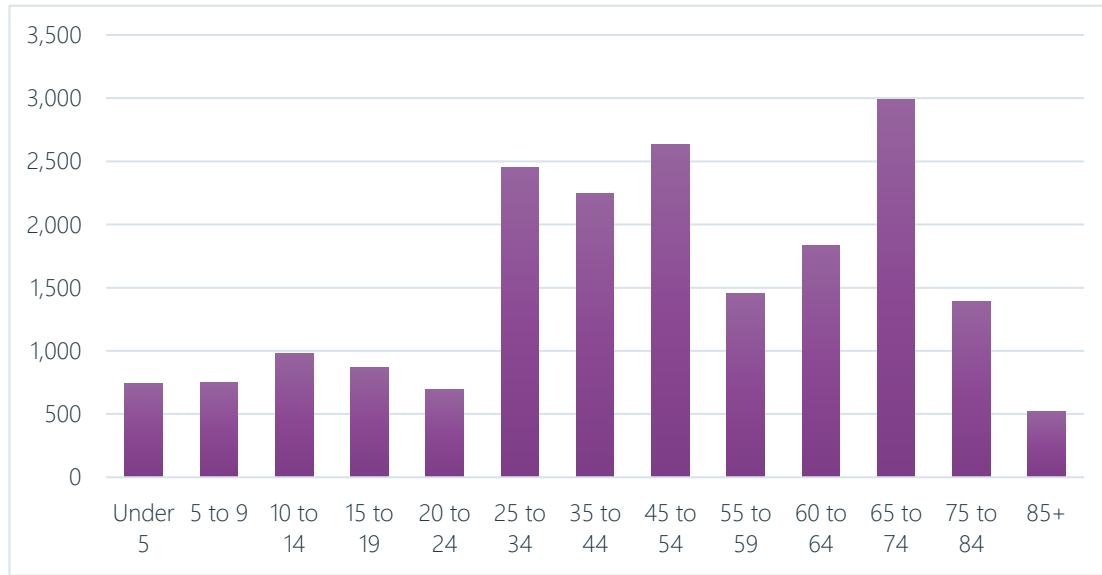
As a group, the elderly are more apt to lack the physical and economic resources necessary for response to hazard events and are more likely to suffer health-related consequences making recovery slower. They are more likely to be vision, hearing, or mobility impaired, and more likely to experience mental impairment or dementia. Additionally, the elderly are more likely to live in assisted-living facilities where emergency preparedness occurs at the discretion of facility operators. These facilities are typically identified as “critical facilities” by emergency managers because they require extra notice to implement evacuation. Elderly residents living in their own homes may have more difficulty evacuating their homes and could be stranded in dangerous situations. This population group is more likely to need special medical attention, which may not be readily available during natural disasters due to isolation caused by the event. Specific planning attention for the elderly is an important consideration given the current aging of the national population.

Children under 14 are particularly vulnerable to disaster events because of their young age and dependence on others for basic necessities. Very young children may additionally be vulnerable to injury or sickness; this vulnerability can be worsened during a natural disaster because they may not understand the measures that need to be taken to protect themselves from hazards.

The overall age distribution for the planning area is illustrated in Figure 3-5. According to U.S. Census data, 25% of the planning area’s population is 65 or older. Of that age group, 32.9% have a disability, accounting for roughly 8% of the county’s total population.

It is estimated 12.6% of the county’s population is 14 years old or younger. American Community Survey 5-year estimates for 2015-2019 indicate that 10.6% of Chaffee County families with children under 18 are below the poverty line, slightly above the 10.3% statewide rate for the same category.

**Figure 3-5 Chaffee County Age Distribution**



### 3.4.3 Disabled Populations

The 2019 U.S. Census American Community Survey estimates indicated that there are approximately 40 million non-institutionalized Americans living with disabilities. This equates to about 12.6% of the total civilian non-institutionalized population. People with disabilities are more likely to have difficulty responding to a hazard event than the general population. Local government is the first level of response to assist these individuals, and coordination of efforts to meet their access and functional needs is paramount to life safety efforts. It is important for emergency managers to distinguish between functional and medical needs in order to plan for incidents that require evacuation and sheltering. Knowing the percentage of population with a disability will allow emergency management personnel and first responders to have personnel available who can provide services needed by those with access and functional needs. According to the 2019 American Community Survey 5-year Estimates, 17.1% of the population in the planning area lives with some form of disability.

### 3.4.4 Ethnic Population

Research shows that minorities are less likely to be involved in pre-disaster planning and experience higher mortality rates during a disaster event. Post-disaster recovery can be less effective for ethnic populations and is often characterized by cultural insensitivity. Since higher proportions of ethnic minorities live below the poverty line than the majority white population, poverty can compound vulnerability. In Chaffee County, 6.8% of individuals speak a language other than English at home, compared to 16.9% of the statewide population. According to the U.S. Census, the ethnic composition of the planning area is predominantly white, at about 93.7%. The largest minority population is Hispanic or Latino at 10%.

### 3.4.5 Incarcerated Population

The Buena Vista Correctional Facility is a state prison for men located in Buena Vista which is owned and operated by the Colorado Department of Corrections. The facility opened as an adult prison in 1978, and houses 871 inmates at medium and close security levels, along with the 288-inmate Buena Vista Minimum Center, and another 100 minimum security inmates within the Colorado Correctional Alternative Program ("Boot Camp"). The Boot Camp is closed today.

### 3.5 Economy

Select economic characteristics estimated for Chaffee County by the American Community Survey Five-Year estimates for 2015-2019 are shown in Table 3-4.

**Table 3-4 Chaffee County Economic Characteristics**

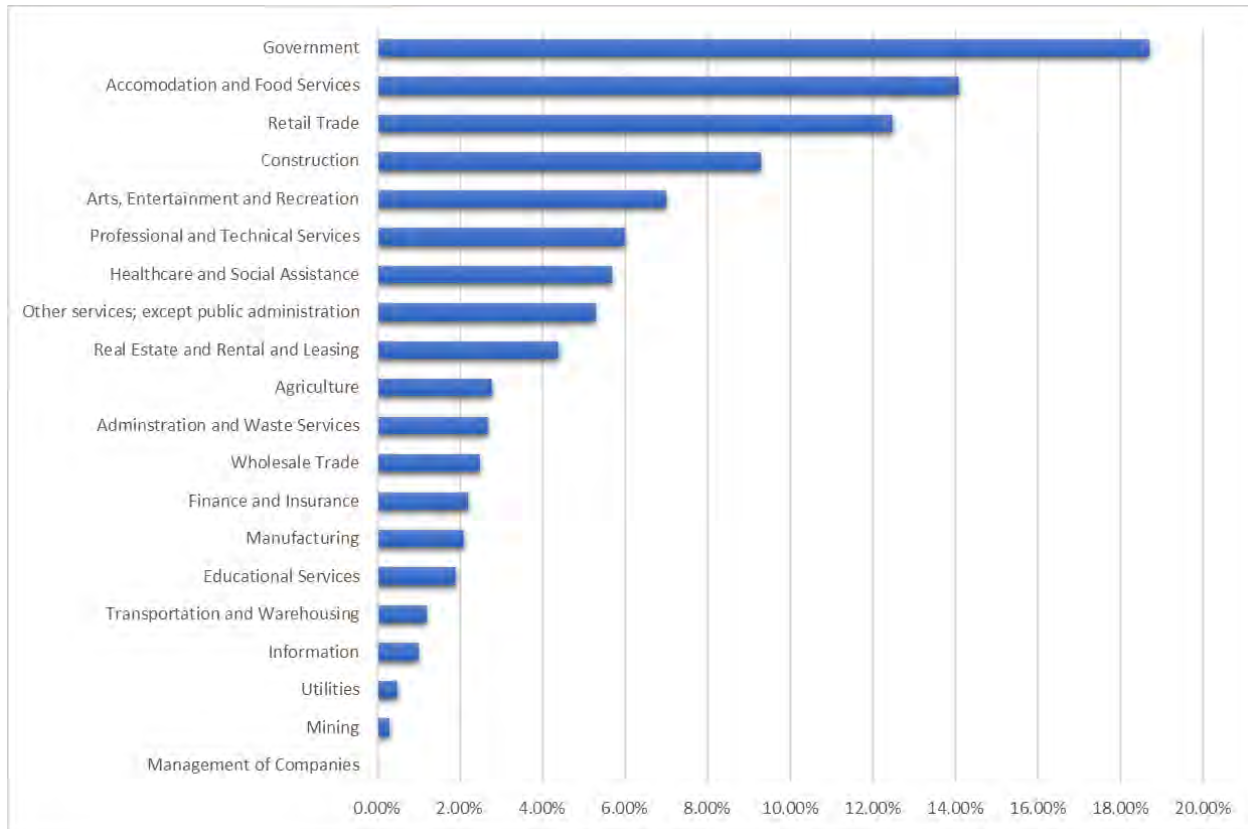
	Chaffee County	Buena Vista	Poncha Springs	Salida
% of Families Below Poverty Level	6.1%	0.0%	16.3%	11.8%
% of Individuals Below Poverty Level	9.8%	2.4%	27.7%	11.6%
Median Home Value	\$357,800	\$238,700	\$267,000	\$328,200
Median Household Income	\$55,771	\$44,104	\$38,021	\$46,875
Per Capita Income	\$29,827	\$25,708	\$24,918	\$28,619
% of Population > 16 years old in Labor Force	51%	60.4%	52.7%	54.9%
% of Population (Civilian Labor Force) Employed	49.3%	59.6%	50.6%	52.1%
Source: U.S. Census Bureau, 2015-2019 5-Year American Community Survey				

#### 3.5.1 Occupations and Industries

According to the State Demography Office, in 2019 the County's economy is largely based in the government (18.7% of total employment), accommodation and food services (14.1% of total employment), retail trades (12.5% of total employment), and construction (9.3% of total employment). Figure 3-6 shows the distribution of industry types in Chaffee County, based on the share of total employment.



**Figure 3-6 2019 Share of Jobs by Industry in Chaffee County**



Source: Colorado Department of Local Affairs, State Demography Office, 2019 Community Demographic Profiles

According to the Chaffee County Economic Development Corporation, the following are the largest employers in Chaffee County (Chaffee County EDC, 2020 EMSI Industry Snapshot):

- Heart of the Rockies Regional Medical Center
- Corrections Department Facility (Buena Vista)
- Monarch Mountain
- Walmart Supercenter
- Adventure Unlimited Ranches

The U.S. Census estimates that 68.6% of Chaffee County workers commute alone (by car, truck or van) to work, and mean travel time to work is 19.2 minutes.

### 3.6 Housing

In the United States, individual households are expected to use private resources to prepare for, respond to, and recover from disasters to some extent. This means that households living in poverty are automatically disadvantaged when confronting hazards. Additionally, the poor typically occupy more poorly built and inadequately maintained housing. Mobile or modular homes, for example, are more susceptible to damage in earthquakes and floods than other types of housing. Mobile homes represent 8.6% of the total housing stock in Chaffee County.

The following table shows select housing characteristics from the and the American Community Survey Five-Year estimates for 2019 for the planning area:

**Table 3-5 Chaffee County Select Housing Characteristics**

	Chaffee County	Buena Vista	Poncha Springs	Salida
Total Housing Units	11,064	1,514	339	3,081
# Occupied Housing Units	8,231	1,143	303	2,507
Vacancy Rate	25.6%	24.5%	10.6%	18.6%
% Owner-Occupied	77.8%	67.9%	68.6%	73.6%
% Renter-Occupied	22.2%	32.1%	31.4%	26.4%
Average # of Persons per Household	2.12	2.29	1.97	2.16
% of Rental Households paying 35% or more of income on housing	42.3%	23.1%	59.3%	49.7%
Source: U.S. Census Bureau, American Community Survey 5-Year Estimates 2014-2019				

## 3.7 Government

### 3.7.1 Chaffee County

The Chaffee County government is made up of the following offices and departments:

- Airport
- Assessor
- Building Department
- Combined Courts
- Clerk and Recorder
- Colorado State University Extension
- Coroner
- County Administration
- County Attorney
- County Commissioners
- Development Services
- Emergency Management
- Emergency Medical Services
- Environmental Health
- Fairgrounds
- Finance and Human Resources
- Human Services
- Landfill
- Planning and Zoning
- Public Health
- Road and Bridge
- Sheriff
- Treasurer
- Veterans Service
- Weed Control

### 3.7.2 Town of Buena Vista

The Town of Buena Vista is governed by a town board of trustees and a town administrator and includes the following departments:

- Administration
- Airport
- Cemetery
- Code Enforcement
- Finance Department
- Fire Department
- Municipal Court
- Recreation
- Planning
- Police Department
- Public Works – Streets
- Public Works – Parks
- Public Works – Water
- Town Clerk

### **3.7.3 Town of Poncha Springs**

The Town of Poncha Springs is governed by a mayor and a board of trustees and includes the following staff and several committees, including a Planning & Zoning Committee:

- Town Administrator/Treasurer/Clerk
- Public Works

### **3.7.4 City of Salida**

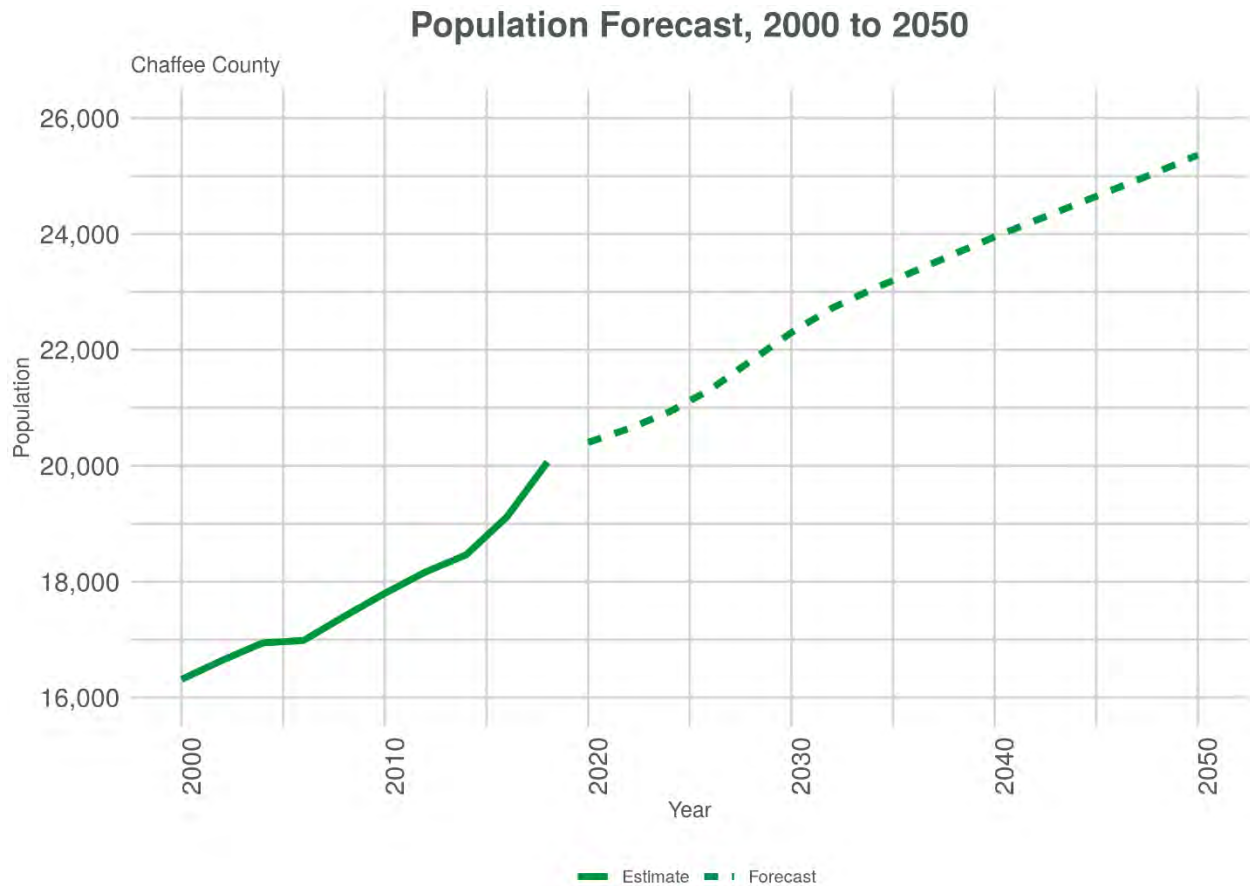
The City of Salida is governed by a mayor and city council and includes the following departments:

- Arts and Culture
- City Administrator's Office
- City Clerk
- Community Development
- Finance
- Fire
- Municipal Court
- Parks and Recreation
- Police
- Public Works
- Salida Airport at Harriet Alexander Field

## **3.8 Future Trends in Development**

According to the State Demography Office projects the County's population to continue to grow through 2050. The Office forecasts the population to reach 25,361 by the year 2050. The following figure shows the population forecast from 2000 to 2050, from the State Demography Office.

**Figure 3-7 Population Forecast, 2000 to 2050**



Source: State Demography Office, Print Date: 04/28/2021

The municipal planning partners have adopted plans that govern land use decision and policy making in their jurisdictions. Decisions on land use will be governed by these programs. This plan will work together with these programs to support wise land use in the future by providing vital information on the risk associated with natural hazards in the planning area.

It is the goal that all municipal planning partners will incorporate this hazard mitigation plan update into their next comprehensive plans (if applicable) by reference. This will help ensure that future development trends can be established with the benefits of the information on risk and vulnerability to natural hazards identified in this plan.

### 3.9 Capability Assessment

The planning team performed an inventory and analysis of existing authorities and capabilities called a "capability assessment." A capability assessment creates an inventory of an agency's mission, programs and policies, and evaluates its capacity to carry them out.

#### 3.9.1 Chaffee County

##### Legal and Regulatory Capabilities

Table 3-6 lists planning and land management tools typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in Chaffee County.

**Table 3-6 Chaffee County Regulatory Mitigation Capabilities Matrix**

Regulatory Tool (ordinances, codes, plans)	Yes/No	Comments
Comprehensive/master plan	Yes	Chaffee County Comprehensive Plan
Zoning ordinance	Yes	Chaffee County Land Use Code Article 2- Zoning.
Subdivision ordinance	Yes	Chaffee County Land Use Code Article 5- Division of Land
Growth management ordinance	Yes	Growth is managed in accordance with the comprehensive plan and the land use code.
National Flood Insurance Program	Yes	Joined 3/4/1987
Community Rating System	No	
Floodplain ordinance	Yes	Flood Damage Prevention Resolution, 1987-7
Other special purpose ordinance (stormwater, steep slope, wildfire)	Yes	Chaffee County Land Use Code, Chapter 2.11 (Drainage and Flood Protection, Weed Management, Erosion Control and Re-Vegetation, Wildfire Protection)
Building code	Yes	International Building Code, 2015 Edition
BCEGS Rating (1-10)	N/A	
Erosion or sediment control program	No	
Stormwater management	No	
Site plan review requirements	Yes	Building Department reviews site plans before issuing permits
Capital improvement plan	Yes	
Economic development plan	Yes	Comprehensive Plan to guide economic development of the county. Other plans include the Chaffee County Housing Needs Assessment (2007), Chaffee County Community Assessment (2006), and Chaffee County Action Plan (2006)
Local emergency operations plan	Yes	Chaffee County Local Emergency Operations Plan. This plan applies to all county officials, departments, and agencies.
Floodplain Management Plan	No	
Community Wildfire Protection Plan (CWPP)	Yes	Chaffee County Community Wildfire Protection Plan; Chaffee County
Other special plans	Yes	Citizen Emergency Preparedness Guide; Transportation Plan; Noxious Weed Management Plan
Flood insurance study or other engineering study for streams	Yes	The Planning and Zoning Department is the local repository for the FEMA FIRM for the unincorporated areas of the county and makes the maps available for public review.
Elevation Certificates.	No	

## Administrative and Technical Capabilities

Table 3-7 identifies the county personnel responsible for activities related to mitigation and loss prevention in Chaffee County.

**Table 3-7 Chaffee County Administrative/Technical Mitigation Capabilities Matrix**

Personnel Resources	Yes/No	Department/Position
Planner/engineer with knowledge of land development/land management practices	Yes	Development Services Department (Building Department, Planning and Zoning)
Engineer/professional trained in construction practices related to buildings or infrastructure	Yes	Development Services Department (Building Department, Planning and Zoning)
Planner/engineer/scientist with an understanding of natural hazards	Yes	Development Services Department
Transportation Planner	Yes	
Resiliency Planner	No	
Personnel skilled in GIS	Yes	Department of Planning and Zoning/County Assessor
Full-time building official	Yes	Development Services Department (Building Department, Planning and Zoning)
Floodplain manager	Yes	Department of Planning and Zoning
Emergency manager	Yes	Department of Emergency Management
Grant writer	No	
Other personnel	Yes	Environmental Health Manager
GIS data: Hazard areas	Yes	
GIS data: Critical facilities	Yes	
GIS data: Building footprints	Yes	
GIS data: Land use	Yes	
GIS data: Links to Assessor's data	Yes	
Warning systems/services (Reverse callback, cable override, outdoor warning signals)	Yes	Everbridge
Other	No	
Notes: GIS Geographic Information System		

## Financial Capabilities

Table 3-8 identifies financial tools or resources that Chaffee County could use to help fund mitigation activities.

**Table 3-8 Chaffee County Financial Mitigation Capabilities Matrix**

Financial Capabilities Used to Fund Mitigation Activities	Accessible/Eligible to Use	Has Been Used in the Past
Community Development Block Grants	Yes	No
Capital improvements project funding	Yes	Yes
Authority to levy taxes for specific purposes	No	No

Financial Capabilities Used to Fund Mitigation Activities	Accessible/Eligible to Use	Has Been Used in the Past
Fees for water, sewer, gas, or electric services	No	No
Stormwater Service Fees	No	No
Impact fees for new development	Yes	Yes
Incur debt through general obligation bonds	No	No
Incur debt through special tax bonds	Yes	No
Incur debt through private activities	No	No
Withhold spending in hazard prone areas	No	No
Other	No	No

### Education and Outreach Capabilities

Table 3-9 lists additional education and outreach capabilities, such as specific programs, which Chaffee County utilizes to implement hazard mitigation activities.

**Table 3-9 Chaffee County Education and Outreach Capabilities**

Capability/Program	Yes/No (Briefly Describe)
Local Citizen Groups That Communicate Hazard Risks	Yes - Envision Chaffee County, Central Colorado Conservancy, GARNA
Firewise	Envision Chaffee County outreach efforts. Pinon Ridge Community, Maysville, Alpine, St. Elmo are Firewise participants in the County
StormReady	No
Other?	Envision Community Action Plan Chaffee Chips – Wildfire mitigation disposal program to encourage community involvement and the creation of defensible space SRS Title 3 Chaffee County funds used in partnership with CSFS to map residence wildfire danger ranking and provide defensible space education.

### 3.9.2 City of Salida

#### Legal and Regulatory Capabilities

Table 3-10 lists regulatory and planning tools typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the City of Salida.

**Table 3-10 Salida Regulatory Mitigation Capabilities Matrix**

Regulatory Tool (ordinances, codes, plans)	Yes/No	Comments
General plan	Yes	The City of Salida 2013 Comprehensive Plan
Zoning ordinance	Yes	City of Salida Municipal Code Ch. 16 – Land Use and Development, Article 4- Zoning. Update currently underway as of 7/2021
Subdivision ordinance	Yes	City of Salida Municipal Code Ch. 16 – Land Use and



Regulatory Tool (ordinances, codes, plans)	Yes/No	Comments
		Development, Article 6- Subdivision. Update currently underway as of 7/2021
Growth management	Yes	
Floodplain ordinance	Yes	City of Salida Municipal Code Ch. 16 – Land Use and Development, Article 11- Flood Control. The purpose of this article to promote public health, safety and general welfare and to minimize public and private losses due to flood conditions in specific areas
National Flood Insurance	Yes	Joined 9/30/1982
Community Rating System	No	
Other special purpose ordinance (stormwater, steep slope, wildfire)	Yes	City of Salida Municipal Code Ch. 16 – Section 16-8-60, Stormwater Management Standards; Section 16-8-70, Grading and Erosion Control
Building code	Yes	Moved to the 2015 IBC & IFC in March 2018.
BCEGS Rating (1-10)	N/A	
Erosion or sediment control program	Yes	City of Salida Municipal Code Ch. 16 – Land Use and Development, Article 8.70- Grading and Erosion Control
Stormwater management	Yes	City of Salida Stormwater Master Plan adopted January 2018.
Site plan review requirements	Yes	Building permits are processed by Chaffee County Building Department
Capital improvements plan	Yes	5-yr CIP updated annually and provided in Financial Management Plan 2020.
Economic development plan	Yes	Downtown Improvement and Economic Sustainability Plan
Local emergency operations plan	No	
Floodplain Management Plan	No	
Community Wildfire Protection Plan (CWPP)	Yes	Covered in Chaffee County Community Wildfire Protection Plan
Other special plans	Yes	Salida Water Treatment Emergency Response Plan; Salida Wastewater Treatment Emergency Response Plan; Highway Corridor Improvement Plan; Strategic Housing Plan; Salida Water Conservation Plan, Raw Water Master Plan; Salida Transportation Plan
Flood insurance study or other engineering study for streams	Yes	“The Flood Insurance Study for Salida, Colorado” dated March 30, 1982. The floodplain administrator keeps copies of flood maps on file.
Elevation certificates	Yes	Elevation certificates are maintained by the Chaffee County Building Department

## Administrative and Technical Capabilities

Table 3-11 identifies the city personnel responsible for activities related to mitigation and loss prevention in Salida.

**Table 3-11 Salida Administrative/Technical Mitigation Capabilities Matrix**

Personnel Resources	Yes/No	Department/Position
Planner/engineer with knowledge of land development/land management practices	Yes	Community Development
Engineer/professional trained in construction practices related to buildings or infrastructure	Yes	Community Development/Public Works
Planner/engineer/scientist with an understanding of natural hazards	Yes	Community Development
Transportation Planner	No	
Resiliency Planner	Yes	
Personnel skilled in GIS	Yes	Community Development
Full-time building official	Yes	Community Development/Public Works
Floodplain manager	Yes	City of Salida designated JVA consulting engineers (Mark Rocheleau) as Floodplain Administrator.
Emergency manager	No	The city coordinates with the Chaffee County Office of Emergency Management
Grant writer	No	
Other personnel	No	
GIS data: Hazard areas	Yes	Added floodplain layer to mapping
GIS data: Critical facilities	Yes	Utilities update to mapping
GIS data: Building footprints	Yes	Only aerial
GIS data: Land use	Yes	
GIS data: Links to Assessor's data	Yes	Assessor's data is coordinated through Chaffee County
Warning systems/services (Reverse callback, cable override, outdoor warning signals)	Yes	Everbridge replaced CodeRED, Ipaws
Other	No	
Notes: GIS Geographic Information System		

### Financial Capabilities

Table 3-12 identifies financial tools or resources that the City of Salida could use to help fund mitigation activities.

**Table 3-12 Salida Financial Mitigation Capabilities Matrix**

Financial Capabilities Used to Fund Mitigation Activities	Accessible/Eligible to Use	Has Been Used in the Past
Community Development Block Grants	Yes	No
Capital improvements project funding	Yes	No
Authority to levy taxes for specific purposes	Yes	No

Financial Capabilities Used to Fund Mitigation Activities	Accessible/Eligible to Use	Has Been Used in the Past
Fees for water, sewer, gas, or electric services	Yes	No
Stormwater Service Fees	Yes	No
Impact fees for new development	Yes	No
Incur debt through general obligation bonds	Yes	No
Incur debt through special tax bonds	No	No
Incur debt through private activities	No	No
Withhold spending in hazard prone areas	No	No
Other	No	

### Education and Outreach Capabilities

Table 3-13 lists additional education and outreach capabilities, such as specific programs, which Chaffee County utilizes to implement hazard mitigation activities.

**Table 3-13 Salida Education and Outreach Capabilities**

Capability/Program	Yes/No (Briefly Describe)
Local Citizen Groups That Communicate Hazard Risks	No
Firewise	No
StormReady	No
Other?	No

### 3.9.3 Town of Buena Vista

#### Legal and Regulatory Capabilities

Table 3-14 lists planning and land management tools typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the Town of Buena Vista.

**Table 3-14 Buena Vista Regulatory Mitigation Capabilities Matrix**

Regulatory Tool (ordinances, codes, plans)	Yes/No	Comments
General plan	Yes	Buena Vista Comprehensive Plan (2015)
Zoning ordinance	Yes	Updated Unified Development Code in 2018. Integrated into new Chapter 16 of Municipal Code
Subdivision ordinance	Yes	Updated Unified Development Code in 2018. Integrated into new Chapter 16 of Municipal Code
Growth management	Yes	
Floodplain ordinance	Yes	Adopted updated FEMA maps in 2017
National Flood Insurance	Yes	Joined 9/30/1982
Community Rating System	No	
Other special purpose ordinance (stormwater, steep slope, wildfire)	Yes	Stormwater standards for development in Municipal Code Chapter 16
Building code	Yes	Adopted IBC, 2015 Edition
BCEGS Rating (1-10)	NA	
Erosion or sediment control program	Yes	Erosion Control requirements for development in Municipal Code Chapter 16
Stormwater management	Yes	Stormwater Fund created in 2016
Site plan review requirements	Yes	Site Plans are required for commercial and larger subdivisions and reviewed by Town Planning Department
Capital improvements plan	Yes	
Economic development plan	Yes	
Local emergency operations plan	No	
Floodplain Management Plan	No	
Community Wildfire Protection Plan (CWPP)	Yes	Covered in Chaffee County Community Wildfire Protection Plan
Other special plans	Yes	Water Resources Master Plan; 3 Mile Plan; Comprehensive Trail Plan Map; Transportation Master Plan; Recreation Master Plan Covered under County's CWPP
Flood insurance study or other engineering study for streams	Yes	
Elevation certificates	Yes	Elevation certificates are maintained by the Chaffee County Building Department

## Administrative and Technical Capabilities

Table 3-15 identifies the town personnel responsible for activities related to mitigation and loss prevention in Buena Vista.

**Table 3-15 Buena Vista Administrative/Technical Mitigation Capabilities Matrix**

Personnel Resources	Yes/No	Department/Position
Planner/engineer with knowledge of land development/land management practices	Yes	Planning and Zoning Department
Engineer/professional trained in construction practices related to buildings or infrastructure	Yes	Planning and Zoning Department
Planner/engineer/scientist with an understanding of natural hazards	Yes	Planning and Zoning Department
Transportation Planner	No	
Resiliency Planner	No	
Personnel skilled in GIS	Yes	Planning and Zoning Department
Full-time building official	Yes	Planning and Zoning Department, Contracted with Chaffee County Building Department
Floodplain manager	Yes	The Director of Public Works is the authorized floodplain administrator (Municipal Code, Chapter 18, Article IX)
Emergency manager	No	The town coordinates with the Chaffee County Office of Emergency Management
Grant writer	No	
Other personnel	No	
GIS data: Hazard areas	Yes	
GIS data: Critical facilities	Yes	
GIS data: Building footprints	Yes	
GIS data: Land use	Yes	
GIS data: Links to Assessor's data	Yes	
Warning systems/services (Reverse callback, cable override, outdoor warning signals)	Yes	County Everbridge emergency communication system
Other	No	
Notes: GIS Geographic Information System		

## Financial Capabilities

Table 3-16 identifies financial tools or resources that Buena Vista could use to help fund mitigation activities.

**Table 3-16 Buena Vista Financial Mitigation Capabilities Matrix**

Financial Capabilities Used to Fund Mitigation Activities	Accessible/Eligible to Use	Has Been Used in the Past
Community Development Block Grants	Yes	No
Capital improvements project funding	Yes	Yes, Water well installed to provide backup water supply
Authority to levy taxes for specific purposes	Yes	No
Fees for water, sewer, gas, or electric services	Yes	Yes, Stormwater Enterprise Fund created in 2016 with monthly fees.

Financial Capabilities Used to Fund Mitigation Activities	Accessible/Eligible to Use	Has Been Used in the Past
		Used to for capital projects
Stormwater Service Fees	No	No
Impact fees for new development	Yes	No
Incur debt through general obligation bonds	Yes	No
Incur debt through special tax bonds	Yes	No
Incur debt through private activities	No	No
Withhold spending in hazard prone areas	No	No
Other	No	

### Education and Outreach Capabilities

Table 3-17 lists additional education and outreach capabilities, such as specific programs, which Chaffee County utilizes to implement hazard mitigation activities.

**Table 3-17 Buena Vista Education and Outreach Capabilities**

Capability/Program	Yes/No (Briefly Describe)
Local Citizen Groups That Communicate Hazard Risks	No
Firewise	No
StormReady	No
Other?	No

### 3.9.4 Town of Poncha Springs

#### Legal and Regulatory Capabilities

Table 3-18 lists regulatory and planning tools typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the Town of Poncha Springs.

**Table 3-18 Poncha Springs Regulatory Mitigation Capabilities Matrix**

Regulatory Tool (ordinances, codes, plans)	Yes/No	Comments
General plan	Yes	Town of Poncha Springs Comprehensive Plan. The Poncha Springs Comprehensive Plan establishes a framework for physical, social and economic development in Poncha Springs, over the next 20 to 30 years.
Zoning ordinance	Yes	Town of Poncha Springs Land Use and Zoning Code
Subdivision ordinance	Yes	Town of Poncha Springs Land Use and Zoning Code
Growth management	Yes	Town of Poncha Springs Comprehensive Plan
Floodplain ordinance	Yes	Town of Poncha Springs Floodplain Damage Prevention Ordinance (updated 2017-13)
National Flood Insurance Program	Yes	Joined 2/19/1987
Community Rating System	No	
Floodplain Management Plan	No	

Regulatory Tool (ordinances, codes, plans)	Yes/No	Comments
Community Wildfire Protection Plan (CWPP)	Yes	Covered in Chaffee County Community Wildfire Protection Plan
Other special purpose ordinance (stormwater, steep slope, wildfire)	Yes	Ch. 30 (Land Use Code), Section 3.8 (Hazard Standards), Section 3.8.1 (Wildfire)
Building code	Yes	Ordinance 2015-2 – automatically adopts Building Codes adopted and amended by the CC Building Dept.
BCEGS Rating	No	
Erosion or sediment control program	No	
Stormwater management	No	
Site plan review requirements	Yes	Identified in Land Use Code
Capital improvements plan	Yes	
Economic development plan	No	
Local emergency operations plan	Yes	Resolution 2016-7 – Adopting Chaffee County's Local Emergency Operations Plan
Floodplain Management Plan	No	
Community Wildfire Protection Plan (CWPP)	Yes	Covered in Chaffee County Community Wildfire Protection Plan
Other special plans	Yes	Snow Removal Plan; Highway Corridor Plan; Access Control Plan; Transportation Plan Covered under County's CWPP
Flood insurance study or other engineering study for streams	Yes	
Elevation certificates	Yes	Elevation certificates are maintained by the Chaffee County Building Department

### Administrative and Technical Capabilities

Table 3-19 identifies the town personnel responsible for activities related to mitigation and loss prevention in Poncha Springs.

**Table 3-19 Poncha Springs Administrative/Technical Mitigation Capabilities Matrix**

Personnel Resources	Yes/No	Department/Position
Planner/engineer with knowledge of land development/land management practices	Yes	Contracted
Engineer/professional trained in construction practices related to buildings or infrastructure	Yes	Contracted
Planner/engineer/scientist with an understanding of natural hazards	Yes	Contracted
Transportation Planner	No	
Resiliency Planner	No	
Personnel skilled in GIS	No	



Personnel Resources	Yes/No	Department/Position
Full-time building official	Yes	The Town coordinates with the CC Building Department for all building permits
Floodplain manager	Yes	Per Ordinance 2017-13 the Town Administrator acts as the floodplain manager
Emergency manager	No	The town coordinates with the Chaffee County Office of Emergency Management
Grant writer	Yes	
Other personnel	No	
GIS data: Hazard areas	Yes	County Assessor's Database
GIS data: Critical facilities	Yes	Town GIS system & County Assessor's Database
GIS data: Building footprints	Yes	County Assessor's Database
GIS data: Land use	Yes	Official Transect Zoning Map & County Assessor's Database
GIS data: Links to Assessor's data	Yes	
Warning systems/services (Reverse callback, cable override, outdoor warning signals)	Yes	CodeRED replaced with Everbridge
Other	No	
Notes: GIS Geographic Information System		

## Financial Capabilities

Table 3-20 identifies financial tools or resources that Poncha Springs could use to help fund mitigation activities.

**Table 3-20 Poncha Springs Financial Mitigation Capabilities Matrix**

Financial Capabilities Used to Fund Mitigation Activities	Accessible/Eligible to Use	Has Been Used in the Past
Community Development Block Grants	Yes	No
Capital improvements project funding	Yes	Yes - \$25,000 towards the Methodist Front Wildland Urban Interface Project
Authority to levy taxes for specific purposes	Yes	No
Fees for water, sewer, gas, or electric services	Yes	Yes – \$2.7M Water Infrastructure Improvement Project – increase fire flow capacity and offset demand during an extended drought
Stormwater Service Fees	No	
Impact fees for new development	Yes	No
Incur debt through general obligation bonds	Yes	No
Incur debt through special tax	Yes	No

Financial Capabilities Used to Fund Mitigation Activities	Accessible/Eligible to Use	Has Been Used in the Past
bonds		
Incur debt through private activities	No	No
Withhold spending in hazard prone areas	No	No
Other	Yes	Yes – GOCO Grants – CYCA crews to be utilized for hand work for the Methodist Front Wildland Urban Interface Project

### Education and Outreach Capabilities

Table 3-21 lists additional education and outreach capabilities, such as specific programs, which Chaffee County utilizes to implement hazard mitigation activities.

**Table 3-21 Poncha Springs Education and Outreach Capabilities**

Capability/Program	Yes/No (Briefly Describe)
Local Citizen Groups That Communicate Hazard Risks	No
Firewise	No
StormReady	No
Other?	No

### 3.9.5 State and Regional Partnerships

#### Colorado Division of Homeland Security and Emergency Management

Pursuant to House Bill 12-1283, the former Division of Emergency Management moved from the Department of Local Affairs to the Division of Homeland Security and Emergency Management under the Colorado Department of Public Safety, effective July 1, 2012. The division is comprised of three offices:

- Office of Emergency Management
- Office of Grants Management
- Office of Prevention and Security/Colorado Information Analysis Center

The Division of Homeland Security and Emergency Management operates under the following mission: To lead and support Colorado's effort to prevent, protect, mitigate, respond to and recover from all hazards events." New vision is "A prepared, safe and resilient Colorado! Colorado Water Conservation Board

The CWCB is an agency of the State of Colorado. The CWCB Flood Protection Program is directed to review and approve statewide floodplain studies and designations prior to adoption by local governments. The CWCB is also responsible for the coordination of the NFIP in Colorado and for providing assistance to local communities in meeting NFIP requirements. This includes CWCB prepared or partnered local floodplain studies.

#### Colorado Geological Survey

The Colorado Geological Survey is a non-regulatory state government agency within the Colorado School of Mines. The mission of CGS is to help reduce the impact of geologic hazards on the citizens of Colorado,

to promote responsible economic development of mineral and energy resources, provide geologic insight into water resources, provide avalanche safety training and forecasting, and to provide geologic advice and information to a variety of constituencies.

### **Colorado State Forest Service**

The mission of the Colorado State Forest Service is to provide for the stewardship of forest resources and to reduce related risks to life, property, and the environment for the benefit of present and future generations. Its fire preparedness and response strategic priority is to provide leadership in wildland fire protection for state and private lands in Colorado and reduce wildfire-related loss of life, property, and critical resources.

### **Chaffee County Next Generation Community Wildfire Protection Plan**

The Chaffee County Next Generation Community Wildfire Protection Plan was adopted in February 2020 and is the most recent Community Wildfire Protection Plan (CWPP) in place for the County. Chaffee County typifies the new reality of wildfire in the West. Decades of fire suppression and ensuing insect infestations have caused our forests to decline into very poor health. Forests are overly dense with high fuel loads. These unhealthy forests are further impacted by multiple insect epidemics, including a beetle epidemic resulting in 80 to 90% mortality of spruce trees countywide. The United States Forest Service (USFS) estimates that an average of five standing dead trees per acre across Chaffee County in 2017 will increase to about 120 per acre by 2020.

The Chaffee County community, including over 1,500 citizens and a Community Wildfire Protection Plan (CWPP) Leaders Team (including 36 leaders from 17 agencies, local government bodies, fire protection districts, water providers and nonprofit organizations) worked together to develop the Next Generation Community Wildfire Protection Plan. The outcome of the Chaffee County Next Generation CWPP process is profound and proposes substantial change to the way forest management is done in Chaffee County. The plan is to reduce the overall risk to the community's assets by nearly 50% in ten years by accelerating treatment on the right acres—as unanimously supported by the CWPP Leaders Team.

The Chaffee County Next Generation CWPP establishes 5 goals with objectives in order to achieve the vision summarized above:

1. **Fire-Resilient Forests and Productive Habitat:** Accelerate multi-jurisdictional treatment and stewardship activity in Treatment Priority Areas to decrease the risk wildfire poses to community values at risk while also (as practicable) enhancing watershed health, habitat and agricultural productivity.
2. **Fire-Adapted Communities:** Build community engagement, understanding, preparedness, public support and realistic expectations for forest and fire management. This includes personal preparedness (such as evacuation plans), citizen action to decrease the risk wildfire poses to private lands and structures and continuing to build upon strong local support for accelerated treatment—or “social license to treat.”
3. **Safe and Effective Wildfire Response:** Enable safe and effective wildfire response, including collaborative preparedness for severe wildfires and evacuation events.
4. **Effective Post-Fire Recovery:** Develop proactive planning and projects for post-fire recovery, flood, and sediment management.
5. **Strategic Funding for Healthy Forests:** Develop collaborative funding to deliver on the goals and objectives outlined above.

The Chaffee County Next Generation CWPP seeks to build on the progress of the County's first CWPP from 2009, by adding new data and technology, community momentum, increasing collaboration and local funding.

### **Envision Chaffee County**

Envision Chaffee County is an organization that seeks to "engage citizens to sustain and improve our quality of life and to create the future they want as the county grows". Envision's mission statement is as follows:

"Chaffee County is a special place with clean air and water, beautiful landscapes, vibrant small towns, fantastic recreation opportunities and friendly people.

Envision enhances our community's ability to collectively create impact by taking action to protect what we have going forward starting now, rather than in another couple of decades.

The county's population growth, influx of visitors and the demands on our numerous activities spurred citizens into the Envision planning program."

One of the accomplishments of the organization is the creation of the Envision Community Action Plan, which details 40 programs and project ideas designed and led by community members to address the county's most pressing challenges and to seize the opportunities. The programs and projects range from short-term wins to game-changers that will ensure a better future for Chaffee County.

### **Upper Arkansas Area Council of Governments**

The Upper Arkansas Area Council of Governments (UAACOG) promotes regional cooperation and coordination among local governments and between levels of government for the geographic area comprising the Counties of Chaffee, Custer, Fremont, and Lake. The purpose of the organization is to provide community services on a regional basis that are not practical or efficient to provide on an individual county or municipal basis. The Articles of Incorporation emphasize the need for a regional council based on the recognition that people in the region form a single community and are bound together not only physically, but economically and socially. The services have evolved and changed over the years, but the benefit of regional cooperation and coordination are more important than ever.

### **Sangre de Cristo Electric Association (SDCEA)**

Chaffee County and Office of Emergency Management and SDCEA have a valued partnership that includes mutual support during planning and during disaster events. SDCEA plans to spend nearly \$4.5 million over the next four years (2021-2025) to address wildfire risk within Chaffee County, to clear approximately 247 miles of energized, overhead power lines. In spring 2021 a section of line was cleared on CR 162 and in Alpine. SDCEA has the capability to provide additional GIS mapping information regarding the location of their lines to help County OEM's future planning efforts. SDCEA assists in implementation of the County's CWPP through vegetation management treatments in priority areas to reduce the risk of ignition and spread of wildfire. SDCEA field and administrative staff is highly trained in safety operations, locally based, and can be dispatched to assist the County in responding to electrical system emergencies 24/7, 365 days a year. SDCEA's office facilities in Buena Vista may also be used in an emergency to provide a staging area for field operations, a community meeting room, internet service, communications assistance, showers, two kitchens and an emergency shelter or gathering location if necessary.

### **3.9.6 Opportunities for Capability Enhancement**

The 2020-2021 update provided the County and participating jurisdictions an opportunity to review and update the capabilities currently in place to mitigate hazards. Based on the capability assessment, the jurisdictions have several existing regulatory, administrative/technical, fiscal mechanisms in place that help to mitigate hazards. This also provided an opportunity to identify where capabilities could be improved or enhanced. Specific opportunities could include the update or development of following plans, which should also cross reference this hazard mitigation plan (see also Section 6.3.5):

#### **Regulatory**

- Update Land Use Code to consider hazards and cross-reference the HMP (County)
- Updates of Capital Improvement Plan that cross-reference the HMP and hazard mitigation-related improvements (all jurisdictions).
- Future planned updates to the County Community Wildfire Protection Plan (County) that will include specific neighborhoods
- Update County Local Emergency Operations Plan (County)
- Develop an Economic Development Plan (Poncha Springs).
- Update Comprehensive Plans to include linkages to the hazard mitigation plan and consideration of hazards in land use planning (County, Salida, Buena Vista, Poncha Springs).

#### **Administrative/technical**

- Consider resiliency planners or integrate resiliency in existing positions (all jurisdictions)
- Have staff attend mitigation grants training (see Fiscal below).

#### **Fiscal**

- Obtain training on FEMA Hazard Mitigation Assistance grants through FEMA or CO DHSEM to improve understanding of eligible projects and components of successful applications (County, Salida, Buena Vista, Poncha Springs).

#### **Outreach and Education**

- Become StormReady certified communities (County, Salida, Buena Vista, Poncha Springs)

## 4 Hazard identification and Risk Assessment

### DMA Requirement §201.6(c)(2):

*[The plan shall include] A risk assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards.*

Risk, for the purposes of this plan and as defined by FEMA, is a combination of hazard, vulnerability, and exposure. "It is the impact that a hazard would have on people, services, facilities, and structures in a community and refers to the likelihood of a hazard event resulting in an adverse condition that causes injury or damage."

Risk assessment is the process of measuring the potential loss of life, personal injury, economic injury, and property damage resulting from natural hazards. The process allows for a better understanding of a jurisdiction's potential risk to hazards and provides a framework for developing and prioritizing mitigation actions to reduce risk from future hazard events.

This risk assessment builds upon the methodology described in the 2013 FEMA Local Mitigation Planning Handbook, which recommends a four-step process for conducting a risk assessment:

1. Describe Hazards
2. Identify Community Assets
3. Analyze Risks
4. Summarize Vulnerability

The risk assessment is the process of measuring the potential loss of life, personal injury, economic injury, and property damage resulting from natural and human caused hazards. It allows emergency management personnel to establish early response priorities by identifying potential hazards and vulnerable assets. Data collected through this process has been incorporated into the following sections of this chapter:

Section 4.1: Hazard Identification – Identifies the hazards that threaten the Planning Area (Chaffee County) and describes why some hazards have been omitted from further consideration.

Section 4.2: Assets Summary - Describes the methodology for inventorying assets as the basis for determining vulnerability of the Planning Area to the identified hazards.

Sections 4.3-4.16: Hazard Profiles - Discusses the threat each hazard poses to the Planning Area and describes previous occurrences of hazard events and the likelihood of future occurrences (2013 FEMA Local Mitigation Planning Handbook Risk Assessment, Step 1). It also includes a vulnerability assessment for each hazard, considering assets at risk, critical facilities, and future development trends (2013 FEMA Local Mitigation Planning Handbook Risk Assessment, Steps 2, 3 and 4).

### 4.1 Identified Hazards of Concern and Prioritization

#### DMA Requirement §201.6(c)(2)(i):

*[The risk assessment shall include a] description of the type of all-natural hazards that can affect the jurisdiction.*



The first step in developing a risk assessment is identifying the hazards. The Chaffee County Hazard Mitigation Planning Committee (HMPC) conducted a hazard identification study to determine the hazards that threaten the Planning Area and estimates of potential losses or assets that could be affected by those hazards (if/as applicable).

#### **4.1.1 Methodology and Results**

For this plan, the Hazard Mitigation Planning Committee (HMPC) considered the full range of natural hazards that could impact the planning area and then listed hazards that present the greatest concern. Hazard data was obtained from various federal, state, and local sources such as FEMA, the Colorado Geological Survey (CGS), the National Oceanic and Atmospheric Administration (NOAA) National Center for Environmental Information (NCEI), the United States Geological Survey (USGS), and others. Together, these sources were examined to assess the significance of these hazards to the County. The hazards evaluated in this plan include those that have occurred historically or have the potential to cause significant human and/or monetary losses in the future. The process also incorporated a review of state and local hazard planning documents. Anecdotal information regarding natural hazards and the perceived vulnerability of the planning area's assets to them was also used. Based on the review, this plan addresses the following hazards of concern:

- Avalanche
- Dam Failure or Incident
- Drought
- Earthquake
- Erosion and Deposition
- Expansive Soil
- Extreme Heat
- Flood
- Hail
- Landslide, Mud/Debris Flow, Rockfall
- Lightning
- Severe Wind
- Subsidence
- Tornado
- Wildfire
- Winter Storm
- Pandemic/Epidemic
- Cyber Threats
- Hazardous Materials Incidents

Several of these hazards were profiled together because of their common occurrence or damage assessments, such as drought and extreme heat; hail, lightning, and severe winds; and Erosion and deposition/expansive soil/subsidence. Levee failure was dropped from the Dam Failure section during the update as there are no levees in the County; non-failure dam incidents are included in the updated hazard profile. The HMPC reviewed the list of natural hazards in the 2018 Colorado Hazard Mitigation Plan. HMPC omitted one statewide natural hazard that does not commonly affect the County: dense fog. The plan is mainly focused on natural hazards, as required by the DMA 2000, but as a result of the impacts the County experienced during the ongoing COVID-19 Pandemic, the HMPC decided to include Pandemic/Epidemic in the 2021 update. Other human caused hazards added during the 2021 update include Hazardous Materials Incidents and Cyber Threats. Other primarily human-caused hazards addressed in the State HMP not addressed in this plan include animal disease, wildlife-vehicle collisions, pest infestation, infrastructure failure, mine accidents, radon/CO2/methane seeps, power failure, radiological release, chemical, biological, radiological and nuclear attack (CBRNE) and explosive attack. These were omitted due to low probability of occurrence or historic low impacts and to keep the list focused on natural and most significant hazards. Power failure and infrastructure failure are considered within this plan as a consequence of applicable natural hazards.

#### **Overall Hazard Significance Summary**

Members of the HMPC used a hazards worksheet to identify and rate the significance of a variety of possible hazards based on their experience and knowledge of the Planning Area. Overall hazard

significance was based on a combination of Probability of Future Occurrence, and Potential Impact to people, property and economy (Magnitude/Severity, e.g. Extent) as defined below.

### ***Probability of Occurrence***

The probability of occurrence of a hazard is indicated by a probability factor based on likelihood of annual occurrence. The assessment of hazard frequency is generally based on past hazard events in the area.

- High—Hazard event is likely to occur within 25 years (Probability Factor = 3)
- Medium—Hazard event is likely to occur within 100 years (Probability Factor = 2)
- Low—Hazard event is not likely to occur within 100 years (Probability Factor = 1)
- No exposure—There is no probability of occurrence (Probability Factor = 0)

### ***Impact***

Hazard impacts were assessed in three categories: impacts on people, impacts on property, and impacts on the local economy. Numerical impact factors were assigned as follows:

- **People**—Values were assigned based on the percentage of the total population exposed to the hazard event. The degree of impact on individuals will vary and is not measurable, so the calculation assumes for simplicity and consistency that all people who live in a hazard zone will be equally impacted when a hazard event occurs. It should be noted that planners can use an element of subjectivity when assigning values for impacts on people. Impact factors were assigned as follows:
  - High – 50% or more of the population is exposed to a hazard (Impact Factor = 3)
  - Medium – 25% to 49% of the population is exposed to a hazard (Impact Factor = 2)
  - Low – 24% or less of the population is exposed to the hazard (Impact Factor = 1)
  - No impact – None of the population is exposed to a hazard (Impact Factor = 0)
- **Property**—Values were assigned based on the percentage of the total assessed property value exposed to the hazard event:
  - High – 30% or more of the total assessed property value is exposed to a hazard (Impact Factor = 3)
  - Medium – 15% to 29% of the total assessed property value is exposed to a hazard (Impact Factor = 2)
  - Low – 14% or less of the total assessed property value is exposed to the hazard (Impact Factor = 1)
  - No impact – None of the total assessed property value is exposed to a hazard (Impact Factor = 0)
- **Economy**—Values were assigned based on total impact to the economy from the hazard event and activities conducted after the event to restore the community to previous functions. Values were assigned based on the number of days the hazard impacts the community, including impacts on tourism, businesses, road closures, or government response agencies.
  - High – Community impacted for more than 7 days (Impact Factor = 3)
  - Medium – Community impacted for 1 to 7 days (Impact Factor = 2)
  - Low – Community impacted for less than 1 day (Impact Factor = 1)
  - No impact – No community impacts estimated from the hazard event (Impact Factor = 0)

The impacts of each hazard category were assigned a weighting factor to reflect the significance of the impact. These weighting factors are consistent with those typically used for measuring the benefits of

hazard mitigation actions: impact on people was given a weighting factor of 3; impact on property was given a weighting factor of 2; and impact on the economy was given a weighting factor of 1.

The risk rating for each hazard was calculated by multiplying the probability factor by the sum of the weighted impact factors for people, property and operations, as summarized in Table 4-1. Based on these ratings, a priority of high, medium, or low was assigned to each hazard. The hazards ranked as being of highest concern vary by jurisdiction but generally include drought, landslide, mud/debris flow, and rockfall, wildfire, and winter storm. Other hazards ranked as being of high or medium concern include dam/levee failure, extreme heat, flood, hail, lightning, and severe wind. The hazards ranked as being of lowest concern are avalanche, earthquake, erosion and deposition, expansive soils, subsidence, and tornado. Table 4-2 summarizes the hazard risk ranking.

**Table 4-1 Hazard Risk Rating Calculations**

Hazard	Chaffee County			City of Salida			Town of Buena Vista			Town of Poncha Springs		
	Probability Factor	Impact Weighted Sum	Total	Probability Factor	Impact Weighted Sum	Total	Probability Factor	Impact Weighted Sum	Total	Probability Factor	Impact Weighted Sum	Total
Avalanche	3	7	21	0	1	0	1	5	5	1	6	6
Dam Failure/Incident	1	13	13	2	10	20	2	12	24	2	12	24
Drought	3	16	48	2	6	12	2	12	24	3	11	33
Earthquake	1	12	12	0	6	0	1	6	6	1	12	12
Erosion and Deposition	2	6	12	1	6	6	0	0	0	2	13	26
Expansive Soils	2	6	12	0	6	0	0	0	0	1	8	8
Extreme Heat	1	6	6	1	6	6	1	4	4	3	12	36
Flood	3	12	36	2	12	24	3	18	54	2	17	34
Hail	2	8	16	2	12	24	1	7	7	2	14	28
Landslide, Mud/Debris Flow, Rockfall	3	6	18	1	0	0	2	12	24	3	14	42
Lightning	3	12	36	2	6	12	3	9	27	3	9	27
Severe Wind	3	11	33	1	6	6	3	10	30	3	13	39
Subsidence	1	6	6	1	6	6	0	0	0	1	6	6
Tornado	1	6	6	1	6	6	1	6	6	1	11	11
Wildfire	3	18	54	2	13	26	3	18	54	3	18	54
Winter Storm	3	15	45	3	10	30	3	18	54	3	15	45
Pandemic/Epidemic	2	12	24	2	10	20	3	15	45	2	12	24
Cyber Threat	1	12	12	0	6	0	1	6	6	1	12	12
Hazardous Materials Incidents	2	8	16	2	6	12	2	8	16	2	14	28

Notes: Impact Weighted Sum = Total Impact Factor People + Total Impact Factor Property + Total Impact Factor Economy Total = Probability x Impact Weighted Sum

**Table 4-2 Hazard Significance Summary**

Hazard	Chaffee County	City of Salida	Town of Buena Vista	Town of Poncha Springs
Avalanche	M	NA	L	L
Dam Failure/Incident	L	M	M	M
Drought	H	L	M	M
Earthquake	L	L	L	L
Erosion and Deposition	L	L	NA	M
Expansive Soils	L	NA	NA	L
Extreme Heat	L	L	L	M
Flood	M	M	H	M
Hail	L	M	L	M
Landslide, Mud/Debris Flow/Rockfall	L	L	M	M
Lightning	M	L	M	M
Severe Wind	M	L	M	H
Subsidence	L	L	NA	L
Tornado	L	L	L	L
Wildfire	H	M	H	H
Winter Storm	H	M	H	H
Pandemic/Epidemic	M	M	M	M
Cyber Threat	L	L	L	L
Hazardous Materials Incident	L	L	L	M

Note: NA = Not Exposed

## **Hazard Significance and Risk Assessment Changes from 2016 Plan**

The overall hazard significance ratings have generally remained the same with the exception of landslide rating for Poncha Springs, which decided to lower the significance rating from high to low. The hazard profiles have been improved with additional data and analysis. The 2021 planning process showed that recent hazard events have increased awareness of the interconnectedness of many hazards. Another difference of this plan compared to the 2016 HMP is that a vulnerability section of Historic, Cultural, and Natural Resources was added in each hazard profile to discuss impacts to the County's multiple resources, where applicable. The maps and GIS analysis were updated with best available data, and the writing was made more concise across most sections.

### **4.1.2 Disaster Declaration History**

One method used to identify hazards applicable for this HMP involved researching past events that triggered federal and state emergency or disaster declarations in Chaffee County. Federal and state disaster declarations may be granted when the severity and magnitude of an event surpasses the ability of the local government to respond to such hazard event and have difficulty in recovering. Disaster assistance is supplemental and sequential. When the local government's capacity has been surpassed, a state disaster declaration may be issued, allowing for the provision of state assistance. Should the disaster be so severe that both the local and state governments' capacities are exceeded, a federal emergency or disaster declaration may be issued allowing for the provision of federal monetary or other assistance. In other words, a presidential disaster declaration puts federal recovery programs in place to help disaster victims, business, and public agencies.

The federal government may issue a disaster declaration through FEMA, the U.S. Department of Agriculture (USDA), or the Small Business Administration (SBA). FEMA also issues emergency declarations, which are more limited in scope and come without the long-term federal recovery programs of major disaster declarations (Farm Service Agency 2018). The quantity and types of damage are the determining factors behind receiving these assistance sources. The following section focuses on state and federal disaster and emergency declarations.

Chaffee County is among the many communities in Colorado that are susceptible to disasters. Details on federal and state disaster declarations were obtained by the HMPC, FEMA, and the Colorado Division of Homeland Security and Emergency Management (DHSEM) and compiled in chronological order in Table 4-3. A review of state and federal declared disasters indicates that Chaffee County experienced 5 disaster declarations between 2002 and 2020. The 2020 declarations were related to the Covid-19 pandemic, an ongoing disaster that occurred during the 2021 plan update process.

Since 2003, there have been 18 drought declarations issued by the USDA's Secretary of Agriculture in Chaffee County. Refer to Table 4-14 in the Drought hazard profile for more information of Disaster Declarations from the Secretary of Agriculture related to drought events.

Review of these events helps identify hazards for risk reduction and ways to increase a community's capability to avoid large-scale events in the future. Still, many natural hazard events do not trigger federal disaster declaration protocol but have significant impacts on their communities. These events are also important to consider in establishing recurrence intervals for hazards of concern. More detailed event tables can be found in the individual hazard profile sections.

**Table 4-3 Past Disaster Declarations in Chaffee County**

Disaster Declaration	Incident Type	Description	Incident Dates
DR-1421	Fire	Spring Fire	6/2-6/26/2002
EM-3185	Winter Storm	Snow	3/17-3/20/2003
EM-3224	Coastal Storm	Hurricane Katrina Evacuation	8/29-10/1/2005
EM-3436	Biological	COVID-19	3/13/2020 – continuing
DR-4498	Biological	Colorado Covid-19 Pandemic	3/28/2020-continuing

Federal disaster declarations are coded as follows: DR = Major Disaster Declaration; EM = Emergency Declaration; FM = Fire Management Assistance

Sources: FEMA Data Visualization: Disaster Declarations for States and Counties  
<https://www.fema.gov/data-visualization-disaster-declarations-states-and-counties>  
 USDA, U.S. Department of Agriculture, (<http://www.fsa.usda.gov/programs-and-services/disaster-assistance-program/index>)

#### 4.1.3 Overview of Hazard Identification and Risk Assessment

Sections 4.3-4.16 contains detailed hazard profiles for the identified hazards. Each hazard profiled includes the following subsections:

- **Hazard Profile**—This section gives a description of the hazard in question and associated issues followed by details on the hazard specific to the Chaffee County Planning Area.
- **Past Events**—This section contains information on historical incidents, including impacts where known.
- **Location**– This section gives a spatial description of the potential location or areas of Chaffee County where the hazard is expected to have an impact or generally occur.
- **Frequency and Severity (Extent)**– The frequency of past events is used in this section to gauge the likelihood of future occurrences. Where possible, frequency was calculated based on existing data. This section also gives a description of the potential strength or magnitude of the hazard as it pertains to Chaffee County.
- **Warning Time** – This section takes into consideration the speed of onset of the hazard event.
- **Climate Change Considerations**—Descriptions of the potential for climate change to affect the frequency and intensity of the hazard in the future.
- **Vulnerability** —Following the hazard profiles is a vulnerability assessment for each identified hazard. The assessment was conducted through the study of potential impacts to the following specific sectors:
  - Population
  - Property
  - Critical Facilities and Infrastructure
  - Economy
  - Historic, Cultural, and Natural Resources
- **Development Trends** – This section reviews current trends in land use development in the county and how that might impact the vulnerability to specific hazards in the County.
- **Risk Summary** —Summary of the key issues/problems based on threat, vulnerability and consequence to the Planning Area and jurisdictions from the specific hazard.



## 4.2 Assets Summary

### 4.2.1 Methodology

This vulnerability assessment is an attempt to quantify assets at risk, by jurisdiction where possible, to further define populations, properties, and critical facilities at risk to hazards identified in this plan. The methods of analysis vary by hazard type and data available.

Data to support the vulnerability assessment was collected and compiled from the following sources:

- GIS data (spatial data such as hazard threats, base layers like hydrology, boundaries, roads, etc., and parcel/assessor's data)
- Written descriptions of inventory and risks provided by participating jurisdictions and the HMPC
- Existing plans, studies, and reports with relevant information
- Plan update guides shared with planning team members and Chaffee County, Town of Buena Vista, City of Salida and Town of Poncha Springs.

This section assesses the population, structures, critical facilities and infrastructure, and other important assets in the Planning Areas as an initial consideration of risk to hazards identified in this plan. It begins with an inventory of people and buildings (total exposure) in the County to provide a baseline for evaluating vulnerability by hazard.

### Limitations

Loss estimates, exposure assessments, and hazard-specific vulnerability evaluations rely on the best available data and methodologies. Uncertainties are inherent in any loss estimation methodology and arise in part from incomplete scientific knowledge concerning natural hazards and their effects on the built environment. Uncertainties also result from the following:

- Approximations and simplifications necessary to conduct a study
- Incomplete or outdated inventory, demographic, or economic parameter data
- The unique nature, geographic extent, and severity of each hazard
- Mitigation measures already employed
- The amount of advance notice residents have to prepare for a specific hazard event

These factors can affect loss estimates by a factor of two or more. Therefore, potential exposure and loss estimates are approximate. The results do not predict precise results and should be used only to understand relative risk. Over the long term, Chaffee County and its planning partners will collect additional data to assist in estimating potential losses associated with other hazards.

### 4.2.2 Assets Exposure

As a starting point for analyzing the Planning Area's vulnerability to identified hazards, the HMPC used a variety of data to define a baseline of property exposure against which disaster impacts could be compared. If a catastrophic disaster was to occur in the Planning Area, this section describes significant assets exposed or at risk in the Planning Area. Data used in this baseline assessment included:

- Total property assets at risk based on County Assessor's Office parcel values and a digital database of building address points;
- Critical facility inventory;
- Cultural, historical, and natural resources; and
- Population growth and land use/development trends.

## Total Assets at Risk

Chaffee County Assessor data was used to inventory the total number and types of parcels with improvements, defined as parcels with an improvement value greater than zero, in the County. Building content values were estimated based on the following formulas based on FEMA methods: a) Residential properties received content values worth 50% of the improved values; b) Commercial, Agricultural, and Government related properties (including State Assessed and Exempt parcels) received content values worth 100% of the improved values; and c) Industrial properties received content values worth 150% of the improved values. Adding up these content and original improved values yields the Total Value of Improved Parcels, which is an estimation of the total property exposure within the County. Building counts were based on an address point database to further refine the number of structures, as one parcel may have multiple buildings.

**Table 4-4 Property Exposure Summaries by Jurisdiction and Parcel Type**

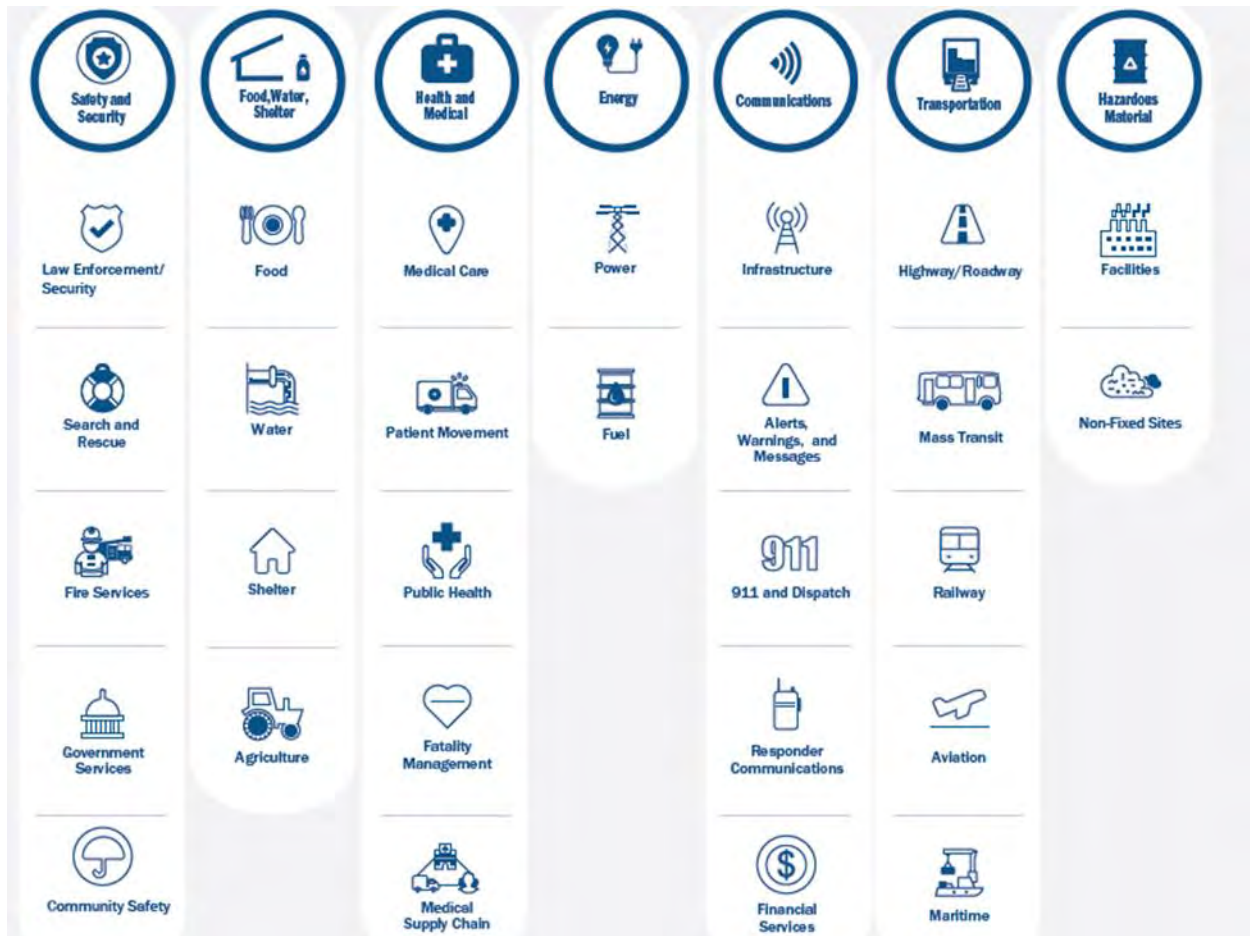
Jurisdiction	Property Type	Improved Parcels	Building Count	Improved Value	Content Value	Total Value
Buena Vista	Commercial	232	263	\$65,580,860	\$65,580,860	\$131,161,720
	Exempt	50	50	\$45,817,930	\$45,817,930	\$91,635,860
	Industrial	2	2	\$384,822	\$577,233	\$962,055
	Residential	1,409	1,447	\$327,208,429	\$163,604,215	\$490,812,644
	Vacant Land*	6	7	\$21,885	\$21,885	\$43,770
	<b>Total</b>	<b>1,699</b>	<b>1,769</b>	<b>\$439,013,926</b>	<b>\$275,602,123</b>	<b>\$714,616,049</b>
Poncha Springs	Agricultural	5	5	\$1,608,887	\$1,608,887	\$3,217,774
	Commercial	56	61	\$19,354,493	\$19,354,493	\$38,708,986
	Exempt	17	18	\$7,601,379	\$7,601,379	\$15,202,758
	Industrial	1	1	\$51,243	\$76,865	\$128,108
	Residential	444	456	\$119,742,057	\$59,871,029	\$179,613,086
	Vacant Land*	4	4	\$128,148	\$128,148	\$256,296
	<b>Total</b>	<b>527</b>	<b>545</b>	<b>\$148,486,207</b>	<b>\$88,640,800</b>	<b>\$237,127,007</b>
Salida	Agricultural	3	4	\$6,494	\$6,494	\$12,988
	Commercial	348	364	\$129,688,936	\$129,688,936	\$259,377,872
	Exempt	58	73	\$136,519,829	\$136,519,829	\$273,039,658
	Residential	2,691	2,784	\$766,987,720	\$383,493,860	\$1,150,481,580
	Vacant Land*	11	11	\$305,680	\$305,680	\$611,360
	<b>Total</b>	<b>3,111</b>	<b>3,236</b>	<b>\$1,033,508,659</b>	<b>\$650,014,799</b>	<b>\$1,683,523,458</b>
Unincorporated	Agricultural	509	544	\$161,283,089	\$161,283,089	\$322,566,178
	Commercial	226	273	\$80,748,490	\$80,748,490	\$161,496,980
	Exempt	81	89	\$50,999,123	\$50,999,123	\$101,998,246
	Industrial	17	17	\$2,808,409	\$4,212,614	\$7,021,023
	Nonprod. Mine	26	27	\$671,761	\$671,761	\$1,343,522
	Residential	4,835	4,931	\$1,567,805,786	\$783,902,893	\$2,351,708,679
	Vacant Land*	161	163	\$2,224,408	\$2,224,408	\$4,448,816
	<b>Total</b>	<b>5,855</b>	<b>6,044</b>	<b>\$1,866,541,066</b>	<b>\$1,084,042,378</b>	<b>\$2,950,583,444</b>
<b>Grand Total</b>		<b>11,192</b>	<b>11,594</b>	<b>\$3,487,549,858</b>	<b>\$2,098,300,099</b>	<b>\$5,585,849,957</b>

Source: Wood Analysis, Chaffee County Assessor; \*vacant land includes those with improvement values > 0\$.

## Critical Facilities and Infrastructure

For the purposes of this plan, a critical facility is defined as one that is essential in providing utility or direction either during the response to an emergency or during the recovery operation. FEMA organizes critical facilities into seven lifeline categories as shown in Figure 4-1.

**Figure 4-1 FEMA Lifeline Categories**



Source: FEMA

These lifeline categories standardize the classification of critical facilities and infrastructure that provide indispensable service, operation, or function to a community. A lifeline is defined as providing indispensable service that enables the continuous operation of critical business and government functions, and is critical to human health and safety, or economic security. These categorizations are particularly useful as they:

- Enable effort consolidations between government and other organizations (e.g. infrastructure owners and operators)
- Enable integration of preparedness efforts among plans, easier identification of unmet critical facility needs
- Refine sources and products to enhance awareness, capability gaps, and progress towards stabilization
- Enhance communication amongst critical entities, while enabling complex interdependencies between government assets

- Highlight lifeline related priority areas regarding general operations as well as response efforts.

To develop a comprehensive list of critical facilities in Chaffee County (Table 4-5), three data sources were compiled and broken down along the three aforementioned critical asset categories: Chaffee County's GIS databases of critical facilities and infrastructure, Colorado Emergency Planning Commission and the Homeland Security Infrastructure Program (HSIP) database maintained by the Department of Homeland Security.

The best available data was used, but some limitations include lack of complete or comprehensive data and values such as replacement costs. These databases were used in vulnerability assessments for hazards such as wildfire and flood and are represented in maps and tables in the vulnerability by hazard section that follows. Figure 4-2 illustrates the location of critical facilities in Chaffee County.

**Table 4-5 Total Critical Facilities by FEMA Lifeline and Jurisdiction**

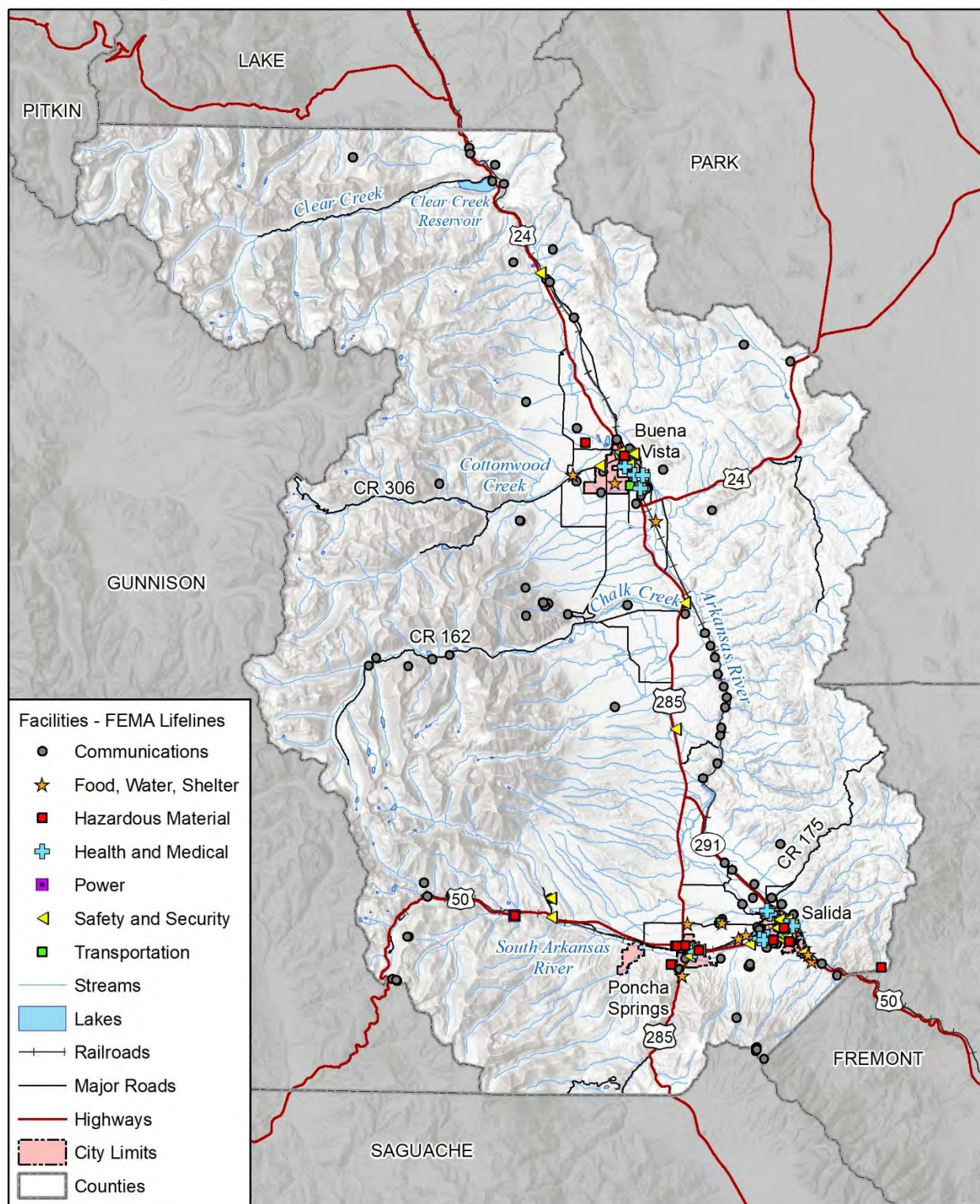
Jurisdiction	FEMA Lifeline	Critical Facility Type	Count
Buena Vista	Communications	Land Mobile Private Transmission Tower	6
		Microwave Transmission Tower	6
	Food, Water, Shelter	Water Treatment Plant	1
	Hazardous Materials	Medical/Healthcare	3
	Health and Medical	Medical/Healthcare	3
	Safety and Security	Government Support	1
		Library	1
		Public Safety	5
		School	7
	Transportation	Airport	1
Total		32	
Poncha Springs	Communications	Cellular Tower	2
		FM Transmission Tower	1
		Land Mobile Private Transmission Tower	3
		Microwave Transmission Tower	3
	Food, Water, Shelter	Water Tank	3
	Hazardous Materials	Tier II	2
	Health and Medical	Medical/Healthcare	1
	Safety and Security	Government Support	2
		Public Safety	2
	Total		19
Salida	Communications	Land Mobile Private Transmission Tower	21
		Microwave Transmission Tower	11

Jurisdiction	FEMA Lifeline	Critical Facility Type	Count
	Food, Water, Shelter	Wastewater Treatment Plant	1
	Hazardous Materials	Tier II	3
	Health and Medical	Air Ambulance	1
		Medical/Healthcare	10
	Safety and Security	Childhood Learning Center	1
		Government Support	6
		Library	1
		Public Safety	5
		School	5
	Total		65
Unincorporated	Communications	Cellular Tower	10
		FM Transmission Tower	11
		Land Mobile Private Transmission Tower	107
		Microwave Transmission Tower	56
		Paging Transmission Tower	1
	Food, Water, Shelter	Community Support	1
		Wastewater Treatment Plant	1
		Water Tank	5
		Water Treatment Plant	1
	Hazardous Materials	Medical/Healthcare	1
	Health and Medical	Medical/Healthcare	1
	Energy	Power Plant	1
	Safety and Security	EOC	1
		Government Support	1
		Public Safety	5
	Transportation	Airport	1
	Total		209
Grand Total			324

Source: Wood Analysis, Chaffee County, HIFLD, Colorado Emergency Planning Commission, FEMA Lifelines



**Figure 4-2 Critical Facilities in Chaffee County**



Map compiled 2/2021;  
intended for planning purposes only.  
Data Source: Chaffee County, CDOT,  
HIFLD

0 5 10 Miles



## Natural Assets, Historic, and Cultural Resources

Natural resources are important for protection from hazards, and they also can help mitigate hazards. For instance, protecting wetlands areas protects sensitive habitat as well as attenuates and stores floodwaters. Chaffee County's fauna, flora, spectacular views, natural environmental assets and historic and cultural resources draw visitors from around the world every year.

### Endangered Species

To further understand natural resources that may be particularly vulnerable to a hazard event, as well as those that need consideration when implementing mitigation activities, it is important to take into account identified at-risk species (threatened and endangered species) in the planning area. A threatened species is a species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. An endangered species is any species of plant life or wildlife (birds, fish, mammals, etc.) that is in danger of extinction throughout all or most of its range. 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.

According to the U.S. Fish and Wildlife Service there are 11 Federal endangered, threatened, recovering, or candidate species in Chaffee County. These species are listed in Table 4-6 along with state listed species. State special concern is not a statutory category but suggests a species may be in danger.

**Table 4-6 Sensitive Species Occurring in the Planning Area**

Group	Name	Status
Birds	American Peregrine Falcon	Recovery
	Eastern Black Rail	Threatened
	Gunnison Sage Grouse	Threatened
	Mexican Spotted Owl	Threatened
Fishes	Peppered Owl	Proposed Endangered
Flowering Plants	Western Prairie Fringed Orchid	Threatened
Insects	Monarch Butterfly	Candidate
	Uncompahgre Fritillary Butterfly	Endangered
Mammals	Long-Eared Myotis	Species of Concern
	Long-Legged Myotis	Species of Concern
	Canada Lynx	Threatened

Source: US Fish and Wildlife Service Species by County Report

### Historic and Cultural Resources

There are many important historic resources within Chaffee County. A historic property not only includes buildings or other types of structures such as bridges and dams but can also refer to prehistoric or Native American sites, roads, byways, historic landscapes, and such other features. Given the history of the County, these types of historic properties exist; some are inventoried and listed in this plan.

Historic properties and cultural resources are also valuable economic assets that increase property values and attract businesses and tourists. Far from being at odds with economic development, preservation of these assets is often an important catalyst for economic development (e.g., historic downtown revitalization programs leading to growth in heritage tourism).

Information about historic assets in Chaffee County came from local sources, the HMPC, and the following two historic inventories:



- **National Register of Historic Places.** The Nation’s official list of cultural resources worthy of preservation. The National Register is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect historic and archeological resources. Properties listed include districts, sites, buildings, structures, and objects that are significant in American history, architecture, archeology, engineering, and culture. The National Register is administered by the National Park Service, which is part of the U.S. Department of the Interior.
- **Colorado State Register of Historic Properties.** A listing of the state’s significant cultural resources worthy of preservation for the future education and enjoyment of Colorado’s residents and visitors. Properties listed in the Colorado State Register include individual buildings, structures, objects, districts, and historic and archaeological sites. The Colorado State Register program is administered by the Office of Archaeology and Historic Preservation within the Colorado Historical Society. Properties listed in the National Register of Historic Places are automatically placed in the Colorado State Register.

Table 4-7 below lists the properties and districts in Chaffee County that are on the Colorado State Register of Historic Properties and the National Register of Historic Places. All listed historic properties in the Planning Area are on both the State and National registers.

**Table 4-7 Chaffee County Historic Properties on State and National Registers**

Property Name	Register	Location	Date Listed
Alexander House	National	Salida	11/7/2007
Alpine Tunnel Historic District	National/State	Southwest of St. Elmo	9/13/1995 4/1/1996
Behrman Ranch	National	Buena Vista	3/27/2012
Bode-Stewart House	National	Salida	4/29/2008
Bonney, J. M., House	National	Buena Vista	12/19/1994
Bridge over Arkansas River	National	Buena Vista	2/4/1985
Brown Cabin	State	St. Elmo	3/12/1997
Brown's Canyon Bridge	National	Salida	7/30/2013
Buena Vista Depot	State	Buena Vista	3/10/2004
Chaffee County Courthouse	State	Salida	9/11/1996
Chaffee County Courthouse and Jail Buildings	National	Buena Vista	9/10/1979
Chaffee County Poor Farm	National	Salida	5/16/1985
Church of Ascension	State	Salida	6/14/2000
Cleora Cemetery	National	Salida	3/27/2017
Comanche Drive-In	National	Buena Vista	8/3/2015
Commercial Hotel	National	Granite	7/27/2015
Corbin, E.W., House	National	Salida	11/1/1996
Crescent Moly Mine No. 100 and Mining Camp	National/State	Vicksburg	10/11/2003, 9/10/2003
Edison Electric Light Plant/Salida Steam Plant	State	Salida	3/10/1993
F Street Bridge	National	Salida	2/4/1985
Fay, William and Anna, House	National	Buena Vista	7/27/2015
First National Bank of Buena Vista Building	State	Buena Vista	8/9/2000
Gas Creek School	National	Nathrop	11/26/2018
Gimlett/LeFevre Cabin	National	Garfield	12/17/2018
Grace Episcopal Church	National	Buena Vista	1/20/1978
Gray, Garret and Julia, Cottage	National	Salida	9/12/1980

Property Name	Register	Location	Date Listed
Head Lettuce Day-Collegiate Peaks Stampede Rodeo Grounds	National	Buena Vista	11/7/2016
Heister House	National	Salida	10/8/2008
Hutchinson Ranch	National	Poncha Springs	5/11/1973
Hutchinson Ranch (Boundary Increase)	National	Salida	8/9/2005
Jackson, F.A., House	National	Salida	4/15/1999
Jacobs Building	National	Buena Vista	12/22/2011
Kelley-McDonald House	National	Buena Vista	7/27/2015
Kesner Memorial Building	State	Salida	9/10/2003
Littlejohn Mine Complex	National	Granite	12/27/1978
Manhattan Hotel	National	Salida	4/21/1983
Maxwell Park School	National	Buena Vista	12/7/2020
Maysville School	National	Maysville	4/29/1999
Methodist Episcopal Church, Salida	State	Salida	3/10/1999
Morley Bridge	National	Romley	8/14/2003
Nachtrieb-Kelly Ranch	National	Buena Vista	3/27/2017
Ohio-Colorado Smelting and Refining Company Smokestack	National	Salida	1/11/1976
Orpheum Theater	State	Buena Vista	9/13/1995
Pedro-Botz House	National	Salida	7/27/2015
Pine Hall	National	Granite	11/7/2016
Poncha Springs Schoolhouse	National	Poncha Springs	1/25/1990
Rancho Antero	State	Nathrop	3/12/1997
Rock Ledge Ranch-Franzel Ranch	National	Buena Vista	7/27/2015
Salida Downtown Historic District	National	Salida	6/14/1984
Salida Livestock Commission Company	National	Salida	7/27/2015
Salida Public Library	State	Salida	12/13/1995
Smith-Friskey Ranch	National	Buena Vista	3/27/2017
Spear Cabin/Turret Post Office	State	Turret	9/26/2018
St. Elmo Historic District	National	St. Elmo	9/17/1979
St. Elmo Siding & Crew Quarters	State	St. Elmo	5/16/2001
St. Rose of Lima Catholic Church	State	Buena Vista	3/10/1999
Turner Place	State	Buena Vista	3/13/1996
Valley View School	National	Salida	10/12/2003
Valley View School	State	Salida	9/10/2003
Vicksburg Mining Camp	National	Buena Vista	3/8/1977
Winfield Mining Camp	National	Buena Vista	3/10/1980
Wright-Sindlinger House	State	Buena Vista	8/8/2001

Source: History Colorado, and National & State Register Listed Properties

## Climate Change

Climate includes patterns of temperature, precipitation, humidity, wind and seasons. Climate plays a fundamental role in shaping natural ecosystems, and the human economies and cultures that depend on them. "Climate change" refers to changes over a long period of time. It is generally perceived that climate change will have a measurable impact on the occurrence and severity of natural hazards around the world. Impacts include the following:

- Snow cover losses will continue, and declining snowpack will affect snow-dependent water supplies and stream flow levels in Colorado and around the world.
- The risk of drought and the frequency, intensity, and duration of heat waves are expected to increase.
- More extreme precipitation is likely, increasing the risk of flooding.
- The world's average temperature is expected to increase.

Climate change will affect communities in a variety of ways. Impacts could include an increased risk for extreme events such as drought, storms, flooding, and wildfires; and more heat-related stress. In many cases, communities are already facing these problems to some degree. Climate change influences the frequency, intensity, extent, or magnitude of the problems.

This hazard mitigation plan addresses climate change as an influencer of the probability and intensity of applicable hazards of concern. Each chapter addressing one of the hazards of concern includes a section with a qualitative discussion on the probable impacts of climate change for that hazard. As climate change science and projections change in the future, this risk assessment may be enhanced to incorporate this information.

## 4.3 Avalanche

AVALANCHE HAZARD RANKING	
Chaffee County	Medium
City of Salida	No Exposure
Town of Buena Vista	Low
Town of Poncha Springs	Low

### 4.3.1 Hazard Profile

Avalanches can occur whenever a sufficient depth of snow is deposited on slopes steeper than approximately 20 degrees, with the most dangerous coming from slopes in the 35- to 40- degree range. Avalanche-prone areas can be identified with some accuracy, since they typically follow the same paths year after year, leaving scarring on the paths. However, unusual weather conditions can produce new paths or cause avalanches to extend beyond their normal paths.

In the spring, warming of the snowpack occurs from below (from the warmer ground) and above (from warm air, rain, etc.). Warming can be enhanced near rocks or trees that transfer heat to the snowpack. The effects of a snowpack becoming weak may be enhanced in steeper terrain where the snowpack is shallow, and over smooth rock faces that may focus meltwater and produce "glide cracks." Such slopes may fail during conditions that encourage melt.

Wind can affect the transfer of heat into the snowpack and associated melt rates of near-surface snow. During moderate to strong winds, the moistening near-surface air in contact with the snow is constantly mixed with drier air above through turbulence. As a result, the air is continually drying out, which enhances evaporation from the snow surface rather than melt. Heat loss from the snow necessary to drive the evaporation process cools off near-surface snow and results in substantially less melt than otherwise might occur, even if temperatures are well above freezing.

When the snow surface becomes uneven in spring, air flow favors evaporation at the peaks, while calmer air in the valleys favors condensation there. Once the snow surface is wet, its ability to reflect solar energy drops dramatically; this becomes a self-perpetuating process, so that the valleys deepen (favoring calmer air and more heat transfer), while more evaporation occurs near the peaks, increasing the differential between peaks and valleys. However, a warm wet storm

### DEFINITIONS

**Avalanche**—Any mass of loosened snow or ice and/or earth that suddenly and rapidly breaks loose from a snowfield and slides down a mountain slope, often growing and accumulating additional material as it descends.

**Slab avalanches**—The most dangerous type of avalanche, occurring when a layer of coherent snow ruptures over a large area of a mountainside as a single mass. Like other avalanches, slab avalanches can be triggered by the wind, by vibration, or even by a loud noise, and will pull in surrounding rock, debris, and even trees.

**Climax avalanches**—An avalanche involving multiple layers of snow, usually with the ground as a bed surface.

**Loose snow avalanches**—An avalanche that occurs when loose, dry snow on a slope becomes unstable and slides. Loose snow avalanches start from a point and gather more snow as they descend, fanning out to fill the topography.

**Powder snow avalanches**—An avalanche that occurs when sliding snow has been pulverized into powder, either by rapid motion of low-density snow or by vigorous movement over rugged terrain.

**Surface avalanches**—An avalanche that occurs only in the uppermost snow layers.

**Wet snow avalanche**—An avalanche in wet snow, also referred to as a wet loose avalanche or a wet slab avalanche. Often the basal shear zone is a water-saturated layer that overlies an ice zone.

can quickly flatten the peaks as their larger surface area exposed to warm air, rain or condensation hastens their melt over the sheltered valleys.

Avalanches can reach speeds of up to 200 miles per hour (mph) and can exert forces great enough to destroy structures and uproot or snap off large trees. Avalanche paths consist of a starting zone, a track, and a runout zone. The runout zone is often an attractive setting for development.

According to the Colorado Avalanche Information Center (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 (CAIC no date). Avalanche forecasts were first issued by the Colorado Avalanche Warning Center in 1973. The mission of the CAIC is to provide avalanche information and education and to promote research for the protection of life, property, and the enhancement of the state's economy (CAIC no date).

### **Past Events**

Although infrequent, avalanches do occur periodically in the county. Generally, avalanches in Chaffee County are relatively minor. There have been 16 recorded deaths attributable to avalanches in Chaffee County from 1950 to 2020. Two of the casualties occurred in the Sawatch Mountains in 2014. As of February 14, 2021, the 2020-2021 Colorado avalanche season was on track to become either the deadliest or second deadliest on record.

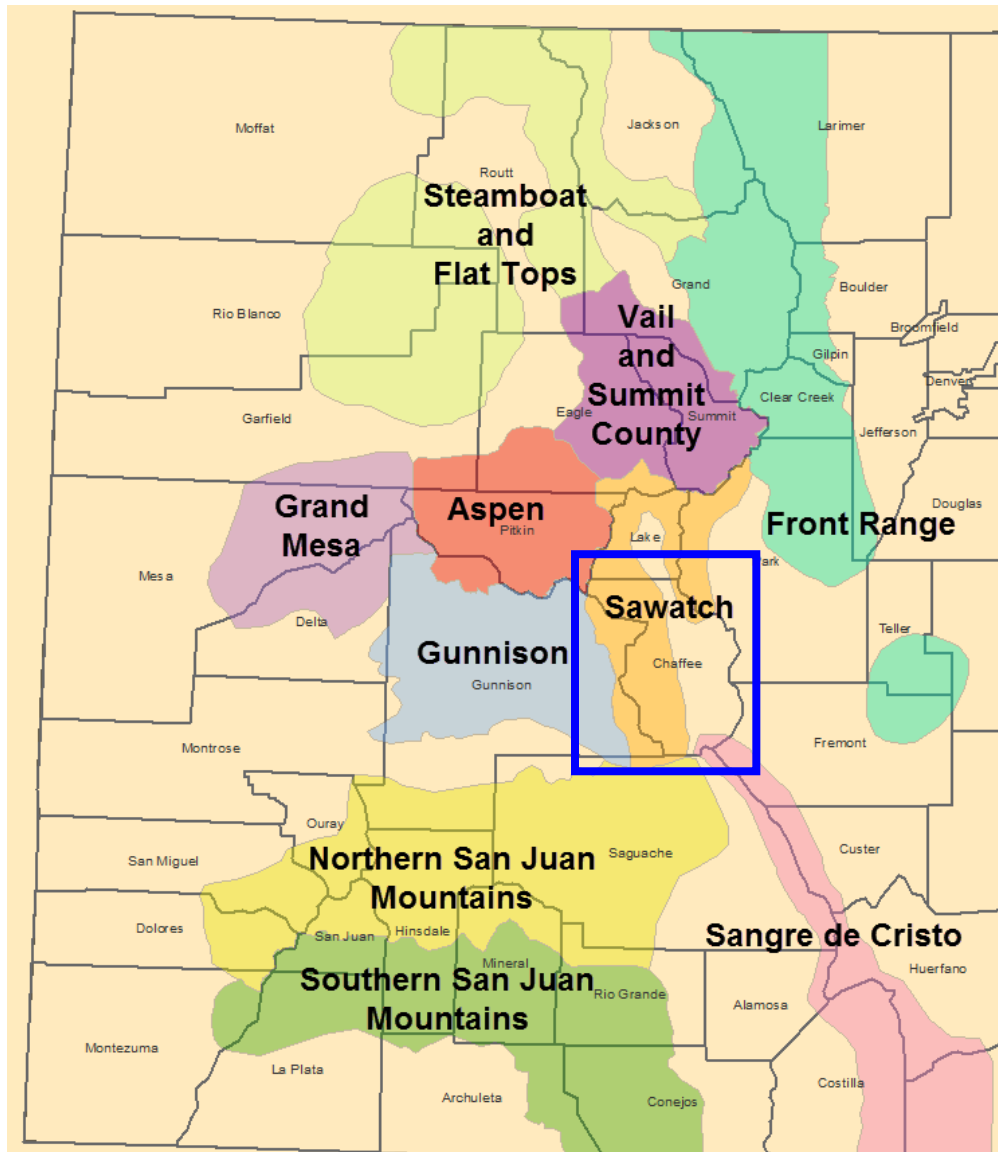
The severe avalanche cycle in March 2019 resulted in avalanches with significant woody debris reaching the valley bottom in areas near CR 306 in the Cottonwood Creek drainage below Cottonwood Pass (closed in winter).

A notable avalanche event occurred on February 13, 2021 and was reported by the Colorado State Patrol and CDOT. The avalanche occurred around mile marker 190 on Highway 50 over Monarch Pass and closed both directions of the highway at mile marker 205. The avalanche caught one vehicle, however there were no injuries reported.

### **Location**

The majority of the higher elevations in unincorporated Chaffee County has a slope greater than 20% and therefore is considered to have moderate to high risk of an avalanche. There were not available hazard maps in GIS during the time of the plan update in 2021. In lieu of that, Figure 4-3 shows the CAIC forecast zones in Colorado, which shows most of the county falls within the Sawatch forecast zone with a small portion at the southern end of the county within the Sangre de Cristo zone. The majority of the major towns in Chaffee County are located in the Upper Arkansas River Valley in flatter terrain and are therefore at a decreased risk to avalanches.

**Figure 4-3      Avalanche Forecast Zones in Colorado and Chaffee County**



### **Frequency and Severity (Extent)**

The probability of an avalanche occurring in the future is high for the county as avalanches occur every year. The risk to recreational users in the backcountry can be high because of high potential for avalanches.

A number of weather and terrain factors determine avalanche severity and danger:

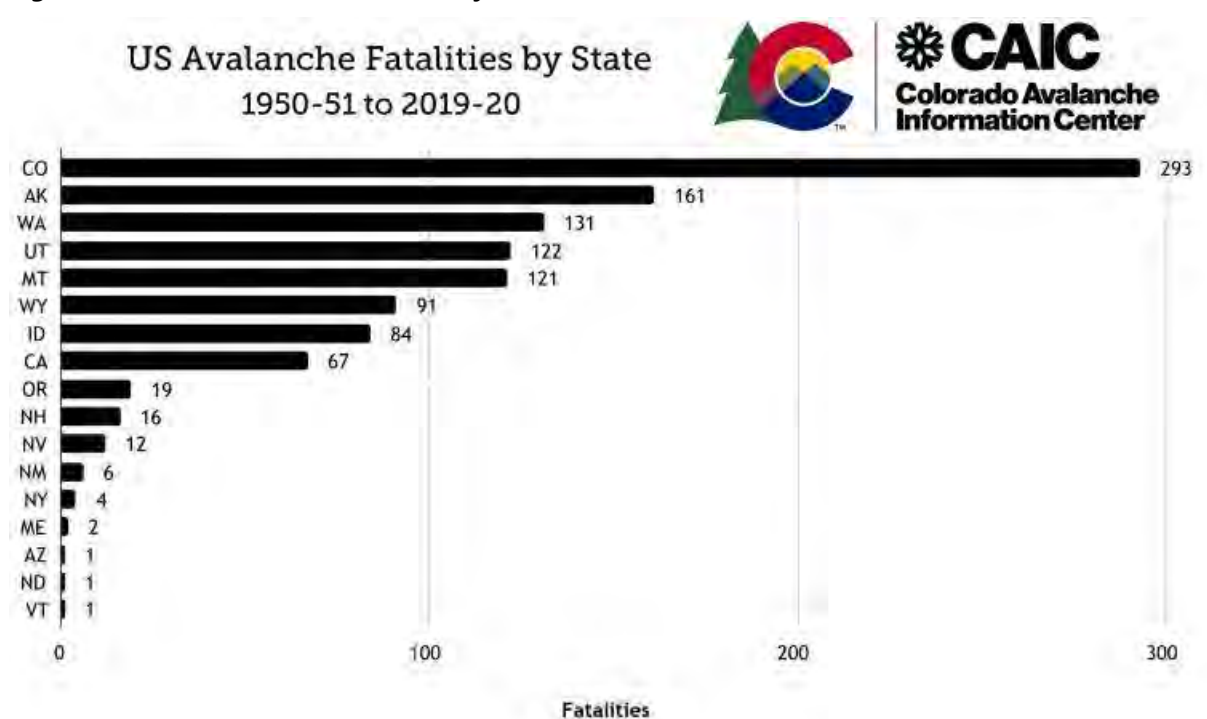
- Weather:
  - Storms—A large percentage of all snow avalanches occur during and shortly after storms.
  - Rate of snowfall—Snow falling at a rate of 1 inch or more per hour rapidly increases avalanche danger.

- Temperature—Storms starting with low temperatures and dry snow, followed by rising temperatures and wetter snow, are more likely to cause avalanches than storms that start warm and then cool with snowfall.
- Wet snow—Rainstorms or spring weather with warm, moist winds and cloudy nights can warm the snow cover, resulting in wet snow avalanches. Wet snow avalanches are more likely on sun-exposed terrain (south-facing slopes) and under exposed rocks or cliffs.
- Terrain:
  - Ground cover—Large rocks, trees, and heavy shrubs help anchor snow.
  - Slope profile—Dangerous slab avalanches are more likely to occur on convex slopes.
  - Slope aspect—Leeward slopes are dangerous because windblown snow adds depth and creates dense slabs. South-facing slopes are more dangerous in the springtime.
  - Slope steepness—Snow avalanches are most common on slopes of 30 to 45 degrees.

The common factors contributing to the avalanche hazard are old snow depth, old snow surface, new snow depth, new snow type, density, snowfall intensity, precipitation intensity, settlement, wind direction and speed, temperature, and subsurface snow crystal structure.

There has been an average of approximately 4 deaths a year in Colorado over the 70 years since 1950 where records are available. Most fatal incidents are investigated and reported; however, non-fatal incidents are likely to go unreported (CAIC no date). Colorado has recorded the greatest number of fatalities due to avalanches of all states in the United States, as shown in Figure 4-4. Sixteen of the recorded fatalities on Figure 4-4 occurred in Chaffee County). Five fatalities were recorded between 2003 and 2004, all from backcountry activities.

**Figure 4-4      Avalanche Fatalities by State, 1950/1951 to 2019/2020**









Source: Colorado Avalanche Information Center Website (<http://avalanche.state.co.us/accidents/statistics-and-reporting/>)



The severity of the avalanche hazard in the county is considered to be moderate to limited with isolated deaths and injuries; minimal property damage that does not threaten structural stability; and or interruption of essential facilities and services for less than 24 hours. Based on the information in this hazard profile, the magnitude/severity of an avalanche, its overall significance is considered to have a moderate potential impact for the county. The magnitude/severity of an avalanche for the jurisdictions is minimal.

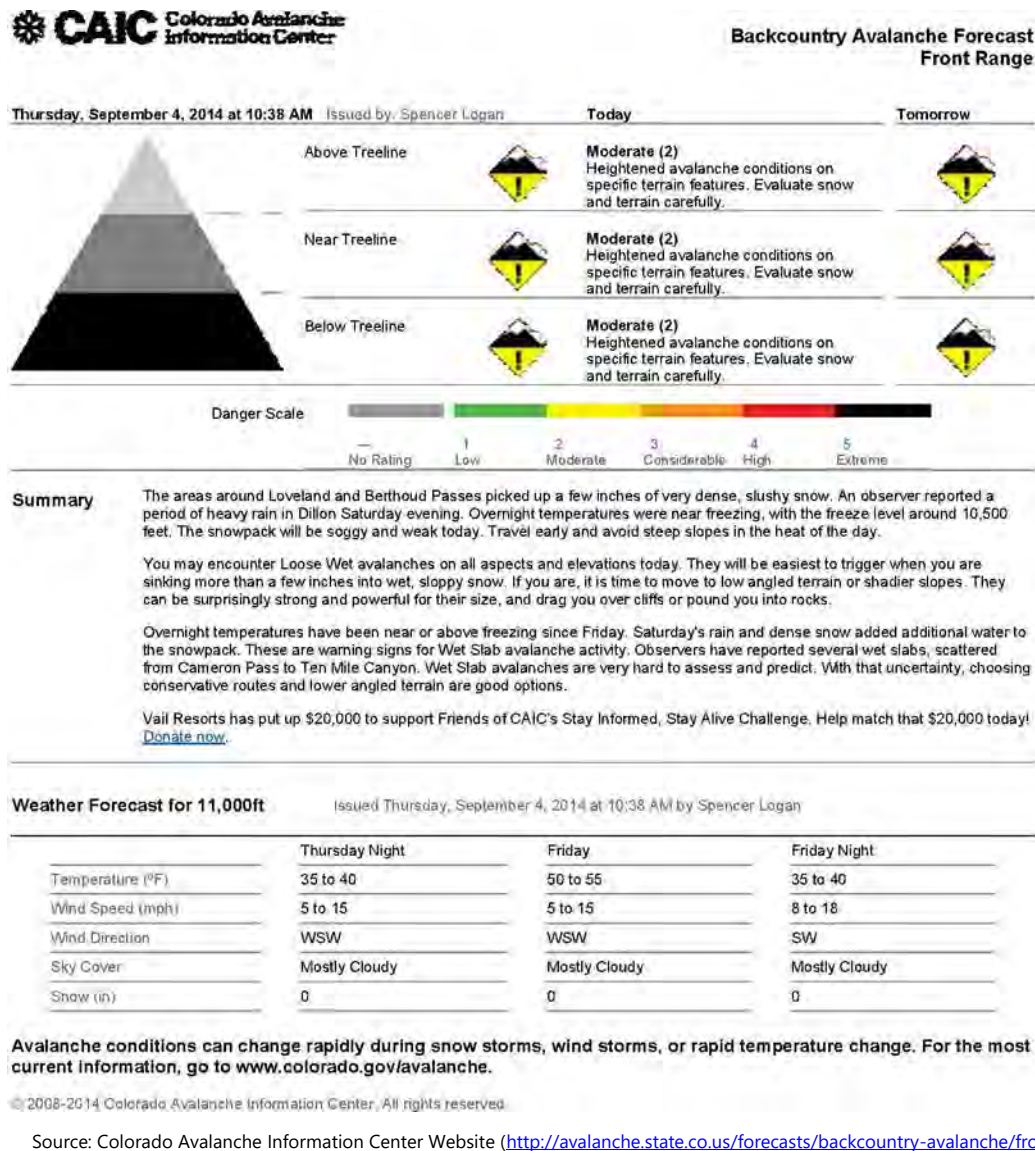
CAIC issues watches and warnings by zone to communicate avalanche danger levels to those recreating in backcountry areas. The North American Danger Scale, which ranges from low to extreme danger is shown in Figure 4-5 as an example of an extent scale. An example of this forecast for the Front Range area is shown in Figure 4-6.

**Figure 4-5      Avalanche Danger Scale**

<b>North American Public Avalanche Danger Scale</b> Avalanche danger is determined by the likelihood, size and distribution of avalanches.				
Danger Level		Travel Advice	Likelihood of Avalanches	Avalanche Size and Distribution
<b>5 Extreme</b>		Avoid all avalanche terrain.	Natural and human-triggered avalanches certain.	Large to very large avalanches in many areas.
<b>4 High</b>		Very dangerous avalanche conditions. Travel in avalanche terrain <u>not</u> recommended.	Natural avalanches likely; human-triggered avalanches very likely.	Large avalanches in many areas; or very large avalanches in specific areas.
<b>3 Considerable</b>		Dangerous avalanche conditions. Careful snowpack evaluation, cautious route-finding and conservative decision-making essential.	Natural avalanches possible; human-triggered avalanches likely.	Small avalanches in many areas; or large avalanches in specific areas; or very large avalanches in isolated areas.
<b>2 Moderate</b>		Heightened avalanche conditions on specific terrain features. Evaluate snow and terrain carefully; identify features of concern.	Natural avalanches unlikely; human-triggered avalanches possible.	Small avalanches in specific areas; or large avalanches in isolated areas.
<b>1 Low</b>		Generally safe avalanche conditions. Watch for unstable snow on isolated terrain features.	Natural and human-triggered avalanches unlikely.	Small avalanches in isolated areas or extreme terrain.
Safe backcountry travel requires training and experience. You control your own risk by choosing where, when and how you travel.				
<b>No Rating</b>		Insufficient information to establish avalanche danger rating. Check zone forecast for local information.		

Source: Colorado Avalanche Information Center Website (<http://avalanche.state.co.us/wp-content/uploads/2013/09/ads.jpg>)

Figure 4-6 Sample Front Range Avalanche Danger Forecast



## Warning Time

The time of an avalanche release depends on the condition of the snowpack, which can change rapidly during a day and particularly during rainfall. Although forecasts can provide information regarding when avalanches are more likely to occur, an avalanche can occur with little or no warning time.

### 4.3.2 Related Hazards

Avalanches are often caused by heavy snowfall and can also be triggered by a blizzard event with severe wind as well increased temperatures. Severe avalanches also can temporarily dam rivers or streams with woody debris and might pose a subsequent flood risk. Drought can also affect avalanche activity as a shallow snowpack can be weaker and more susceptible to slides.

#### **4.3.3 Climate Change Considerations**

The likelihood and nature of future avalanches may be affected by climate change. Winters are becoming shorter, which means there is potential for weaker snow accumulations at the very bottom of the snowpack. As more snow piles on top of the weak layer, and temperatures remain warm, the upper, moisture-laden layers become vulnerable to sliding. More extreme precipitation events that deposit large amounts of snow in a short period of time as well as increased temperatures could also periodically increase the potential for large avalanches. The extent of avalanche activity and debris in parts of the southwestern and central mountains during the 2019 winter in Colorado was unprecedented from CAIC's perspective. The CAIC is studying the age of trees felled by the avalanches in 2019 to gain a better understanding of the recurrence interval of the extreme event; some trees were more than 250 years old (Purtell 2019).

#### **4.3.4 Vulnerability**

Overall, public safety is the primary concern regarding avalanche hazards and vulnerability. Building impacts are negligible. Backcountry recreationalists and road crews are the most at risk to avalanche dangers. Rising numbers of outdoor enthusiasts may lead to an increase in fatal avalanche occurrences. Beyond backcountry skiing, there has been a growing interest in other forms of recreation, and an introduction of new toys that are bigger, heavier, and intensify avalanche susceptibility. There is no effective way to keep the public out of avalanche-prone recreational areas, even during times of highest risk, but education and hazard awareness can help to reduce impacts on life safety in combination with self-rescue tools such as locator beacons, shovels, and probes.

#### **Population**

Mountain communities are exposed to avalanche risk; however, the greatest exposure to the avalanche hazard is to persons participating in outdoor recreation in backcountry areas. Avalanches are also a danger to backcountry skiers, snowmobilers, and others involved in outdoor sports in these areas. The populations of Salida, Buena Vista, and Poncha Springs are unlikely to be affected by avalanches.

Backcountry avalanche incidents involve search and rescue teams and resources, which can put these personnel at risk. The key actions to limiting impacts to individuals recreating in hazardous areas include spreading knowledge and awareness of the hazard and being properly equipped for self-rescue, if necessary, with tools such as locator beacons, shovels, GPS units and other communication tools and probes.

#### **Property**

Avalanche exposure in the county is minimal. The City of Salida and Towns of Buena Vista and Poncha Springs are not in avalanche exposure areas, and any damage is likely to be insignificant or limited to snow sliding from building roofs.

#### **Critical Facilities and Infrastructure**

Avalanches can cause several types of secondary effects, such as blocking roads, which can isolate residents and businesses and delay commercial, public, and private transportation. Other potential problems resulting from avalanches are power and communication failures. It is unlikely that there are critical facilities exposed to avalanche hazards, although there may be some facilities in particular the possibility of disruption to the electrical grid network. Other potential problems resulting from avalanches are power and communication failures.

There is road infrastructure that could be blocked by avalanches, such as US Highway 50 over Monarch Pass. This highway may be temporarily closed due to avalanches. According to the CDOT Avalanche Control website "When there is a high risk of avalanche danger, CDOT will close highways at the location

of the avalanche path in order to conduct avalanche control. Once all the unstable snow has been brought down, CDOT crews have to clear all of the snow and debris from the roadway before reopening the highway to traffic. Since it is impossible to predict how much snow will be brought down during a control mission, CDOT cannot estimate how long a highway closure will be in place. CDOT will open the highway as soon as it is safe for the traveling public" (CDOT).

### **Economy**

Avalanche activity inside or outside the county (along connecting roadways) can disrupt transportation in and out of the local communities, which could result in temporary economic impacts. Closures of transportation routes into or out of the county could prevent the import and export of goods and services, as well as disrupt tourism. Closures of US 50 over Monarch Pass results in significant travel detours. This could result in economic losses for businesses.

### **Historic, Cultural, and Natural Resources**

Avalanches are a natural event, but they can negatively affect the environment. This includes trees located on steep slopes. A large avalanche can knock down many trees and kill the wildlife that live in them. In spring, this loss of vegetation on the mountains may weaken the soil, causing landslides and mudflows. If significant woody debris reaches the valley bottoms this could cause a potential for ponding and flooding. The impact on historic or cultural resources in the County is unknown.

#### **4.3.5 Development Trends**

Development and population growth in the County are increasing, but is largely concentrated to the towns and city, which are at decreased risk for avalanche as compared to the County as a whole. As tourism and backcountry recreation increase and more travelers visit the county there could be increased exposure to avalanche risks.

#### **4.3.6 Risk Summary**

- Since 1950 there have been 16 fatalities in the County.
- Backcountry recreationalists, road crews, and motorists along the main roadways are the most at risk to avalanche dangers. Human-caused avalanches are most common cause of events.
- US 50 over Monarch Pass is periodically closed due to avalanches, or for avalanche mitigation work and poses some risk to the travelling public and economic impacts due to detours during closures.
- The City of Salida and Towns of Buena Vista and Poncha Springs do not have avalanche exposure.
- Related hazards: Winter Storm, Severe Wind, Drought.



## 4.4 Dam Failure or Incident

DAM/LEVEE FAILURE HAZARD RANKING	
Chaffee County	Low
City of Salida	Medium
Town of Buena Vista	Medium
Town of Poncha Springs	Medium

### 4.4.1 Hazard Profile

A dam is a barrier constructed across a watercourse that stores, controls, or diverts water. Dams are constructed for a variety of uses, including flood protection, power, agriculture/irrigation, water supply, and recreation. The water impounded behind a dam is referred to as the reservoir and is usually measured in acre-feet, with one acre-foot being the volume of water that covers one acre of land to a depth of one foot. Depending on local topography, even a small dam may have a reservoir containing many acre-feet of water. Dams serve many purposes, including irrigation control, providing recreation areas, electrical power generation, maintaining water levels, and flood control.

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 safety incidents are defined as situations at dams that require an immediate response by dam safety engineers.

#### Low Head Dams

A low head dam is an engineered structure built into and across stream and river channels. Low head dams were historically built for a variety of purposes to support industrial, municipal, and agricultural water usage through the diversion of water from streams. Low head dams have also been built to provide recreational amenities for boating, rafting and tubing as well as improve aquatic habitats (Colorado DNR). Water flows over the dams creating a recirculating current that can trap unknowing river users. Due to the low height of this type of dam, low head dams can be difficult to see by river users that are not aware of them and because of the tranquil pool that gives the appearance there is no danger. There are 6 identified low head dams located on

## DEFINITIONS

**Dam**—A man-made barrier, together with appurtenant structures, constructed above the natural surface of the ground for the purpose of impounding water. Flood control and storm runoff detention dams are included (2-CCR 402-1, Rule 4, Section 4.2.5).

**Dam Incident** — Situations at dams that require an immediate response by dam safety engineers. These are episodes that without intervention will likely result in a dam failure. (ASDSO).

**Emergency Action Plan**—A document that identifies potential emergency conditions at a dam and specifies actions to be followed to minimize property damage and loss of life. The plan specifies actions the dam owner should take to alleviate problems at a dam. It contains procedures and information to assist the dam owner in issuing early warning and notification messages to responsible downstream emergency management authorities of the emergency situation. It also contains inundation maps to show emergency management authorities the critical areas for action in case of an emergency. (FEMA 64)

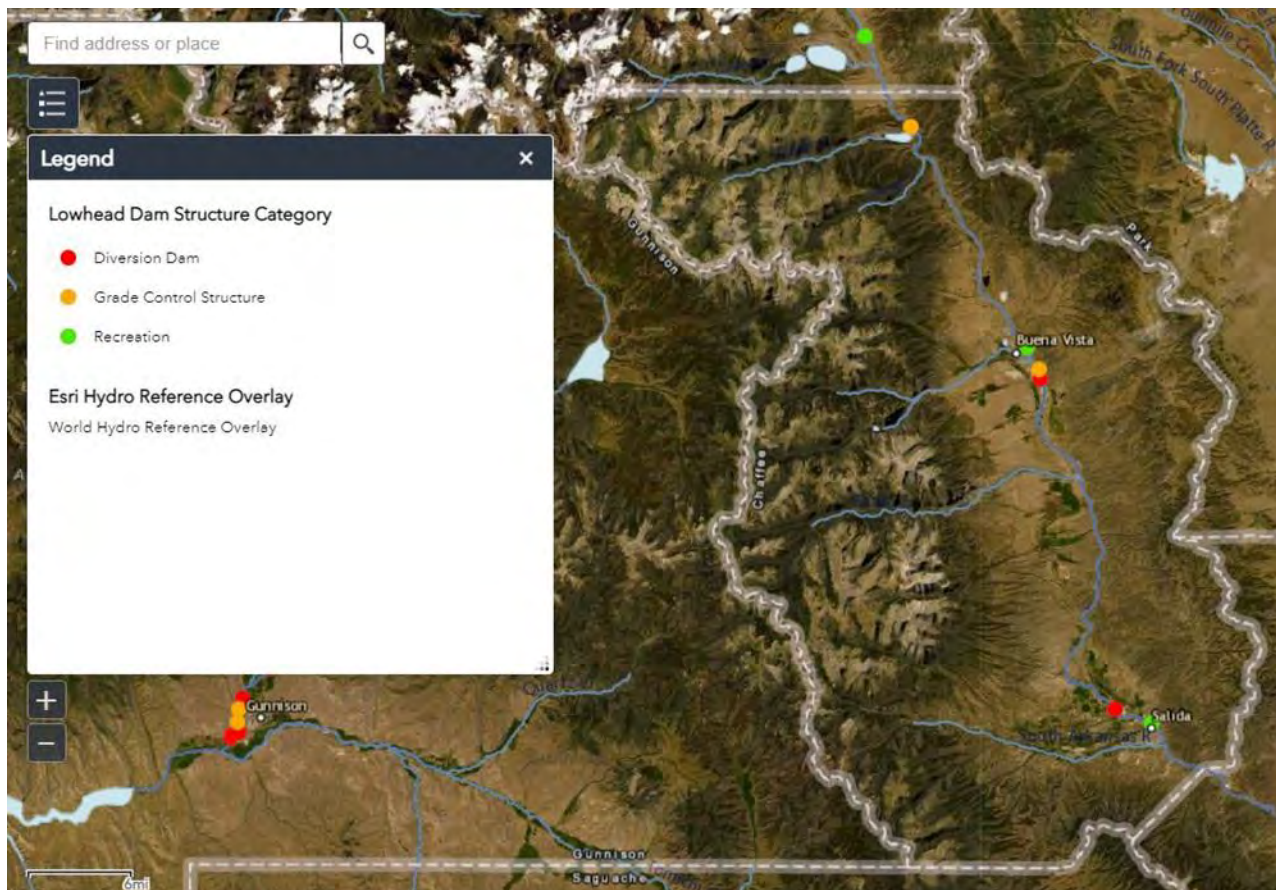
**High Hazard Dam**—Dams where failure or operational error will probably cause loss of human life. (FEMA 333)

**Significant Hazard Dam**—Dams where failure or operational error will result in no probable loss of human life but can cause economic loss, environmental damage, or disruption of lifeline facilities, or can impact other concerns. Significant hazard dams are often located in rural or agricultural areas but could be located in areas with population and significant infrastructure. (FEMA 333)

**Low Head Dam**— Engineered structures built into and across stream and river channels for a variety of purposes. Water flows over the dams continuously, as they span from one riverbank to the other. Low head dams generally range in height from 1-15 feet (CO DWR).

the Arkansas River in Chaffee County. These low head dams in the County are used as diversion, grade control structures and for recreation purposes. The location of each dam is shown in Figure 4-7.

**Figure 4-7 Low Head Dams in Chaffee County**



Source: Colorado Department of Natural Resources <https://dnr.colorado.gov/initiatives/colorado-low-head-dams>

### Non-Failure Inundation

The Colorado DNR has studied the potential for non-failure dam inundation statewide to show potential areas of flooding where outlet capacity exceeds the downstream channel capacity. Dams are ranked as high, moderate, or low likelihood for outlet releases to cause conditions that could require an emergency response to reduce potential downstream consequences. The ranking is based on a statewide database of high hazard dams that includes 441 high hazard dams that have been analyzed by the Colorado DNR for this aspect of dam incident flooding. The high, moderate, or low designations were assigned by DNR by dividing the total number of ranked dams across the state into thirds. Should there be a need to relieve pressure on the dam (e.g. if there was excess inflow from high rains or snowmelt) releases from the dams ranked as high or moderate may result in downstream flooding. The dams at the highest risk of non-failure inundation are shown in Table 4-9.

### Causes of Dam Failure

Dam failures in the United States typically occur in one of four ways:

- Overtopping of the primary dam structure, which accounts for 34% of all dam failures, can occur due to inadequate spillway design, settlement of the dam crest, blockage of spillways, and other factors.

- Foundation defects due to differential settlement, slides, slope instability, uplift pressures, and foundation seepage can also cause dam failure. These account for 30% of all dam failures.
- Failure due to piping and seepage accounts for 20% of all failures. These are caused by internal erosion due to piping and seepage, erosion along hydraulic structures such as spillways, erosion due to animal burrows, and cracks in the dam structure.
- Failure due to problems with conduits and valves, typically caused by the piping of embankment material into conduits through joints or cracks, constitutes 10% of all failures.

The remaining 6% of dam failures in the United States are due to miscellaneous causes. Many dam failures in the United States have been secondary results of other disasters. The prominent causes are earthquakes, landslides, extreme storms, massive snowmelt, equipment malfunction, structural damage, foundation failures, and sabotage.

Poor construction, lack of maintenance and repair, and deficient operational procedures are preventable or correctable by a program of regular inspections. Terrorism and vandalism are serious concerns that all operators of public facilities must plan for; these threats are under continuous review by public safety agencies.

In general, there are three types of dams: concrete arch or hydraulic fill, earth-rockfill, and concrete gravity. Each type of dam has different failure characteristics. A concrete arch or hydraulic fill dam can fail almost instantaneously: the flood wave builds up rapidly to a peak then gradually declines. An earth-rockfill dam fails gradually due to erosion of the breach: a flood wave will build gradually to a peak and then decline until the reservoir is empty. Lastly, a concrete gravity dam can fail instantaneously or gradually with a corresponding buildup and decline of the flood wave.

The Colorado Division of Water Resources Dam Safety Branch assigns hazard ratings to dams within the State. Two factors are considered when assigning hazard ratings: existing land use, and land use controls (zoning) downstream of the dam. Dams are classified in three categories that identify the potential hazard to life and property:

- High hazard indicates that a failure would most probably result in the loss of life
- Significant hazard indicates a failure could result in appreciable property damage
- Low hazard exists where failure would result in only minimal property damage and loss of life is very unlikely

It is important to keep in mind that the hazard classification of a dam is a measure of the consequences if the dam were to fail, not a measure of how likely the dam is to fail.

Privately owned high and significant hazard dams are required by Colorado regulations to have Emergency Action Plans (EAPs) in place. High hazard dams are also required to have inundation maps. Federally owned high hazard dams are also required to have EAPs by federal regulations. Based on the National Inventory of Dams (NID) database (current as of 2021), all high-hazard dams in Colorado have EAPs in place, which provide for the emergency response procedures in the event of a dam emergency.

## Past Events

Colorado has a history of dam failure, with more than 130 known dam failures since 1890. A number of small dams were breeched or had spillway flows in September 2013, but none were in Chaffee County.

According to the Association of State Dam Safety Officials, there have been no reported dam failures in Chaffee County. If failure were to occur on dams north of Chaffee County that lie along the Arkansas River or associated tributaries, there would be significant impacts for the people and property within the county.



## Location

According to the National Inventory of Dams (NID), updated in 2021, there are 8 dams of concern to Chaffee County which could cause impacts if they were to fail. Of these dams, 5 are considered high hazard, 2 of which are outside of the county (Twin Lakes and Sugar Loaf dams) and 3 are rated as significant hazard. There are also 5 dams classified as low hazard. The table below lists the dams with the downstream city impact, the maximum storage capacity, and the date of the latest revised Emergency Action Plan.

**Table 4-8 High and Significant Hazard Dams in Chaffee County**

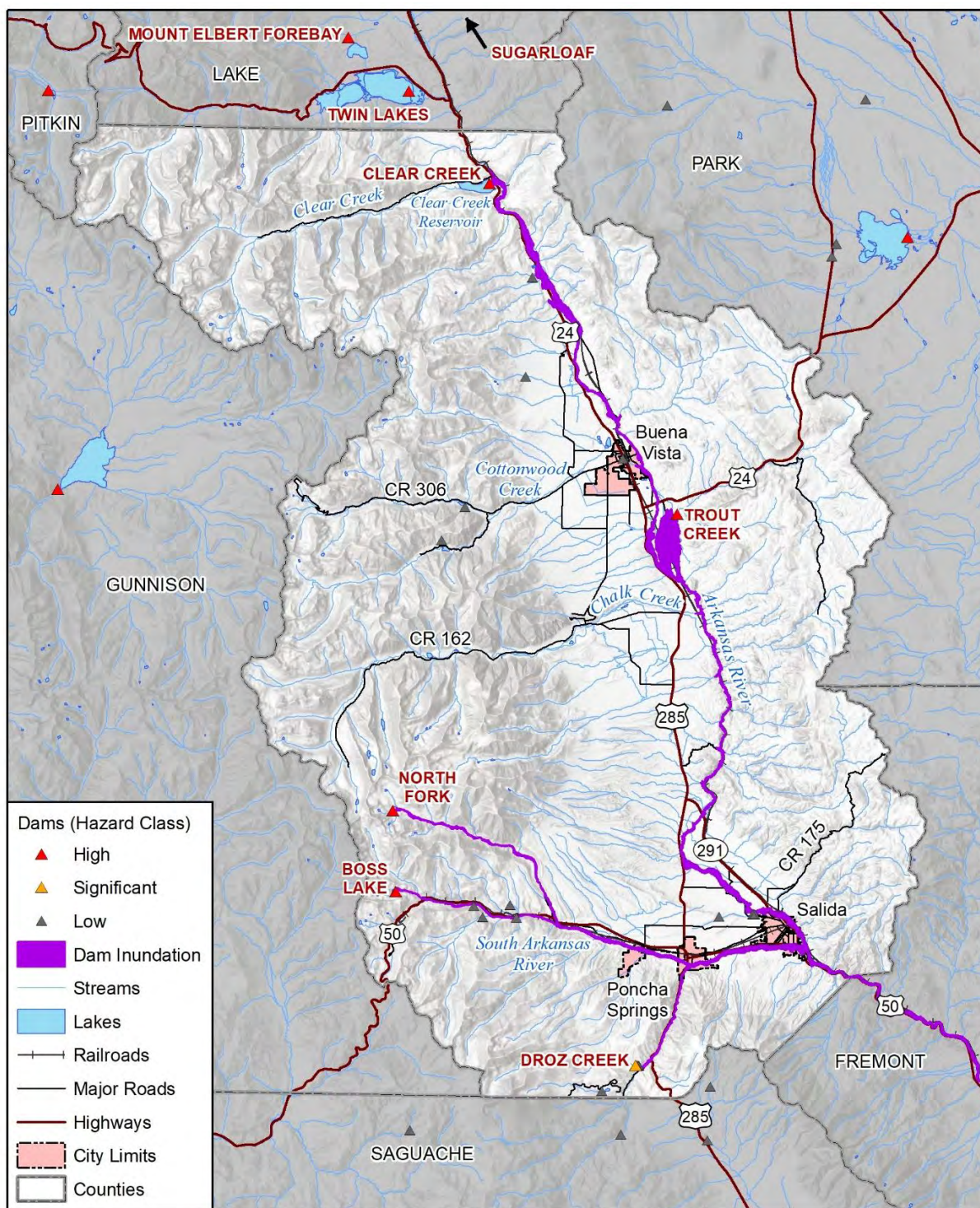
Name	River	Downstream City	Town Distance (Miles)	Max Storage (Acre-Feet)	Hazard Class	Date of Emergency Action Plan
Boss Lake	Middle Fork, South Arkansas	Garfield	2	566	High	01/10/18
Clear Creek	Clear Creek	Buena Vista	15	13,560	High	06/13/17
Trout Creek	Trout Creek	Nathrop	6	727	High	02/18/14
Droz Creek	Droz Creek	Poncha Springs	6	185	Significant	02/16/18
North Fork	North Fork, South Arkansas	Poncha Springs	10.5	810	Significant	01/10/18
Husko	Lost Creek	Maysville	2	48	Significant	No EAP

Source: National Inventory of Dams (NID)

There are an uncounted number of 'non-jurisdictional' dams on public and private lands in the county. These are small dams that normally do not store water but may impound water during heavy precipitation events. Because they are not monitored or maintained, there is potential for them to overtop or fail and cause flooding and property damage during a significant rainfall event. The extent and risk associated with these dams is not known.

Figure 4-8 show locations of the high-potential-loss dams in the county and the locations of critical facilities and infrastructure within the dam inundation areas. The areas of the county most likely to be impacted by a dam failure are along the Arkansas River. Three high and two significant hazard dams could impact Buena Vista, Poncha Springs, and Salida. Figure 4-9 through Figure 4-11 show the inundation areas for each participating jurisdiction.

**Figure 4-8 Dams Within and Upstream of Chaffee County and Dam Inundation Areas**



Map compiled 1/2021;  
intended for planning purposes only.  
Data Source: Chaffee County, CDOT,  
DWR Dam Safety

0 5 10 Miles





**Figure 4-9 Dam Inundation Area Impacting Buena Vista**

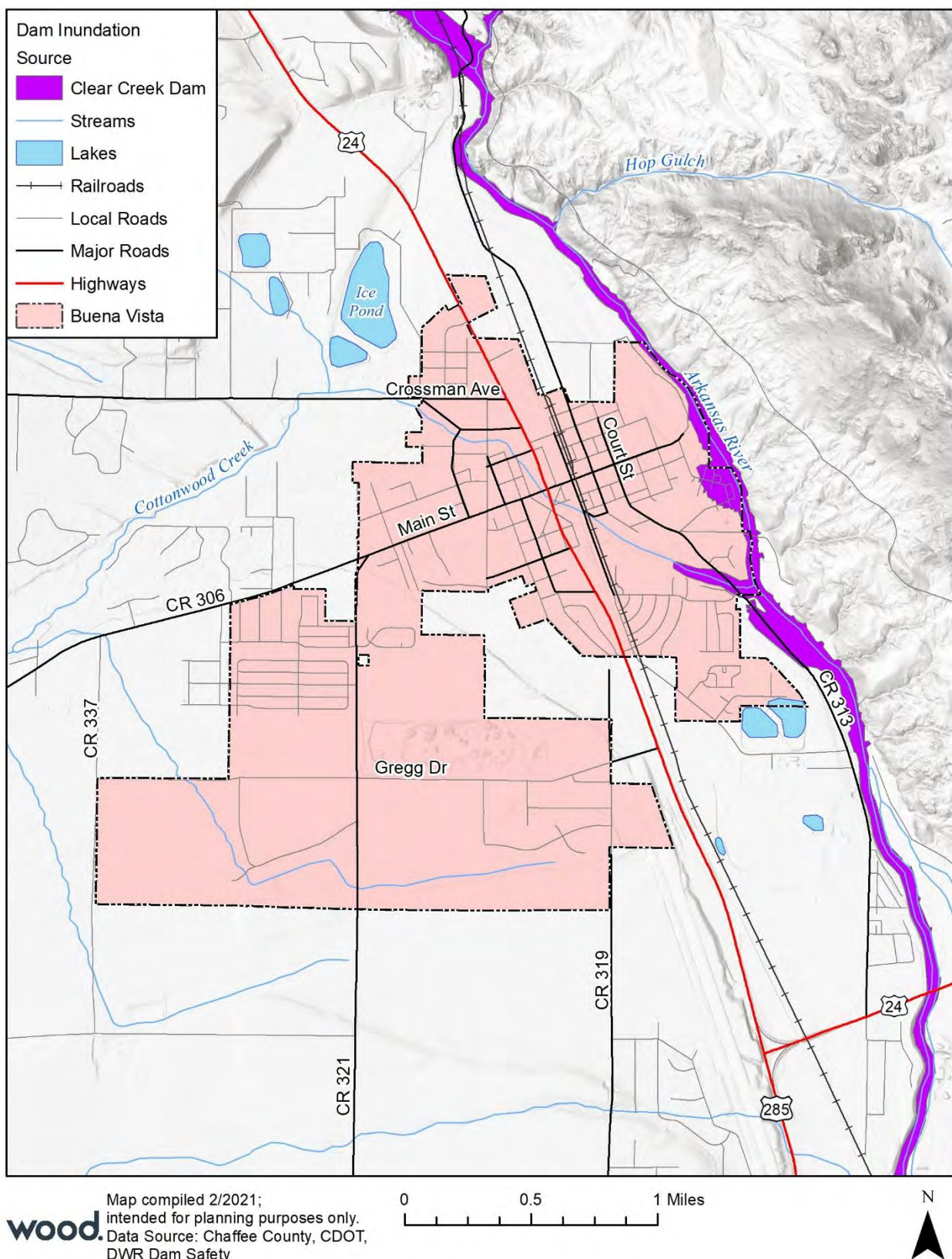
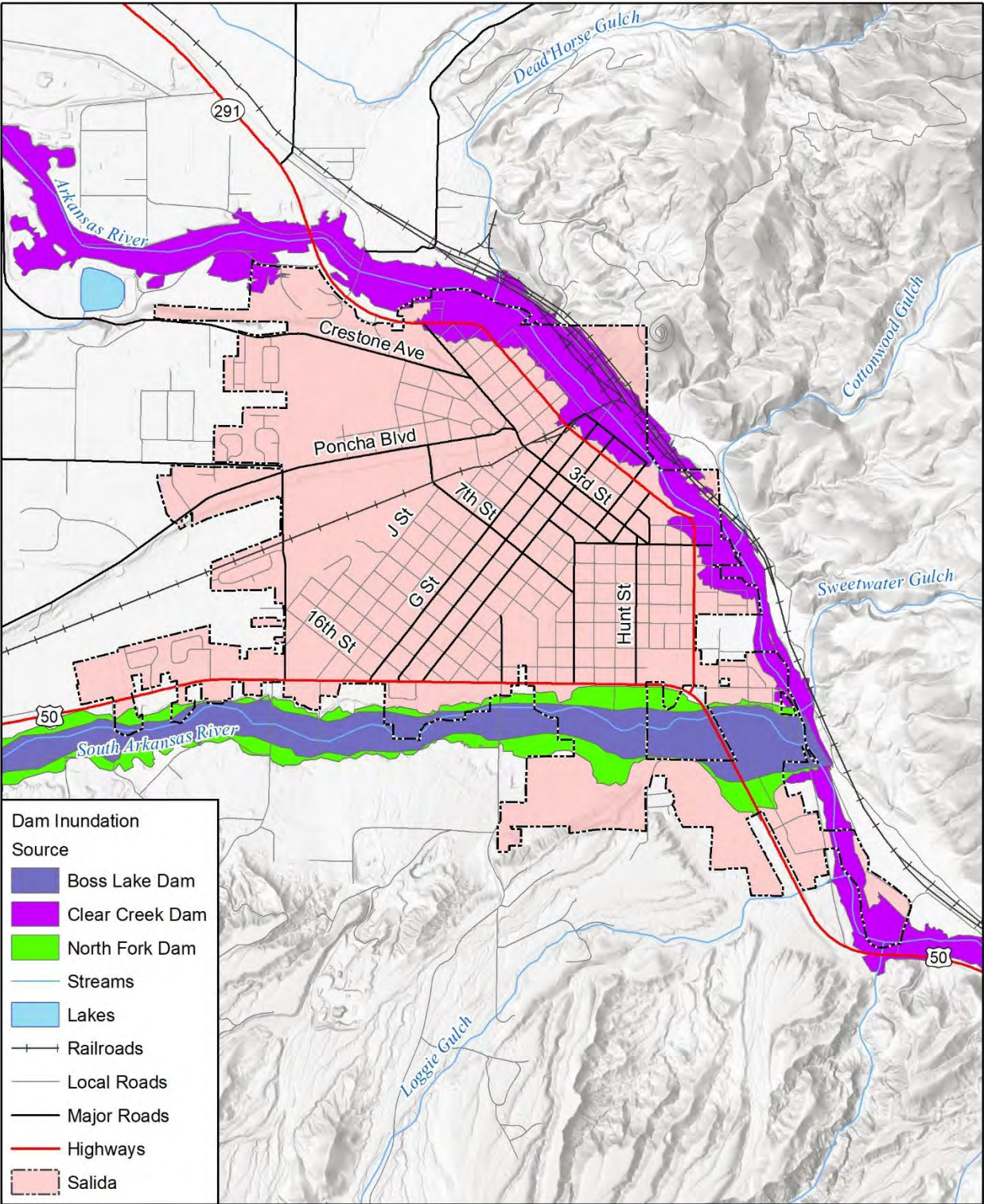








Figure 4-11 Dam Inundation Areas Impacts Salida



wood. Map compiled 2/2021;  
intended for planning purposes only.  
Data Source: Chaffee County, CDOT,  
DWR Dam Safety

0 0.5 1 Miles



### Non-Failure Dam Incidents:

The dams at the highest risk of non-failure inundation are shown in Table 4-9. The high, moderate, or low designations were assigned by DNR by dividing the total number of ranked dams across the state into thirds. Should there be a need to relieve pressure on the dam (e.g. if there was excess inflow from high rains or snowmelt) releases from the dams ranked as high or moderate may result in downstream flooding.

**Table 4-9 Dams with Risk of Non-Failure Inundation**

Dam ID	Dam Name	Outlet Description	Max Outlet Release Capacity (cfs)	Ranking	Outlet Release Hazard Rating
11012	Clear Creek	Upstream end of conduit is HORSESHOE (max height ~3'), Transitions to RCP, which transitions to steel pipe.	645	18	HIGH
110233	Trout Creek	2-24" PVC PIPE	304	24	HIGH
110105	Boss Lake	20" CIP	39	207	MODERATE
110115	North Fork	18" dia. Steel pipe	54	367	LOW

Source: State of Colorado Department of Natural Resources, Dam Safety

### Frequency and Severity (Extent)

There have been no recorded occurrences of dam failures in or near Chaffee County in the past 80 years. Therefore, the probability of a failure in the future is minimal for the county. Steering Committee members for Buena Vista, Poncha Springs, and Salida feel that the likelihood of the occurrence over the next 100 years is moderate since there are high and significant hazard dams in the county.

The USACE developed the classification system shown in the table below for the hazard potential of dam failures. The USACE hazard rating system is based only on the potential consequences of a dam failure and does not take into account the probability of such failures. The County, Salida, Buena Vista and Poncha Springs all have potential inundation from high hazard dams that could lead to loss of life and extensive property losses.

**Table 4-10 U.S. Army Corps of Engineers Hazard Potential Classification**

Hazard Category <sup>a</sup>	Direct Loss of Life <sup>b</sup>	Lifeline Losses <sup>c</sup>	Property Losses <sup>d</sup>	Environmental Losses <sup>e</sup>
Low	None (rural location, no permanent structures for human habitation)	No disruption of services (cosmetic or rapidly repairable damage)	Private agricultural lands, equipment, and isolated buildings	Minimal incremental damage
Significant	Rural location, only transient or day-use facilities	Disruption of essential facilities and access	Major public and private facilities	Major mitigation required
High	Certain (one or more) extensive residential, commercial, or industrial development	Disruption of essential facilities and access	Extensive public and private facilities	Extensive mitigation cost or impossible to mitigate

Hazard Category <sup>a</sup>	Direct Loss of Life <sup>b</sup>	Lifeline Losses <sup>c</sup>	Property Losses <sup>d</sup>	Environmental Losses <sup>e</sup>
<sup>a</sup> . Categories are assigned to overall projects, not individual structures at a project. <sup>b</sup> Loss of life potential based on inundation mapping of area downstream of the project. Analyses of loss of life potential should take into account the population at risk, time of flood wave travel, and warning time. <sup>c</sup> Indirect threats to life caused by the interruption of lifeline services due to project failure or operational disruption; for example, loss of critical medical facilities or access to them. <sup>d</sup> Damage to project facilities and downstream property and indirect impact due to loss of project services, such as impact due to loss of a dam and navigation pool, or impact due to loss of water or power supply. <sup>e</sup> Environmental impact downstream caused by the incremental flood wave produced by the project failure, beyond what would normally be expected for the magnitude flood event under which the failure occurs. Source: U.S. Army Corps of Engineers 1995				

## Warning Time

Warning time for dam failure varies depending on the cause of the failure. In events of extreme precipitation or massive snowmelt, evacuations can be planned with sufficient time. In the event of a structural failure due to earthquake, there may be no warning time. A dam's structural type also affects warning time. Earthen dams do not tend to fail completely or instantaneously. Once a breach is initiated, discharging water erodes the breach until either the reservoir water is depleted, or the breach resists further erosion. Concrete gravity dams also tend to have a partial breach as one or more monolith sections are forced apart by escaping water. The time of breach formation ranges from a few minutes to a few hours (USACE 1997).

### 4.4.2 Related Hazards

Dam failure can cause severe downstream flooding, depending on the magnitude of the failure. Other potential secondary hazards of dam failure are landslides around the reservoir perimeter, bank erosion on the rivers, and destruction of downstream habitat. Large earthquakes have the potential to affect dams, but the probability is low.

### 4.4.3 Climate Change Considerations

With a potential for increase in extreme precipitation events due to climate change, dam failure and dam incidents could become a larger issue if increased rainfall events result in large floods that stress dam infrastructure.

### 4.4.4 Vulnerability

Structures, above-ground infrastructure, critical facilities, and natural environments are potentially vulnerable to dam failure or incidents. With no known failures in the past, failure impacts would likely be limited in Chaffee County. Roads closed due to dam failure floods could result in serious transportation disruptions due to the limited number of roads in the county.

Information for the exposure analysis provided in the sections below is based off dam inundation area provided by the county. These areas are indicated in Figure 4-8 .

The most significant issue associated with dam failure involves the properties and populations in the inundation areas. Flooding as a result of a dam failure would significantly impact these areas. There is often limited warning time for dam failure. These events are frequently associated with other natural hazard events such as earthquakes, landslides or severe weather, which limits their predictability and compounds the hazard.



## Population

The population impacted by dam failure was estimated using the structure count of buildings within the dam inundation area and applying the Colorado State Demography Office values of 2.23 persons per household for Chaffee County, 2.19 for Buena Vista, 2.30 for Poncha Springs and 2.01 for Salida. These estimates are shown in Table 4-11. A portion of the City of Salida and Town of Poncha Springs are within dam inundation areas of Boss Lake, Clear Creek and North Fork Dams.

Vulnerable populations are all populations downstream from dam failures that are incapable of escaping the area within the allowable timeframe. This population includes the elderly and young who may be unable to get themselves out of the inundation area. The vulnerable population also includes those who would not have adequate warning from a television or radio emergency warning system.

Low head dams pose a risk to even the most experienced recreational users of rivers due to the difficulty to detect the dams when approaching from upstream and risk of becoming trapped in the low head dam's recirculating currents. According to the Colorado Department of Natural Resources, Dam Safety Division, in recent years Colorado has experienced 1 fatality annually and there have been a total of 13 fatal incidents recorded since 1986 (Zimmer 2019). The Dam Safety Division, Low Head Dam Inventory Final Report (October 2019), notes an increase of low head dam incidents in the state directly correlated to increased recreational water usage by out-of-state tourists, new residents, and long-term residents (Zimmer 2019). As the population and number of visitors increases in Colorado and in Chaffee County there is the potential for increased fatalities from low head dams.

## Property

Vulnerable properties are those within the dam inundation area. These properties would experience the largest, most destructive surge of water. Low-lying areas are also vulnerable since they are where the dam waters would collect. Transportation routes are vulnerable to dam inundation and have the potential to be wiped out, creating isolation issues. This includes all roads, railroads, and bridges in the path of the dam inundation. Those that are most vulnerable are those that are already in poor condition and would not be able to withstand a large water surge. Utilities such as overhead power lines, cable and phone lines could also be vulnerable. Loss of these utilities could create additional isolation issues for the inundation areas.

In general, communities located below a high or significant hazard dam and along a waterway are potentially exposed to the impacts of a dam failure. For reference, high hazard dams threaten lives and property, significant hazard dams threaten property only. Inundation maps that identify anticipated flooded areas (which may not coincide with known floodplains) are produced for many high hazard dams. Six of the high or significant hazard dams contained dam inundation extents in spatial form that were analyzed to quantify risk across the planning area. Table 4-11 displays the number of structures in dam inundation areas within the county and their values. Total building value and exposure numbers were based off of 2019 county assessor data.

**Table 4-11 Chaffee County Exposure and Value Of Structures Within Dam Inundation Areas, By Jurisdiction and Property Types**

Jurisdiction	Property Type	Improved Parcels	Building Count	Improved Value	Content Value	Total Value	Population
Buena Vista	Commercial	11	16	\$10,458,163	\$10,458,163	\$20,916,326	
	Residential	32	32	\$13,840,605	\$6,920,303	\$20,760,908	70
	<b>Total</b>	<b>43</b>	<b>48</b>	<b>\$24,298,768</b>	<b>\$17,378,466</b>	<b>\$41,677,234</b>	<b>70</b>
Poncha Springs	Agricultural	1	1	\$388,568	\$388,568	\$777,136	
	Residential	21	22	\$7,444,989	\$3,722,495	\$11,167,484	51



Jurisdiction	Property Type	Improved Parcels	Building Count	Improved Value	Content Value	Total Value	Population
	Vacant Land	1	1	\$46,078	\$46,078	\$92,156	
	<b>Total</b>	<b>23</b>	<b>24</b>	<b>\$7,879,635</b>	<b>\$4,157,141</b>	<b>\$12,036,776</b>	<b>51</b>
Salida	Commercial	72	72	\$20,328,197	\$20,328,197	\$40,656,394	
	Exempt	6	6	\$20,484,852	\$20,484,852	\$40,969,704	
	Residential	217	219	\$66,108,543	\$33,054,272	\$99,162,815	441
	Vacant Land	3	3	\$167,807	\$167,807	\$335,614	
	<b>Total</b>	<b>298</b>	<b>300</b>	<b>\$107,089,399</b>	<b>\$74,035,128</b>	<b>\$181,124,527</b>	<b>441</b>
Unincorporated	Agricultural	20	22	\$5,761,519	\$5,761,519	\$11,523,038	
	Commercial	7	9	\$2,888,604	\$2,888,604	\$5,777,208	
	Exempt	5	5	\$1,326,608	\$1,326,608	\$2,653,216	
	Industrial	2	2	\$280,038	\$420,057	\$700,095	
	Residential	144	148	\$45,711,580	\$22,855,790	\$68,567,370	330
	Vacant Land	3	3	\$15,594	\$15,594	\$31,188	
	<b>Total</b>	<b>181</b>	<b>189</b>	<b>\$55,983,943</b>	<b>\$33,268,172</b>	<b>\$89,252,115</b>	<b>330</b>
<b>Grand Total</b>		<b>545</b>	<b>561</b>	<b>\$195,251,745</b>	<b>\$128,838,906</b>	<b>\$324,090,651</b>	<b>891</b>

Source: Wood Analysis, Chaffee County Assessor

## Critical Facilities and Infrastructure

A total dam failure can cause catastrophic impacts to areas downstream of the water body, including critical infrastructure. Any critical asset located under the dam in an inundation area would be susceptible to the impacts of a dam failure. Roads closed due to floods caused by dam failure or incident could result in serious transportation disruptions due to the limited number of roads in the county. Based on the critical facility inventory considered in the updating of this plan, 19 critical facilities were found to intersect with the dam inundation extents obtained in GIS form from the Colorado Dam Safety Program. Only Salida (7) and unincorporated areas of Chaffee County (12) have critical facilities located at risk to dam inundation. Facilities for communications, safety and security and food, water, shelter lifelines were most commonly found to be at risk at inundation. The following table shows the results of the GIS analysis.

**Table 4-12 Chaffee County Critical Facilities Exposure within Dam Inundation Areas**

Jurisdiction	FEMA Lifeline	Facility Type	Count
Salida	Communications	Land Mobile Private Transmission Tower	3
		Microwave Transmission Tower	2
	Food, Water, Shelter	Wastewater Treatment Plant	1
	Safety and Security	Government Support	1
	<b>Total</b>		<b>7</b>
Unincorporated	Communications	Land Mobile Private Transmission Tower	9
	Food, Water, Shelter	Community Support	1
	Hazardous Materials	Tier II	1
	Power	Power Plant	1
	Safety and Security	Government Support	1
<b>Total</b>			<b>13</b>
<b>Grand Total</b>			<b>20</b>

Source: Wood Analysis, Chaffee County Assessor FEMA Lifelines

## **Economy**

Extensive and long-lasting economic impacts could result from a major dam failure or inundation event, including the long-term loss of water in a reservoir, which may be critical for potable water needs. A major dam failure and loss of water from a key structure could bring about direct business and industry damages and potential indirect disruption of the local economy. A dam failure can have long lasting economic impacts and could deter visitors for a period of time.

## **Historic, Cultural and Natural Resources**

The environment would be vulnerable to a number of risks in the event of dam failure. The inundation could introduce many foreign elements into local waterways, potentially causing the destruction of downstream habitats.

Another area of concern for Chaffee County is beaver dam safety. This is a particular issue in Poncha Springs, along Poncha Creek. One particular dam is of concern, located approximately 0.25 miles up County Road 115, also known as Hot Springs Road, from Highway 285. Beaver dams could result in environmental and property damage if not addressed. Since 2016 the beaver dam has been taken down, but the risk continues as the beaver dam is periodically rebuilt.

### **4.4.5 Development Trends**

The vulnerability to dam failure could increase if development occurs in inundation areas downstream of dams. Often these inundation areas are not shown on plat or planning maps or NFIP maps and thus are not regulated. This type of development can change the designation of a dam from low to high hazard.

### **4.4.6 Risk Summary**

- While a low probability, the presence of 5 high hazard and 3 significant hazard dams that could affect the county present the possibility of dam failure or incident. 4 dams with the potential for non-dam failure flooding below them. As well as 6 low head dams in the County which may pose a risk to recreational river users.
- Approximately 891 people are potentially at risk of dam failure or incident events based on the dam inundation analysis.
- Approximately 561 buildings are potentially at risk of dam failure incident events, with over \$324 Million in total values at risk.
- The City of Salida has the most people (441) and buildings (300) at risk of dam failure or incident events followed by unincorporated Chaffee County.
- A total of 19 critical facilities are at risk of dam failure or incident events. Communication facilities are the most noted in the dam inundation analysis. Unincorporated Chaffee County has the greatest number of critical facilities at risk of dam failure or incident events.
- A dam failure and loss of water from a critical reservoir or structure could include direct and indirect business and industry damages or disruption of the local economy and key county resources (e.g. potable water).
- Related hazards: Flooding, Earthquake, Landslide

## 4.5 Drought and Extreme Heat

DROUGHT AND EXTREME HEAT HAZARD RANKING		
	Drought	Extreme Heat
Chaffee County	High	Low
City of Salida	Low	Low
Town of Buena Vista	Medium	Low
Town of Poncha Springs	Medium	Medium

### 4.5.1 Hazard Profile

#### **Drought**

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 forest fires, 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. Drought is a complex issue involving many factors—it occurs when a normal amount of moisture is not available to satisfy an area’s usual water-consuming activities. Due to Colorado’s semiarid conditions, drought is a natural but unpredictable occurrence in the state. However, because of natural variations in climate and precipitation sources, it is rare for all of Colorado to be deficient in moisture at the same time. Single season droughts over some portion of the state are quite common.

Drought impacts are wide-reaching and may be economic, environmental, and/or societal. The most significant impacts associated with drought in Colorado are those related to water intensive activities such as agriculture, wildland fire protection, municipal usage, commerce, tourism, recreation, and wildlife preservation. An ongoing drought may leave an area more prone to beetle kill and associated wildland fires. Drought conditions can also cause soil to compact, increasing an area’s susceptibility to flooding, and reduce vegetation cover, which exposes soil to wind and erosion. A reduction of electric power generation and water quality deterioration are also potential problems. Drought impacts increase with the length of a drought, as carry-over supplies in reservoirs are depleted and water levels in groundwater basins decline.

The onset of drought in Colorado is usually signaled by a lack of significant winter snowfall. Hot and dry conditions that persist into spring, summer, and fall can aggravate drought conditions, making the effects of drought more pronounced as

#### **DEFINITIONS**

**Drought**—The cumulative impacts of several dry years on water users. It can include deficiencies in surface and subsurface water supplies and generally impacts health, well-being, and quality of life.

**Meteorological Drought**— An expression of precipitation’s departure from normal over some period of time. Meteorological measurements are the first indicators of drought. Definitions are usually region-specific and based on an understanding of regional climatology. A definition of drought developed in one part of the world may not apply to another, given the wide range of meteorological definitions.

**Agricultural Drought** — Occurs when there is not enough soil moisture to meet the needs of a particular crop at a particular time. Agricultural drought happens after meteorological drought but before hydrological drought. Agriculture is usually the first economic sector to be affected by drought.

**Hydrological Drought** — Deficiencies in surface and subsurface water supplies. It is measured as stream flow and as lake, reservoir, and groundwater levels. There is a time lag between lack of rain and less water in streams, rivers, lakes, and reservoirs, so hydrological measurements are not the earliest indicators of drought. After precipitation has been reduced or deficient over an extended period of time, this shortage is reflected in declining surface and subsurface water levels. Water supply is controlled not only by precipitation, but also by other factors, including evaporation (which is increased by higher than normal heat and winds), transpiration (the use of water by plants), and human use.

**Socioeconomic Drought**— a physical water shortage starts to affect people, individually and collectively. Most socioeconomic definitions of drought associate it with the supply and demand of an economic good.

**Extreme Heat**— Period of high heat and humidity with temperatures above 90 degrees for at least two to three days. In extreme heat your body works extra hard to maintain a normal temperature, which can lead to death.

water demands increase during the growing season and summer months.

Droughts originate from a deficiency of precipitation resulting from an unusual weather pattern. If the weather pattern lasts a short time (a few weeks or a couple months), the drought is considered short-term. If the weather pattern becomes entrenched and the precipitation deficits last for several months or years, the drought is considered to be long-term. It is possible for a region to experience a long-term circulation pattern that produces drought, and to have short-term changes in this long-term pattern that result in short-term wet spells. Likewise, it is possible for a long-term wet circulation pattern to be interrupted by short-term weather spells that result in short-term drought.

Precipitation in the form of snow is the main source of Colorado's water supply. Annual precipitation in the populated areas of the planning area is approximately 11 to 15 inches per year. According to the 2018 Colorado State Drought Mitigation and Response Plan, "there are no major rivers that flow into Colorado (McKee et al. 1999). There are several major river basins originating in the Colorado Rockies, which flow out of the state, providing water to much of the southwestern United States, and contributing to the Missouri and Mississippi Rivers as well. Thus, Colorado earns its title as "the Mother of Rivers" (CWCB 2013). This supply is stored in five forms throughout the state: snowpack, streamflow, reservoir water, soil moisture, and groundwater (McKee and others 2000).

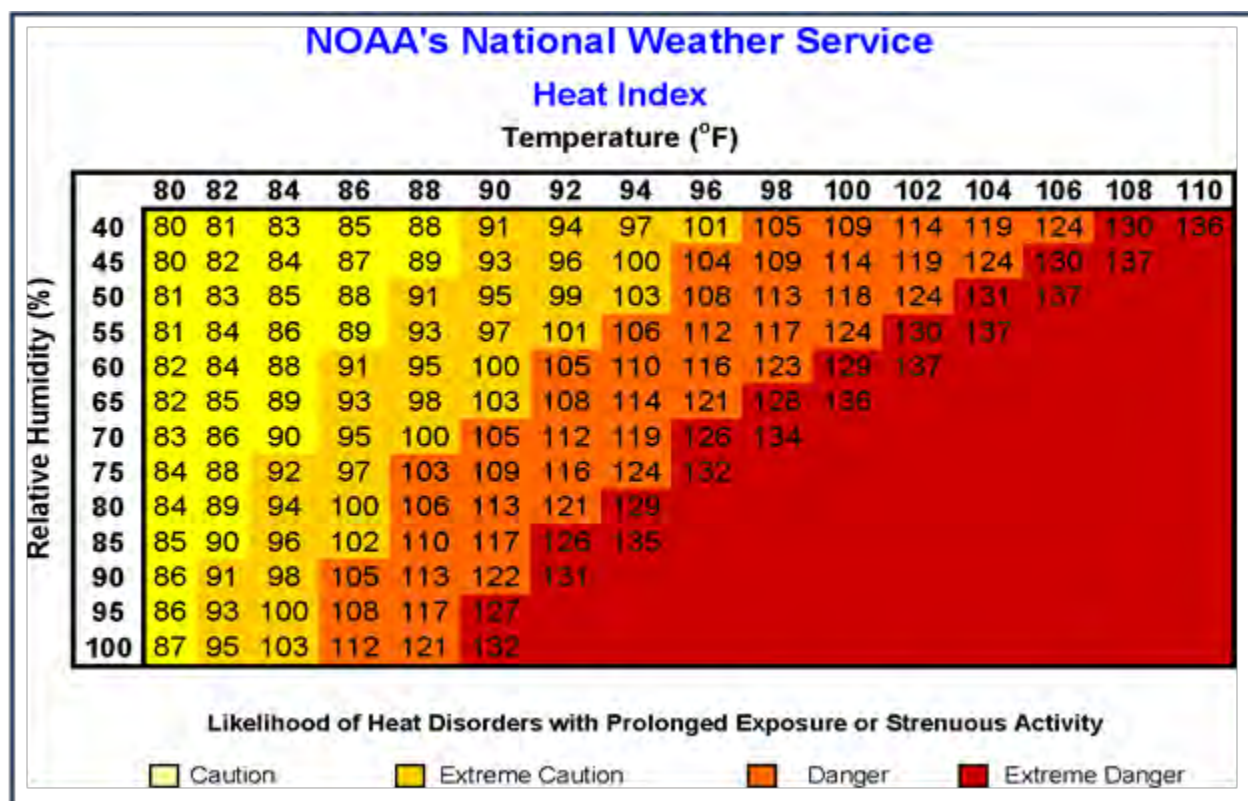
### ***Extreme Heat***

Excessive heat events are defined by the U.S. Environmental Protection Agency (EPA) as "summertime weather that is substantially hotter or more humid than average for a location at that time of year" (EPA 2006). Criteria that define an excessive heat event may differ among jurisdictions and in the same jurisdiction depending on the time of year. Excessive heat events are often a result of more than just ambient air temperature. Heat index tables (see Figure 4-12) are commonly used to provide information about how hot it feels, which is based on the interactions between several meteorological conditions. Since heat index values were devised for shady, light wind conditions, exposure to full sunshine can increase heat index values by up to 15 degrees Fahrenheit (°F). Also, strong winds, particularly with very hot, dry air, can be extremely hazardous. In the future this plan may consider effects of extreme heat on increased energy usage, overloading distribution/transmission system. While it may not be a problem now, but with load growth due to electric vehicles the planning area may someday have that challenge.

Heat kills by taxing the human body beyond its abilities. In a normal year, about 175 Americans succumb to the demands of summer heat. According to the National Weather Service (NWS), among natural hazards, only the cold of winter—not lightning, hurricanes, tornados, floods, or earthquakes—takes a greater toll. In the 40-year period from 1936 through 1975, nearly 20,000 people were killed in the United States by the effects of heat and solar radiation. In the heat wave of 1980, more than 1,250 people died.

Heat disorders are related to a reduction or collapse of the body's ability to shed heat by circulatory changes and sweating or a chemical (salt) imbalance caused by too much sweating. When heat gain exceeds the level the body can remove, or when the body cannot compensate for fluids and salt lost through perspiration, the temperature of the body's inner core begins to rise, and heat-related illness may develop. Elderly persons, small children, people with pre-existing medical conditions, those on certain medications or drugs, and persons with weight and alcohol problems are particularly susceptible to heat reactions, especially during heat waves in areas where moderate climate usually prevails.

Figure 4-12 Heat Index Table



The National Weather Service (NWS) has in place a system to initiate alert procedures (advisories or warnings) when the Heat Index is expected to have a significant impact on public safety. The expected severity of the heat determines whether advisories or warnings are issued. A common guideline for the issuance of excessive heat alerts is when the maximum daytime high is expected to equal or exceed 105°F and a nighttime minimum high of 80°F or above is expected for two or more consecutive days.

## Past Events

### Drought

Colorado has experienced multiple severe droughts. Colorado has experienced drought in 2020, 2018, 2011-2013, 2006-2004, 1996, 1994, 1990, 1989, 1975-1979, 1963-1965, 1951-1957, 1931-1941, and 1893-1905 (Colorado Drought Mitigation and Response Plan, 2018). The most significant are listed in Table 4-13. Although drought conditions can vary across the state, it is likely that Chaffee County was affected during these dry periods.

Table 4-13 Historical 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

Date	Dry	Wet	Duration (years)
1963-1965	X		2
1965-1975		X	10
1975-1978	X		3
1979-1999*		X	20
2000-2006*	X		6
2007-2010*		X	3
2011-2013*	X		2
2018-2019**	X		2

Notes:

Source: McKee, et al. 1999

\*modified for 2018 State of Colorado Drought Mitigation and Response Plan Update based on input from the Colorado Climate Center

\*\*Modified for 2021 Chaffee HMP update

There have been several (18) USDA Secretarial Disaster Declarations for the County in the last 17 years. The following table summarizes the USDA Disaster Declarations related to drought from 2003 to 2020, in which Chaffee County was included. Of the 18 Declarations, 11 were Fast Track designations, all within the past 3 years (2018-2020). According to the Secretary of Agriculture, a Fast Track designation is for a severe drought and provides an automatic designation when, during the growing season, any portion of the county meets the severe drought intensity (D2) value for eight consecutive weeks or more.

**Table 4-14 USDA Secretarial Disasters (2003-2020)**

Year	Type	Declaration Number <sup>a</sup>
2003	Drought, Insects	S1843
2005-2006	Drought, Fire, High Wind, Heat	S2327
2009	Drought	S2996
2011	Drought	S3149
2012	Drought	S3260
2013	Drought, Wind/High Winds, Fire/Wildfire, Heat/Excessive Heat, Insect	S3456, S3548
2018	Drought – FAST TRACK	S4320, S4326, S4329, S4352, S4386
2019	Drought – FAST TRACK	S4468, S4481
2020	Drought – FAST TRACK	S4648, S4722, S4770, S4798

Notes:

a. Secretarial Disaster Number

USDA - U.S. Department of Agriculture

Source: U.S. Department of Agriculture, (<http://www.fsa.usda.gov/programs-and-services/disaster-assistance-program/index>)

Colorado has a history of periods of low precipitation and drought, including most recent years. The county experienced drought in 2002. The years 2000, 2002, 2012, and 2013 were active years for drought conditions. Drought returned in 2018 and lasted through mid-2019 before returning again in 2020 placing Chaffee County in the most severe Drought Monitor ratings through January 2021.



A query of NOAA's National Centers for Environmental Information (NCEI) Storm Events Database from 1950 to 2020, showed only 1 drought event on July 1, 2002 for Chaffee County. However, there are no identified associated economic losses (property damage or crop damage) listed for the event.

The National Drought Mitigation Center developed the Drought Impact Reporter in response to the need for a national drought impact database for the United States. Information comes from a variety of sources: on-line, drought-related news stories and scientific publications, members of the public who visit the website and submit a drought-related impact for their region, members of the media, and members of relevant government agencies. The database is being populated beginning with the most recent impacts and working backward in time. The Drought Impact Reporter contains information on 924 impacts statewide and 23 impacts from droughts that specifically affected Chaffee County between 2000 and 2020. Most of the impacts (12) were classified as "relief, response and restrictions". Other impacts include "agriculture" (9), "plants and wildlife" (7), "tourism and recreation" (4), "fire" (3), "water supply and quality" (3), "business and industry" (2), and "society and public health" (1). The following are the descriptions of each category and reported number of impacts. Note that some impacts have been assigned to more than one category.

- **Agriculture (9)** — Drought effects associated with agriculture, farming, aquaculture, horticulture, forestry, or ranching. Examples of drought-induced agricultural impacts include damage to crop quality; income loss for farmers due to reduced crop yields; reduced productivity of cropland; insect infestation; plant disease; increased irrigation costs; cost of new or supplemental water resource development (wells, dams, pipelines) for agriculture; reduced productivity of rangeland; forced reduction of foundation stock; closure/limitation of public lands to grazing; high cost or unavailability of water for livestock, Christmas tree farms, forestry, raising domesticated horses, bees, fish, shellfish, or horticulture.
- **Energy (0)** — This category concerns drought's effects on power production, rates and revenue. Examples include production changes for both hydropower and non-hydropower providers, changes in electricity rates, revenue shortfalls and/or windfall profits, and purchase of electricity when hydropower generation is down.
- **Plants and Wildlife (7)** — Drought effects associated with unmanaged plants and wildlife, both aquatic and terrestrial, include: loss of biodiversity of plants or wildlife; loss of trees from rural or urban landscapes, shelterbelts, or wooded conservation areas; reduction and degradation of fish and wildlife habitat; lack of feed and drinking water; greater mortality due to increased contact with agricultural producers (as predators seek food from farms and producers are less tolerant of the intrusion); disease; increased vulnerability to predation (from species concentrated near water); migration and concentration (loss of wildlife in some areas and too much wildlife in others); increased stress on endangered species; salinity levels affecting wildlife; wildlife encroaching into urban areas; and loss of wetlands.
- **Society and Public Health (1)** — Drought effects associated with human, public and social health include: health-related problems related to reduced water quantity or quality, such as increased concentration of contaminants; loss of human life (e.g., from heat stress, suicide); increased respiratory ailments; increased disease caused by wildlife concentrations; increased human disease caused by changes in insect carrier populations; population migration (rural to urban areas, migrants into the United States); loss of aesthetic values; change in daily activities (non-recreational, like putting a bucket in the shower to catch water); elevated stress levels; meetings to discuss drought; communities creating drought plans; lawmakers altering penalties for violation of water restrictions; demand for higher water rates; cultural/historical discoveries from low water levels; cancellation of fundraising events; cancellation/alteration of festivals or holiday traditions; stockpiling water; public service



announcements and drought information websites; protests; and conflicts within the community due to competition for water.

- **Business and Industry (2)** — This category tracks drought's effects on non-agriculture and non-tourism businesses, such as lawn care, recreational vehicles, or gear dealers, and plant nurseries. Typical impacts include reduction or loss of demand for goods or services, reduction in employment, variation in number of calls for service, late opening or early closure for the season, bankruptcy, permanent store closure, and other economic impacts.
- **Fire (3)** — Drought often contributes to forest, range, rural, or urban fires, fire danger, and burning restrictions. Specific impacts include enacting or increasing burning restrictions, fireworks bans, increased fire risk, occurrence of fire (number of acres burned, number of wildfires compared to average, people displaced, etc.), state of emergency during periods of high fire danger, closure of roads or land due to fire occurrence or risk, and expenses to state and county governments of paying firefighters overtime and paying equipment (helicopter) costs.
- **Tourism and Recreation (4)** — Drought effects associated with recreational activities and tourism include closure of state hiking trails and hunting areas due to fire danger; water access or navigation problems for recreation; bans on recreational activities; reduced license, permit, or ticket sales (e.g., hunting, fishing, ski lifts, etc.); losses related to curtailed activities (e.g., bird watching, hunting and fishing, boating, etc.); reduced park visitation; and cancellation or postponement of sporting events.
- **Relief, Response, and Restrictions (12)** — This category refers to drought effects associated with disaster declarations, aid programs, requests for disaster declaration or aid, water restrictions, or fire restrictions. Examples include disaster declarations, aid programs, U.S. Department of Agriculture (USDA) Secretarial Disaster Declarations, Small Business Association Disaster Declarations, government relief and response programs, state-level water shortage or water emergency declarations, county-level declarations, a declared "state of emergency," requests for declarations or aid, non-profit organization-based relief, water restrictions, fire restrictions, National Weather Service (NWS) Red Flag Warnings, and declaration of drought watches or warnings.
- **Water Supply and Quality (3)** — Drought effects associated with water supply and water quality include dry wells, voluntary and mandatory water restrictions, changes in water rates, increasing of water restrictions, increases in requests for new well permits, changes in water use due to water restrictions, greater water demand, decreases in water allocation or allotments, installation or alteration of water pumps or water intakes, changes to allowable water contaminants, water line damage or repairs due to drought stress, drinking water turbidity, change in water color or odor, declaration of drought watches or warnings, and mitigation activities.

### ***Extreme Heat***

The Southwest Climate and Environmental Information Collaborative reports data summaries from a station in the City of Salida, the county seat in Chaffee County. Table 4-15 contains temperature summaries related to extreme heat for the station.

**Table 4-15 Temperature Data from Salida (1897-2017)**

	Jan.	Feb.	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
<b>Temperature (degrees Fahrenheit)</b>												
Average Maximum Temperature	43	46	52	61	70	79	84	82	76	65	53	44
Average Minimum Temperature	13	15	21	28	35	42	48	46	38	29	19	13
Average Temperature	28	30	36	44	52	61	66	64	57	47	37	29
<b>Extreme Temperatures (degrees Fahrenheit)</b>												
Extreme Maximum Temperature/year	65 1902	71 1932	77 1900	81 1989	93 2005	98 1900	103 2005 *	96 1938	94 2002	85 2003	80 1937	70 1900
<b>Average Number of Days</b>												
Maximum Temperature above 90 degrees Fahrenheit	0.0	0.0	0.0	0.0	0.1	1.5	4.4	1.9	0.1	0.0	0.0	0.0

Source: Southwest Climate and Environmental Information Collaborative (SCENIC) \*Record High

## Location

### Drought

NOAA has developed several indices to measure drought impacts and severity and to map their extent and locations:

- The Palmer Crop Moisture Index measures short-term drought on a weekly scale and is used to quantify drought's impacts on agriculture during the growing season.
- The Palmer Z Index measures short-term drought on a monthly scale.
- The Palmer Drought Index (PDI) measures the duration and intensity of long-term, drought-inducing circulation patterns. Long-term drought is cumulative, so the intensity of drought during a given month is dependent on the current weather patterns plus the cumulative patterns of previous months. Weather patterns can change quickly from a long-term drought pattern to a long-term wet pattern, and the PDI can respond fairly rapidly.
- The hydrological impacts of drought (e.g., reservoir levels, groundwater levels, etc.) take longer to develop and it takes longer to recover from them. The Palmer Hydrological Drought Index (PHDI), another long-term index, was developed to quantify hydrological effects. The PHDI responds more slowly to changing conditions than the PDI.
- While the Palmer indices consider precipitation, evapotranspiration and runoff, the Standardized Precipitation Index (SPI) considers only precipitation. In the SPI, an index of zero indicates the median precipitation amount; the index is negative for drought and positive for wet conditions. The SPI is computed for time scales ranging from 1 to 24 months.

Due to Colorado's semiarid conditions, drought is a natural but unpredictable occurrence in the state. However, because of natural variations in climate and precipitation sources, it is rare for all of Colorado to be deficient in moisture at the same time. Single season droughts over some portion of the state are quite common.

The entire county is at risk to drought conditions. Drought is one of the few hazards that has the potential to directly or indirectly impact every person in the county as well as adversely affect the local economy.

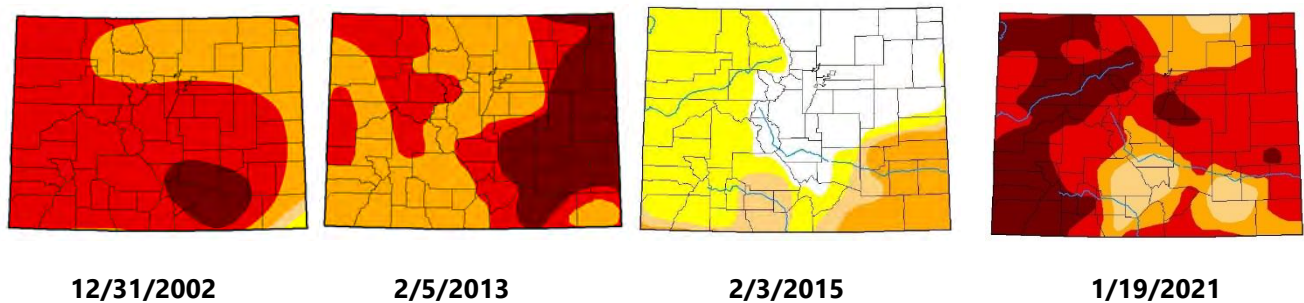
## Extreme Heat

The lower elevations in the county is at potential risk to extreme heat events; however, these events may be exacerbated in urban areas, such as the City of Salida, where reduced air flow, reduced vegetation and increased generation of waste heat can contribute to temperatures that are several degrees higher than in surrounding rural or less urbanized areas. This phenomenon is known as urban heat island effect. Conversely, extreme heat events are unlikely to occur at higher elevations in Chaffee County. Average temperatures tend to decrease with increases in elevation, roughly 4°F per 1,000 feet above mean sea level.

## Frequency and Severity (Extent)

### Drought

**Figure 4-13 U.S. Drought Monitor for the State of Colorado from 2002 to January 2021**



State Drought Conditions

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
<b>12/31/2002</b>	0	100	99.66	98.98	72.73	7.06
<b>2/5/2013</b>	0	100	100	100	54.29	24.92
<b>2/3/2015</b>	36.97	60.03	21.43	12.26	0	0
<b>1/19/21</b>	0	100	100	91.06	73.63	27.59

Intensity:



Source: National Drought Mitigation Center

The probability of a future drought in Chaffee County is likely, with a recurrence interval of 10 years or less. According to information from the 2018 Colorado State Drought Mitigation and Response Plan, over 119 years (1893 to 2012) there were 7 recorded drought incidents that totaled 41 dry years. Short duration droughts occur much more frequently. According to a study cited in the 2018 Colorado Drought Mitigation and Response Plan, they occur somewhere in Colorado in nearly 9 out of every 10 years. (McKee and others 2000).

Drought impacts are wide-reaching and may be economic, environmental, 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. An ongoing drought may leave an area more prone to beetle kill and associated wildfires. Drought conditions can also cause soil to compact, increasing an area's susceptibility to flooding, and

reduce vegetation cover, which exposes soil to wind and erosion. A reduction of electric power generation and water quality deterioration are also potential problems. Drought impacts increase with the length of a drought, as carry-over supplies in reservoirs are depleted and water levels in streams and groundwater decline.

Due to the high probability of severe drought, the overall significance is considered to have a moderate potential impact. Drought can have a widespread impact on the environment and the economy, depending upon its severity, although it typically does not result in loss of life or damage to property, as do other natural disasters. The National Drought Mitigation Center uses three categories to describe likely drought impacts:

- Agricultural—Drought threatens crops that rely on natural precipitation.
- Water supply—Drought threatens supplies of water for irrigated crops and for communities.
- Fire hazard—Drought increases the threat of wildfires from dry conditions in forest and rangelands.

On average, the nationwide annual impacts of drought are greater than the impacts of any other natural hazard. They are estimated to be between \$6 and \$8 billion annually in the United States and occur primarily in the agriculture, transportation, recreation and tourism, forestry, and energy sectors. Social and environmental impacts are also significant, although it is difficult to put a precise cost on these impacts.

The severity of a drought depends on the degree of moisture deficiency, the duration, and the size and location of the affected area. The longer the duration of the drought and the larger the area impacted, the more severe the potential impacts. Droughts are not usually associated with direct impacts on people or property, but they can have significant impacts on agriculture, which can impact people indirectly.

When measuring the severity of droughts, analysts typically look at economic impacts on a planning area. A drought directly or indirectly impacts all people in affected areas. All people could pay more for water if utilities increase their rates due to shortages. Agricultural impacts can result in loss of work for farm workers and those in related food processing jobs. Other water- or electricity-dependent industries are commonly forced to shut down all or a portion of their facilities, resulting in further layoffs. A drought can harm recreational companies that use water (e.g., swimming pools, water parks, and river rafting companies) as well as landscape and nursery businesses because people will not invest in new plants if water is not available to sustain them.

Drought generally does not affect groundwater sources as quickly as surface water supplies, but groundwater supplies generally take longer to recover. Reduced precipitation during a drought means that groundwater supplies are not replenished at a normal rate. This can lead to a reduction in groundwater levels and problems such as reduced pumping capacity or wells going dry. Shallow wells are more susceptible than deep wells. Reduced replenishment of groundwater affects streams. Much of the flow in streams comes from groundwater, especially during the summer when there is less precipitation and after snowmelt ends. Reduced groundwater levels mean that even less water will enter streams when stream flows are lowest.

Drought also is often accompanied by extreme heat. When temperatures reach 90°F and above, people are vulnerable to sunstroke, heat cramps, and heat exhaustion. Pets and livestock are also vulnerable to heat-related injuries. Crops can be vulnerable as well.

Additionally, there is increased danger of wildfires associated with most droughts. Millions of board feet of timber have been lost, and in many cases, erosion occurred, which caused serious damage to aquatic life, irrigation, and power production by heavy silting of streams, reservoirs, and rivers.

Based on the information in this hazard profile, the magnitude/severity of drought is considered to have a moderate potential impact for the county. The City of Salida and Towns of Poncha Springs and Buena

Vista are considered to have a moderate potential impact for drought. This is due to Salida, Poncha Springs, and Buena Vista being at similar elevation and having similar maximum and minimum temperatures with lower rainfall than other parts of the county.

### ***Extreme Heat***

There are no recorded instances of extreme heat or heat events in Chaffee County from 1950 to 2020 in the National Centers for Environmental Information Storm Events Database. However, there are approximately 8 days per year on average where temperatures exceed 90°F (Refer to Table 4-15). When temperatures reach 90°F and above, people are vulnerable to sunstroke, heat cramps, and heat exhaustion. Pets and livestock are also vulnerable to heat-related injuries.

Based on the information in this hazard profile, probability of an extreme heat event is low. The magnitude/severity of extreme heat is considered to have a low potential impact for Chaffee County, City of Salida, Town of Buena Vista and a moderate impact for the Town of Poncha Springs.

## **Warning Time**

### ***Drought***

Droughts are climatic patterns that occur over long periods of time. Only generalized warnings can take place due to the numerous variables that scientists have not pieced together well enough to make accurate and precise predictions. Empirical studies conducted over the past century have shown that meteorological drought is never the result of a single cause. It is the result of many causes, often synergistic in nature.

Scientists at this time do not know how to predict drought more than a month in advance for most locations. Predicting drought depends on the ability to forecast precipitation and temperature. Anomalies of precipitation and temperature may last from several months to several decades. How long they last depends on interactions between the atmosphere and the oceans, soil moisture and land surface processes, topography, internal dynamics, and the accumulated influence of weather systems on the global scale.

Colorado is semiarid; thus, drought is a regular and natural occurrence in the state. The main source of water supply in the state is precipitation and much of this occurs in the winter as snowfall. Although drought conditions are difficult to predict, low levels of winter snowpack act as an indicator that drought conditions are occurring.

### ***Extreme Heat***

The National Oceanic and Atmospheric Administration (NOAA) issues watch, warning and advisory information for extreme heat. Meteorologists can often predict extreme heat days in advance.

## **4.5.2 Related Hazards**

### ***Drought***

The hazard most commonly associated with drought is wildfire. A prolonged lack of precipitation dries out vegetation, which becomes increasingly susceptible to ignition as the duration of the drought extends. An ongoing drought can leave an area more prone to beetle kill and associated wildfires. Drought conditions can also cause soil to compact, increasing an area's susceptibility to flooding, and reduce vegetation cover, which exposes soil to wind and erosion. An ongoing drought that severely inhibits natural plant growth cycles may impact critical wildlife habitats.

## Extreme Heat

Excessive heat events can cause failure of motorized systems such as ventilation systems used to control temperatures inside buildings. It can lead to public health issues such as heat stroke in both the elderly and the young and healthy.

### 4.5.3 Climate Change Considerations

The Intergovernmental Panel on Climate has projected dramatic changes in regional climate characteristics between present-day and if global temperatures rise between 1.5 degrees Celsius and 2 degrees Celsius. Climate change can have impacts both in terms of inter-annual droughts and intra-annual runoff patterns (CWCB 2018). Increasing temperatures and changes in evaporation and soil moistures will also add to the trend of decreasing runoff in a majority of Colorado Basins. The following table shows the challenges water managers may face with the projected changes in climate.

**Table 4-16 Future Drought Vulnerability Due to Climate Change and Challenges Faced by Colorado Water Managers**

Challenge	Observed and/or Projected Change
Water demands for agriculture and outdoor watering	Increasing temperatures raise evapotranspiration by plants, lower soil moisture, alter growing seasons, and thus increase water demand.
Water supply infrastructure	Changes in snowpack, streamflow timing, and hydrograph evolution may affect reservoir operations including flood control and storage. Changes in the timing and magnitude of runoff may affect functioning of diversion, storage, and conveyance structures.
Legal water systems	Earlier runoff may complicate prior appropriation systems and interstate water compacts, affecting which rights holders receive water and operations plans for reservoirs
Water quality	Although other factors have a large impact, "water quality is sensitive both to increased water temperatures and changes in patterns of precipitation" (CCSP SAP 4.3, p. 149). For example, changes in the timing and hydrograph may affect sediment load and pollution, impacting human health.
Energy demand and operating costs	Warmer air temperatures may place higher demands on hydropower reservoirs for peaking power and increased energy usage, potentially overloading distribution/transmission system Warmer lake and stream temperatures may affect water use by cooling power plants and other industries.
Mountain habitats	Increasing temperature and soil moisture changes may shift mountain habitats toward higher elevation.
Interplay among forests, hydrology, wildfires, and pests	Changes in air, water, and soil temperatures may affect the relationships between forests, surface and groundwater, wildfire, and insect pests. Water-stressed trees, for example, may be more vulnerable to pests.
Riparian habitats and fisheries	Stream temperatures are expected to increase as the climate warms, which could have direct and indirect effects on aquatic ecosystems (CCSP SAP 43.), including the spread of instream non-native species and diseases to higher elevation and the potential for nonnative plant species to invade riparian areas. Changes in streamflow intensity and timing may also affect riparian ecosystems.
Water – and snow – based recreation	Changes in reservoir storage affect lake and river recreation activities; changes in streamflow intensity and timing will continue to affect rafting directly and trout fishing indirectly. Changes in the character and timing of snowpack and

Challenge	Observed and/or Projected Change
	the ratio of snowfall to rainfall will continue to influence winter recreational activities and tourism.
Groundwater resources	Changes in long-term precipitation and soil moisture can affect groundwater recharge rates; coupled with demand issues, this may mean greater pressure on groundwater resources.

Source: State of Colorado Drought Mitigation and Response Plan 2018

#### 4.5.4 Vulnerability

All people, property, and environments in the planning area would be exposed to some degree to the impacts of moderate to extreme drought conditions. Populations living in densely populated urban areas are likely to be more exposed to extreme heat events. People who live at higher elevations would be less susceptible to heat events.

Drought produces a complex web of impacts that spans many sectors of the economy and reaches well beyond the area experiencing physical drought. This complexity exists because water is integral to the ability to produce goods and provide services. Drought can affect a wide range of economic, environmental, and social activities. The vulnerability of an activity to the effects of drought usually depends on its water demand, how the demand is met, and what water supplies are available to meet the demand. Extreme heat can exacerbate the effects of drought.

The 2018 State of Colorado Drought Mitigation and Response Plan evaluated the vulnerability of different sectors to drought for all counties in Colorado. (The evaluation excluded the Municipal and Industrial sector because that sector did not follow standard methodology.) The sector vulnerability scores for Chaffee County are shown in Table 4-17. A score of 3.0 or above means that sector is vulnerable to drought. While none of the sectors in Chaffee County score above 3.0, the socioeconomic sector has a score of 2.80 and is vulnerable to an increase. This is largely due to the County's lack of economic diversity and tourism economy base. This includes vulnerability to secondary economic impacts, behavioral health impacts and public health concerns specific to drought.

**Table 4-17 Drought Vulnerability Scores by Sector**

Sector	Chaffee County Score
Recreation	2.55
Energy	1.75
Agriculture	1.92
State Assets	2.14
Socioeconomic	2.80
Environment	2.03
Average Overall Vulnerability	2.20

Source: 2018 State of Colorado Drought Mitigation and Response Plan

## Population

### Drought

The historical and potential impacts of drought on populations include agricultural sector job loss, secondary economic losses to local businesses and public recreational resources, increased cost to local and state government for large-scale water acquisition and delivery, and water rationing and water wells running dry for individuals and families. As drought is often accompanied by prolonged periods of extreme heat, negative health impacts such as dehydration can also occur, where children and elderly are



most susceptible. Other public health issues can include impaired drinking water quality, increased incidence of mosquito-borne illness, an increase in wildlife-human confrontations and respiratory complications as a result of declined air quality in times of drought.

The planning partnership has the ability to minimize any impacts on residents and water consumers in the county should several consecutive dry years occur. No significant life or health impacts are anticipated as a result of drought within the planning area.

### ***Extreme Heat***

According to the EPA, the individuals with the following combinations or characteristics are typically at greater risk to the adverse effects of excessive heat events: individuals with physical or mobility constraints, cognitive impairments, economic constraints, and social isolation. Individuals 65 years and older and those 5 years and younger are considered more vulnerable to extreme heat events. Chaffee County's population has a higher percentage of individuals 65 years and older (25%) compared to the State of Colorado as a whole (14.7%) (CHIP 2021). According to the Colorado Department of Public Health and Environment, 6.6% of individuals admitted to an emergency department at a county hospital in 2017 were for heat-related illnesses.

## **Property**

### ***Drought***

No structures will be directly affected by drought conditions, though some structures may become vulnerable to wildfires, which are more likely following years of drought. Droughts can also have significant impacts on landscapes, which could cause a financial burden to property owners. However, these impacts are not considered critical in planning for impacts from the drought hazard.

### ***Extreme Heat***

Typically, the only impact extreme heat has on general building stock is increased demand on air conditioning equipment, which in turn may cause strain on electrical systems.

## **Critical Facilities and Infrastructure**

### ***Drought***

Critical facilities as defined for this plan will continue to be operational during a drought. Critical facility elements such as landscaping may not be maintained due to limited resources, but the risk to the planning area's critical facilities inventory will be largely aesthetic. For example, when water conservation measures are in place, landscaped areas will not be watered and may die. These aesthetic impacts are not considered significant.

### ***Extreme Heat***

Power outages may occur as a result of extreme heat events. Additionally, transportation systems may experience disruption in services. According to the State of Colorado Hazard Mitigation Plan, concrete pavements have experienced "blowouts or heaves" both on local highway and the higher volume parkway and interstate systems. Blowouts occur when pavements expand and cannot function properly within their allotted spaces. Pavement sections may rise up several inches during such events. These conditions can cause motor vehicle accidents in their initial stages and can shut down traffic lanes or roadways entirely until such times as the conditions are mitigated.

## Economy

Economic impact will be largely associated with industries that use water or depend on water for their business. For example, landscaping businesses were affected in the droughts of the past as the demand for service significantly declined because landscaping was not watered. Agricultural industries will be impacted if water usage is restricted for irrigation. According to the USDA 2017 Census of Agriculture, the market value of crops and livestock sold in Chaffee County was \$12,237,00 in 2017, a 27% increase since the 2012 Census of Agriculture (USDA). Drought and extreme heat may impact all crops grown in Chaffee County and the pastureland used to sustain livestock.

According to the Colorado State Drought Mitigation and Response Plan, economic impacts may also occur for industries that are water intensive such as agriculture, wildfire protection, municipal usage, commerce, tourism, recreation and wildfire preservation. A reduction of electric power generation and water quality deterioration are also potential effects.

Drought impacts on the County's natural environment and the cascading impacts to the recreation sector could lead to less people visiting and spending money in County which could have a negative impact on the entire local economy. Both the summer river sports industry and winter ski industry are important aspects of Chaffee County's economy and rely on adequate snowpack; a drought year or consecutive drought years can drastically affect both industries. The Colorado Water Conservation Board (CWCBC), Future Avoided Cost Explorer (FACE) tool which estimates annual damages from drought, Chaffee County could potentially experience an average annual loss of \$1.5 Million and \$80 per person of total damages due to drought conditions under current population and climate scenarios.

## Historic, Cultural, and Natural Resources

Environmental losses from drought are associated with damage to plants, animals, wildlife habitat, and air and water quality; forest and range fires; degradation of landscape quality; loss of biodiversity; and soil erosion. Some of the effects are short-term and conditions quickly return to normal following the end of the drought. Other environmental effects linger for some time or may even become permanent. Wildlife habitat, for example, may be degraded through the loss of wetlands, lakes, and vegetation. However, many species will eventually recover from this temporary aberration. The degradation of landscape quality, including increased soil erosion, may lead to a more permanent loss of biological productivity. Although environmental losses are difficult to quantify, growing public awareness and concern for environmental quality has forced public officials to focus greater attention and resources on these effects.

### 4.5.5 Development Trends

Each municipal planning partner in this effort has an established comprehensive plan that includes policies directing land use and dealing with issues of water supply and the protection of water resources. These plans provide the capability at the local municipal level to protect future development from the impacts of drought. All planning partners reviewed their general plans under the capability assessments performed for this effort. Deficiencies identified by these reviews can be identified as mitigation initiatives to increase the capability to deal with future trends in development. Vulnerability to drought will increase as population growth increases, putting more demands on existing water supplies. Future water use planning should consider increases in population as well as potential impacts of climate change.

The Colorado Water Conservation Board (CWCBC), Future Avoided Cost Explorer (FACE) provides an in-depth look at the potential economic impacts and expected annual damages from future flood, drought and wildfire events. The tool looks at three different climate scenarios (current climate conditions, 2050 future – moderately warmer climate and 2050 – severely warmer climate) as well as compares current population to low, medium and high growth population scenarios. The following table compares the

estimated annual damages for Chaffee County due to drought events for each of the climate and population scenarios.

**Table 4-18 Potential Fiscal Impacts due to Drought by Climate and Population Scenarios**

Climate Scenarios	Population Scenarios		
	Low Growth (~26,300)	Medium Growth (~27,100)	High Growth (~28,200)
Current	Total damages: \$2.1M	Total damages: \$2.2M	Total damages: \$2.2M
	Total damages per person: \$80	Total damages per person: \$80	Total damages per person: \$80
Moderate Climate	Total damages: \$6.6M	Total damages: \$6.6M	Total damages: \$7.6M
	Total damages per person: \$250	Total damages per person: \$240	Total damages per person: \$270
More Severe Climate	Total damages: \$8.7M	Total damages: \$9.7M	Total damages: \$9.7M
	Total damages per person: \$330	Total damages per person: \$360	Total damages per person: \$340

Source: CWCB FACE tool

#### 4.5.6 Risk Summary

- There have been 18 USDA Disaster Declaration specifics to Drought in the County since 2003. Between 2018 and 2020, 11 were designated as FAST TRACK declarations.
- Chaffee County on average experiences 8 days per year over 90°F.
- Chaffee County experiences an average annual loss of \$1.5 Million and \$80 per person of total damages due to drought under current population and climate scenarios.
- Drought can lead to cascading hazards such as wildfires and flooding.
- Extreme heat can lead to public health problems, including heat stroke and breathing issues.
- Elderly and children are more vulnerable to extreme heat conditions. The County has a higher percentage of individuals 65 years and older (25%) compared to Colorado as a whole (15%).
- Natural resources that County depends on for tourism is at risk of being affected by heat stress and drought.
- The effects of climate change may result in an increase in frequency of drought and extreme heat events.
- Drought can affect both water quantity and quality.
- The Socioeconomic, environment and recreation sectors are particularly vulnerable to drought and extreme heat.

## 4.6 Earthquake

EARTHQUAKE HAZARD RANKING	
Chaffee County	Low
City of Salida	Low
Town of Buena Vista	Low
Town of Poncha Springs	Low

### 4.6.1 Hazard Profile

#### How Earthquakes Happen

An earthquake is the vibration of the earth's surface following a release of energy in the earth's crust. This energy can be generated by a sudden dislocation of the crust or by a volcanic eruption. Most destructive quakes are caused by dislocations of the crust. The crust may first bend and then, when the stress exceeds the strength of the rocks, break and snap to a new position. In the process of breaking, vibrations called "seismic waves" are generated. These waves travel outward from the source of the earthquake at varying speeds.

Earthquakes tend to reoccur along faults, which are zones of weakness in the crust. Even if a fault zone has recently experienced an earthquake, there is no guarantee that all the stress has been relieved. Another earthquake could still occur.

Geologists classify faults by their relative hazards. Active faults, which represent the highest hazard, are those that have ruptured to the ground surface during the Holocene period (about the last 11,000 years).

Potentially active faults are those that displaced layers of rock from the Quaternary period (the last 1,800,000 years). Determining if a fault is "active" or "potentially active" depends on geologic evidence, which may not be available for every fault. Although there are probably still some unrecognized active faults, nearly all the movement between the two plates, and therefore the majority of the seismic hazards, are on the well-known active faults.

Faults are more likely to have earthquakes on them if they have more rapid rates of movement, have had recent earthquakes along them, experience greater total displacements, and are aligned so that movement can relieve accumulating tectonic stresses. A direct relationship exists between a fault's length and location and its ability to generate damaging ground motion at a given site. In some areas, smaller, local faults produce lower magnitude quakes, but ground shaking can be strong, and damage can be significant as a result of the fault's proximity to the area. In contrast, large regional faults can generate great magnitudes but, because of their distance and depth, may result in only moderate shaking in the area.

#### DEFINITIONS

**Earthquake**—The shaking of the ground caused by an abrupt shift of rock along a fracture in the earth or a contact zone between tectonic plates.

**Epicenter**—The point on the earth's surface directly above the hypocenter of an earthquake. The location of an earthquake is commonly described by the geographic position of its epicenter and by its focal depth.

**Fault**—A fracture in the earth's crust along which two blocks of the crust have slipped with respect to each other.

**Focal Depth**—The depth from the earth's surface to the hypocenter.

**Hypocenter**—The region underground where an earthquake's energy originates.

**Liquefaction**—Loosely packed, water-logged sediments losing their strength in response to strong shaking, causing major damage during earthquakes.

## Earthquake Classifications

Earthquakes are typically classified in one of two ways: By the amount of energy released, measured as magnitude; or by the impact on people and structures, measured as intensity.

### Magnitude

Currently the most commonly used magnitude scale is the moment magnitude (Mw) scale, with the following classifications of magnitude:

- Great—Mw > 8
- Major—Mw = 7.0 - 7.9
- Strong—Mw = 6.0 - 6.9
- Moderate—Mw = 5.0 - 5.9
- Light—Mw = 4.0 - 4.9
- Minor—Mw = 3.0 - 3.9
- Micro—Mw < 3

Estimates of Mw scale roughly match the local magnitude scale (ML) commonly called the Richter scale. One advantage of the Mw scale is that, unlike other magnitude scales, it does not saturate at the upper end. That is, there is no value beyond which all large earthquakes have about the same magnitude. For this reason, Mw scale is now the most often used estimate of large earthquake magnitudes.

### Intensity

Currently the most commonly used intensity scale is the modified Mercalli intensity scale, with ratings defined in Table 4-19 below. (U.S. Geological Survey [USGS] 1989)

**Table 4-19 Modified Mercalli Intensity (MMI) Scale**

Magnitude	Mercalli Intensity	Effects	Frequency
Less than 2.0	I	Micro-earthquakes, not felt or rarely felt; recorded by seismographs.	Continual
2.0-2.9	I to II	Felt slightly by some people; damages to buildings.	Over 1M per year
3.0-3.9	II to IV	Often felt by people; rarely causes damage; shaking of indoor objects noticeable.	Over 100,000 per year
4.0-4.9	IV to VI	Noticeable shaking of indoor objects and rattling noises; felt by most people in the affected area; slightly felt outside; generally, no to minimal damage.	10K to 15K per year
5.0-5.9	VI to VIII	Can cause damage of varying severity to poorly constructed buildings; at most, none to slight damage to all other buildings. Felt by everyone.	1K to 1,500 per year
6.0-6.9	VII to X	Damage to a moderate number of well-built structures in populated areas; earthquake-resistant structures survive with slight to moderate damage; poorly designed structures receive moderate to severe damage; felt in wider areas; up to hundreds of miles/kilometers from the epicenter; strong to violent shaking in epicentral area.	100 to 150 per year
7.0-7.9	VIII <	Causes damage to most buildings, some to partially or completely collapse or receive severe damage; well-designed structures are likely to receive damage; felt across great distances with major damage mostly limited to 250 km from epicenter.	10 to 20 per year

Magnitude	Mercalli Intensity	Effects	Frequency
8.0-8.9	VIII <	Major damage to buildings, structures likely to be destroyed; will cause moderate to heavy damage to sturdy or earthquake-resistant buildings; damaging in large areas; felt in extremely large regions.	One per year
9.0 and Greater	VIII <	At or near total destruction - severe damage or collapse to all buildings; heavy damage and shaking extends to distant locations; permanent changes in ground topography.	One per 10-50 years

## Ground Motion

Earthquake hazard assessment is also based on expected ground motion. This involves determining the annual probability that certain ground motion accelerations will be exceeded, then summing the annual probabilities over the time period of interest. The most commonly mapped ground motion parameters are the horizontal and vertical peak ground accelerations (PGA) for a given soil or rock type. Instruments called accelerographs record levels of ground motion due to earthquakes at stations throughout a region. These readings are recorded by state and federal agencies that monitor and predict seismic activity.

Maps of PGA values form the basis of seismic zone maps that are included in building codes such as the International Building Code. Building codes that include seismic provisions specify the horizontal force due to lateral acceleration that a building should be able to withstand during an earthquake. PGA values are directly related to these lateral forces that could damage “short period structures” (e.g., single-family dwellings). Longer period response components create the lateral forces that damage larger structures with longer natural periods (apartment buildings, factories, high-rises, bridges). Table 4-20 lists damage potential and perceived shaking by PGA factors, compared to the modified Mercalli scale.

**Table 4-20 Mercalli Scale and Peak Ground Acceleration Comparison**

Modified Mercalli Scale	Perceived Shaking	Potential Structure Damage		Estimated PGA <sup>a</sup> (%g)
		Resistant Buildings	Vulnerable Buildings	
I	Not Felt	None	None	<0.17%
II-III	Weak	None	None	0.17% - 1.4%
IV	Light	None	None	1.4% - 3.9%
V	Moderate	Very Light	Light	3.9% - 9.2%
VI	Strong	Light	Moderate	9.2% - 18%
VII	Very Strong	Moderate	Moderate/Heavy	18% - 34%
VIII	Severe	Moderate/Heavy	Heavy	34% - 65%
IX	Violent	Heavy	Very Heavy	65% - 124%
X - XII	Extreme	Very Heavy	Very Heavy	> 124%

PGA Peak Ground Acceleration  
a. PGA measured in percent of g, where g is the acceleration of gravity Sources: USGS 2008; USGS 2010

## Effect of Soil Types

The impact of an earthquake on structures and infrastructure is largely a function of ground shaking, distance from the source of the earthquake, and liquefaction, a secondary effect of an earthquake in

which soils lose their shear strength and flow or behave as liquid, thereby damaging structures that derive their support from the soil. Liquefaction generally occurs in soft, unconsolidated sedimentary soils. A program called the National Earthquake Hazard Reduction Program (NEHRP) creates maps based on soil characteristics to help identify locations subject to liquefaction. Table 4-21 summarizes NEHRP soil classifications. NEHRP Soils B and C typically can sustain ground shaking without much effect, dependent on the earthquake magnitude. The areas that are commonly most affected by ground shaking have NEHRP Soils D, E, and F. In general, these areas are also most susceptible to liquefaction.

**Table 4-21 NEHRP Soil Classification System**

NEHRP Soil Type	Description	Mean Shear Velocity to 30 m (m/s)
A	Hard Rock	1,500
B	Firm to Hard Rock	760-1,500
C	Dense Soil/Soft Rock	360-760
D	Stiff Soil	180-360
E	Soft Clays	< 180
F	Special Study Soils (liquefiable soils, sensitive clays, organic soils, soft clays >36 m thick)	
Notes: M - Meters m/s - Meters per second		

## Past Events

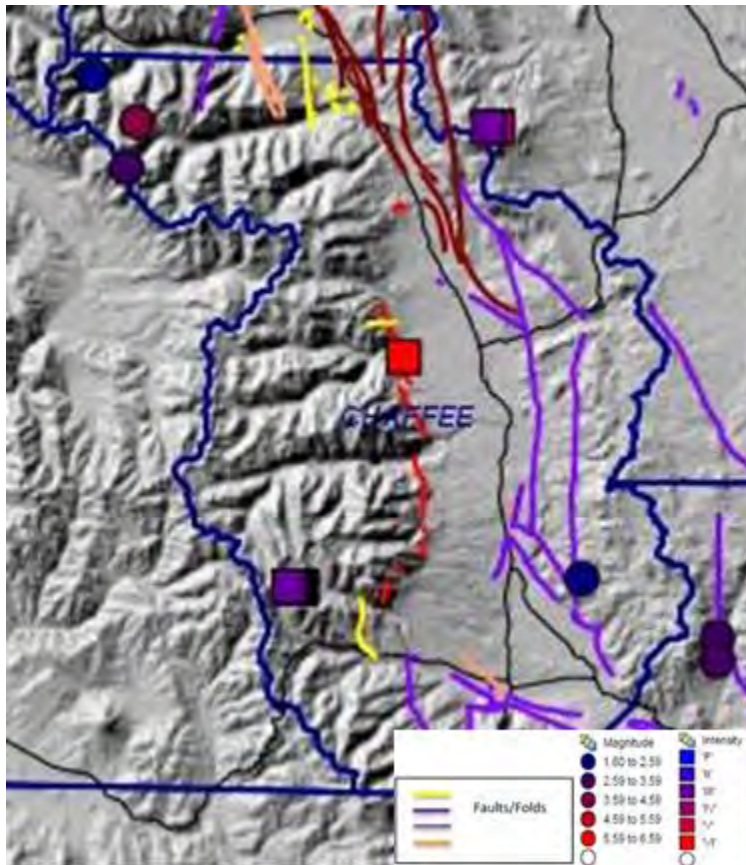
Colorado has a relatively short period of historical records for earthquakes. An earthquake and fault map developed by the Colorado Geological Survey depicts the location of historical epicenters and potentially active faults in that state. The figure below shows the faults and recorded earthquakes for Chaffee County and vicinity. The figure is a collection of all known and catalogued earthquakes in the area. The map indicates six recorded earthquake events occurred in Chaffee County. The table below lists the recorded earthquake events in Chaffee County.

**Table 4-22 Earthquake Events in Chaffee County and Vicinity**

Name	Magnitude/Intensity	Date
23km SE of Salida	3.6 (V Intensity)	November 30, 2017
Aspen	4.6	December 19, 1966
Winfield	2.5	September 14, 1987
Buena Vista	VI (Intensity)	November 15, 1901
Poncha Springs	2.5	August 4, 1994
Taylor Park	2.8	July 20, 1987
Garfield	IV (Intensity)	February 6, 1921
Source: US Geological Survey Earthquake Catalog ( <a href="https://earthquake.usgs.gov/earthquakes/search/">https://earthquake.usgs.gov/earthquakes/search/</a> )		



**Figure 4-14 Earthquake Faults and Recorded Epicenters Map for Chaffee County and Vicinity**

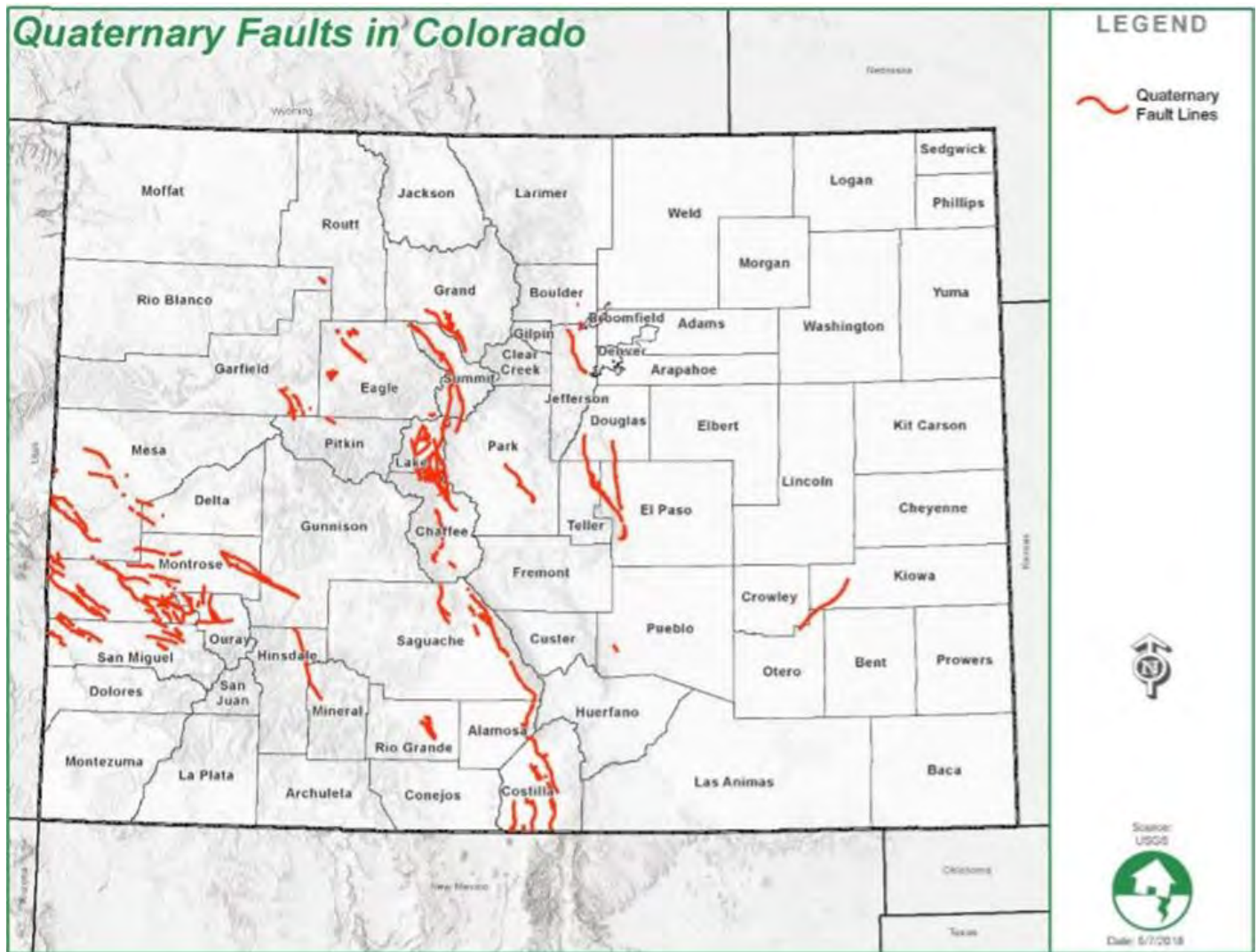


Source: Colorado Geological Survey (<http://dnrwebmapgdev.state.co.us/cgsonline/>)

### Location

Geological research indicates that faults capable of producing earthquakes are prevalent in Colorado. There are approximately 90 potentially active faults in Colorado with documented movement within the last 1.6 million years. Chaffee County does contain several major faults, including the Sawatch Fault that runs north/south through the center of the county on the eastern side of the Sawatch Mountain Range. The figure below shows potentially active faults in or near Chaffee County and in all of Colorado, respectively. More than 700 earthquake tremors of magnitude 2.5 or higher have been recorded in Colorado since 1867. This is considered relatively infrequent for a western state.

Figure 4-15 Colorado Quaternary Fault Map



Source: State of Colorado Hazard Mitigation Plan, 2018

Faults have been classified based on the geologic time frame of their latest suspected movement (in order of activity occurrence, most recent is listed first):

- H—Holocene (within past 15,000 years)
- LQ—Late Quaternary (15,000 to 130,000 years)
- MLQ—Middle to Late Quaternary (130,000 to 750,000 years)
- Q—Quaternary (approximately past 2 million years)
- LC—Late Cenozoic (approximately past 23.7 million years)

Although recorded earthquake events are well documented throughout Colorado and the Western Slope, there are many unnamed faults within Chaffee County.

## Frequency and Severity (Extent)

Research based on Colorado's earthquake history suggests that an earthquake of magnitude 6.3 or larger has a 1% probability of occurring each year somewhere in Colorado (Charlie, Doebling, Oaks Colorado Earthquake Hazard Reduction Program Open File Report 93-01 1993).

Earthquakes can cause structural damage, injury, and loss of life, as well as damage to infrastructure networks, such as water, power, communication, and transportation lines. Damage and life loss can be particularly devastating in communities where buildings were not designed to withstand seismic forces (e.g., historic structures). Other damage-causing effects of earthquakes include surface rupture, fissuring, settlement, and permanent horizontal and vertical shifting of the ground. Secondary impacts can include landslides, rock falls, liquefaction, fires, dam failure, and hazardous materials (HAZMAT) incidents.

The severity of an earthquake can be expressed in terms of intensity or magnitude. Intensity represents the observed effects of ground shaking on people, buildings, and natural features. According to FEMA's 2006 Homebuilder's Guide to Earthquake Resistant Design and Construction, the International Residential Code designates the level of potential seismic hazard for dwellings by assigning a house to a Seismic Design Category based on its location. Chaffee County is in Category B (17% to 33% of the force of gravity) and has the potential of moderate ground shaking. See Figure 4-16 below for summaries of this information.

Magnitude is related to the amount of seismic energy released at the hypocenter of an earthquake. It is calculated based on the amplitude of the earthquake waves recorded on instruments. Whereas intensity varies depending on location with respect to the earthquake epicenter, magnitude is represented by a single, instrumentally measured value for each earthquake event.

In simplistic terms, the severity of an earthquake event can be measured in the following terms:

- How hard did the ground shake?
- How did the ground move? (horizontally or vertically)
- How stable was the soil?
- What is the fragility of the built environment in the area of impact?

Mapping that shows the impacts of these components was used to assess the risk of earthquakes within the planning area. While the impacts from each of these components can build upon each other during an earthquake event, the mapping looks at each component individually. One probabilistic scenario and was selected for this plan:

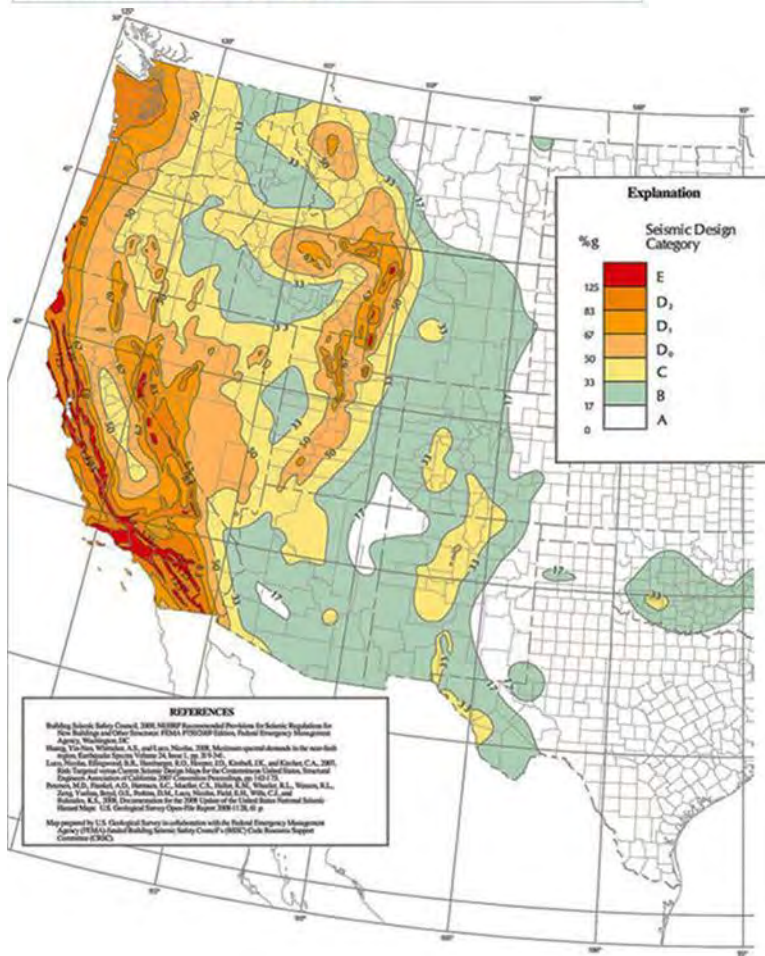
**2,500-Year Probabilistic Scenario**—This is a Hazus-MH Probabilistic Event scenario, which allows the user to generate estimates of damage and loss based on the seismic hazard for a specified return period.



**Figure 4-16 Earthquake Hazard and Potential Effects of Shaking**

SOC	MAP COLOR	EARTHQUAKE HAZARD	POTENTIAL EFFECTS OF SHAKING*
A	White	Very small probability of experiencing damaging earthquake effects.	
B	Gray	Could experience shaking of moderate intensity.	Moderate shaking—Felt by all, many frightened. Some heavy furniture moved, a few instances of fallen plaster. Damage slight.
C	Yellow	Could experience strong shaking.	Strong shaking—Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built structures.
D0	Light brown		
D1	Dark brown	Could experience very strong shaking (the darker the color, the stronger the shaking).	Very strong shaking—Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures.
D2	Darkest brown		
E	Red	Near major active faults capable of producing the most intense shaking.	Strongest shaking—Damage considerable in specially designed structures; frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations. Shaking intense enough to completely destroy buildings.

\* Abbreviated descriptions from [The Modified Mercalli Intensity Scale](#)



Source: FEMA (<https://www.fema.gov/emergency-managers/risk-management/earthquake/hazard-maps>)

## Warning Time

Part of what makes earthquakes so destructive is that they generally occur without warning. The main shock of an earthquake can usually be measured in seconds, and rarely lasts for more than a minute. Aftershocks can occur within the days, weeks, and even months following a major earthquake.

By studying the geologic characteristics of faults, geoscientists can often estimate when the fault last moved and estimate the magnitude of the earthquake that produced the last movement. Because the occurrence of earthquakes is relatively infrequent in Colorado and the historical earthquake record is short, accurate estimations of magnitude, timing, or location of future dangerous earthquakes in Colorado are difficult to estimate.

There is currently no reliable way to predict the day or month that an earthquake will occur at any given location. Research is being done with warning systems that use the low energy waves that precede major earthquakes. These potential warning systems give approximately 40 seconds notice that a major earthquake is about to occur. The warning time is very short, but it could allow for someone to get under a desk, step away from a hazardous material they are working with, or shut down a computer system.

#### **4.6.2 Related Hazards**

Earthquakes can cause large and sometimes disastrous landslides and mudslides. River valleys are vulnerable to slope failure, often as a result of loss of cohesion in clay-rich soils. Soil liquefaction occurs when water-saturated sands, silts, or gravelly soils are shaken so violently that the individual grains lose contact with one another and float freely in the water, turning the ground into a pudding-like liquid, typically in soils with a shallow groundwater table adjacent to rivers. Building and road foundations lose load-bearing strength and may sink into what was previously solid ground. Unless properly secured, hazardous materials can be released, causing significant damage to the environment and people. Earthen dams are potentially susceptible to seismic shaking and can be considered secondary risks for earthquakes.

#### **4.6.3 Climate Change Considerations**

The impacts of global climate change on earthquake intensity and probability are mostly unknown but there is not expected to be a direct correlation.

#### **4.6.4 Vulnerability**

Earthquake vulnerability data was generated during the 2021 update using a Level 1 Hazus-MH analysis. Once the location and size of a hypothetical earthquake are identified, Hazus-MH estimates the intensity of the ground shaking, the number of buildings damaged, the number of casualties, the damage to transportation systems and utilities, the number of people displaced from their homes, and the estimated cost of repair and clean up.

### **Population**

The entire population of Chaffee County is potentially exposed to direct and indirect impacts from earthquakes. The degree of exposure is dependent on many factors, including the age and construction type of the structures people live in, the soil type their homes are constructed on, their proximity to fault location, etc. Whether impacted directly or indirectly, the entire population will have to deal with the consequences of earthquakes to some degree. Business interruption could keep people from working, road closures could isolate populations, and loss of functions of utilities could impact populations that suffered no direct damage from an event itself.

Three population groups are particularly vulnerable to earthquake hazards:

- **Linguistically Isolated Populations**—Approximately 6.8% of the planning area population speaks a language other than English at home. Problems arise when there is an urgent need to inform non-English speaking residents of an earthquake event. They are vulnerable because of difficulties in understanding hazard-related information from predominantly English-speaking media and government agencies.

- **Population Below Poverty Level**—According to the 2019 Census Bureau estimates, 9.8% of Chaffee County’s population is below the poverty level. These individuals may lack the financial resources to improve their homes to prevent or mitigate earthquake damage. Poorer residents are also less likely to have insurance to compensate for losses in earthquakes.
- **Population Over 65 Years Old**—Approximately 25 % of the residents in Chaffee County are over 65 years old. This population group is vulnerable because they are more likely to need special medical attention, which may not be available due to isolation caused by earthquakes. Elderly residents also have more difficulty leaving their homes during earthquake events and could be stranded in dangerous situations.

Impacts on persons and households in the planning area were estimated for the 2,500-Year Probabilistic Earthquake. Table 4-23 summarizes the results.

**Table 4-23 Estimated Earthquake Impact on Persons and Households**

	Number of Displaced Households	Number of Persons Requiring Short-Term Shelter
2,500-Year Earthquake	43	23

The model also estimates casualties based on three different times of day (2am, 2pm and 5pm). The model estimated generally light casualties with the most at 2pm: 25 minor injuries, 5 major, and 1 requiring hospitalization, and 1 death.

## Property

According to the inventory data with the Hazus model there are approximately 10,440 buildings in the planning area, with a total assessed value of \$2.1 billion. Because all structures in the planning area are susceptible to earthquake impacts to varying degrees, this total represents the countywide property exposure to seismic events. Most of the buildings (91%) are associated with residential housing. According to the model about 1,800 buildings would be at least moderately damaged. A summary of these damage estimates is included in Table 4-24 below.

**Table 4-24 Estimated Building Damage by Occupancy**

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	13.86	0.22	4.80	0.23	4.39	0.31	1.73	0.41	0.22	0.54
Commercial	295.12	4.60	138.52	6.52	142.44	9.96	53.41	12.54	6.51	16.04
Education	7.05	0.11	2.48	0.12	2.48	0.17	0.89	0.21	0.09	0.23
Government	14.70	0.23	6.42	0.30	7.07	0.49	2.52	0.59	0.29	0.72
Industrial	80.91	1.26	38.98	1.83	41.89	2.93	16.25	3.81	1.97	4.88
Other Residential	695.81	10.84	430.66	20.26	524.39	36.67	158.79	37.27	17.35	42.73
Religion	31.38	0.49	11.69	0.55	11.42	0.80	4.06	0.95	0.45	1.11
Single Family	5279.23	82.26	1491.65	70.19	695.97	48.67	188.44	44.23	13.71	33.77
Total	6,418		2,125		1,430		426		41	

## Loss Potential

Property losses were estimated through the Level 1 Hazus-MH analysis for the 2,500-Year Probabilistic Earthquake scenario. The table below is an excerpt from the Hazus global summary report and shows the results for two types of building losses:

- Direct building losses, representing damage to building structures.
- Business interruption losses.

For the 2,500-Year probabilistic earthquake scenario the estimated damage potential is approximately \$133M.

**Table 4-25 Hazus Building Related Economic Loss Estimates for 2,500 Year Scenario**

Table 11: Building-Related Economic Loss Estimates  
(Millions of dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
<b>Income Losses</b>							
	Wage	0.0000	1.3237	5.0794	0.1269	0.3917	6.9217
	Capital-Related	0.0000	0.5651	5.0719	0.0742	0.0795	5.7907
	Rental	1.8676	1.7887	2.7070	0.0380	0.2419	6.6432
	Relocation	6.6677	1.5599	3.9440	0.2848	1.4708	13.9272
	<b>Subtotal</b>	<b>8.5353</b>	<b>5.2374</b>	<b>16.8023</b>	<b>0.5239</b>	<b>2.1839</b>	<b>33.2828</b>
<b>Capital Stock Losses</b>							
	Structural	8.5338	3.0858	5.0709	0.6827	1.2689	18.6421
	Non_Structural	29.8712	10.3733	11.5515	1.9528	3.2147	56.9635
	Content	11.9895	2.3931	6.0575	1.1822	1.7947	23.4170
	Inventory	0.0000	0.0000	0.1915	0.2431	0.0156	0.4502
	<b>Subtotal</b>	<b>50.3945</b>	<b>15.8522</b>	<b>22.8714</b>	<b>4.0608</b>	<b>6.2939</b>	<b>99.4728</b>
	<b>Total</b>	<b>58.93</b>	<b>21.09</b>	<b>39.67</b>	<b>4.58</b>	<b>8.48</b>	<b>132.76</b>

The Hazus analysis also estimated the amount of earthquake-caused debris in the planning area for the 2,500-Year probabilistic earthquake scenario event is estimated to be 49,000 tons.

## Critical Facilities and Infrastructure

All critical facilities and infrastructure in the planning area are exposed to the earthquake hazard. HAZMAT releases can occur during an earthquake from fixed facilities or transportation-related incidents.

Transportation corridors can be disrupted during an earthquake, leading to the release of materials to the surrounding environment. Facilities holding HAZMAT are of particular concern because of possible isolation of neighborhoods surrounding them. During an earthquake, structures storing these materials could rupture and leak into the surrounding area or an adjacent waterway, having a disastrous effect on the environment.

## Level of Damage

Hazus-MH classifies the vulnerability of critical facilities to earthquake damage in two categories: at least moderate damage or complete damage. The analysis did not indicate any damages in these categories to specific facilities. The model also estimates lifeline damages to linear networks such as transportation and utilities. Damage to the transportation system is estimated at \$949 million and utility lifelines at \$644.5 million.



## **Economy**

The Hazus model provides total economic losses that includes building and lifeline related losses previously described. In total, \$199.6 million in economic losses is estimated for the 2,500-year scenario.

## **Historic, Cultural, and Natural Resources**

Secondary hazards associated with earthquakes will likely have some of the most damaging effects on the environment. Earthquake-induced landslides can significantly impact surrounding habitat. Streams can be rerouted after an earthquake. This can change the water quality, possibly damaging habitat and feeding areas. There is a possibility of streams fed by groundwater drying up because of changes in underlying geology. Historic building stock is commonly made of unreinforced masonry which is vulnerable to damage from earthquakes. Thus, the historic buildings in the downtown areas of Buena Vista and Salida have higher vulnerability.

### **4.6.5 Development Trends**

Land use in the planning area will be directed by the comprehensive plans adopted by the county and its planning partners as well as local permitting departments and zoning maps. Development in the planning area will be regulated through building standards and performance measures so that the degree of risk will be reduced. The International Building Code also establishes provisions to address seismic risk.

### **4.6.6 Risk Summary**

- Earthquakes represent a high consequence but low probability hazard; due to the low probability the overall significance is considered low.
- Resulting damages to building stock and utility lifelines, and income related losses could equate to millions of dollars based on Hazus-MH modeling.
- Light casualties are anticipated.
- Earthquake risk is relatively the same across all participating jurisdictions, though impacts could be greater in Salida and Buena Vista due to the historic buildings in the downtown area and concentrations of people.

## 4.7 Erosion and Deposition, Expansive Soil, and Subsidence

EROSION AND DEPOSITION, EXPANSIVE SOIL, AND SUBSIDENCE HAZARD RANKING			
	Erosion and Deposition	Expansive Soil	Subsidence
Chaffee County	Low	Low	Low
City of Salida	Low	No Exposure	Low
Town of Buena Vista	No Exposure	No Exposure	No Exposure
Town of Poncha Springs	Medium	Low	Low

### 4.7.1 Hazard Profile

#### Erosion and Deposition

The Colorado Geological Survey defines erosion as “the removal and simultaneous transportation of earth materials from one location to another by water, wind, waves, or moving ice” (Colorado Geological Survey 2014). Deposition is defined as “the placing of eroded material in a new location” (Colorado Geological Survey 2014). According to the Colorado Geological Survey, all material that is eroded is later deposited in another location. Both erosion and deposition are continually occurring phenomenon, although the rate of erosion and deposition varies tremendously and can be affected by a variety of factors including rate of scour, type of material being eroded, and the presence or absence of vegetation.

#### Expansive Soil

Expansive and collapsible soils are some of the most widely distributed and costly geologic hazards. They are also known as metastable soils and are unsaturated soils that undergo changes in volume and settlement in response to wetting and drying, often resulting in severe damage to structures. The sudden and usually large volume change could cause considerable structural damage.

Expansive soil and rock are characterized by clayey material that shrinks as it dries or swells as it becomes wet. In addition, trees and shrubs placed closely to a structure can lead to soil drying and subsequent shrinkage. The parent (source) rock most associated with expansive soils is shale. Figure 4-17 shows expansive soil distribution in United States.

#### Subsidence and Collapsible Soils

According to the 2018 Colorado Natural Hazards Mitigation Plan, “ground subsidence is the sinking of land over human caused or natural underground voids and the settlement of native low-density soils” (Colorado DHSEM 2018). Subsidence can occur gradually over time or virtually instantaneously. There are many different types of subsidence; however, in Colorado, there are three types of subsidence that warrant the most concern: settlement related to collapsing soils, sinkholes in karst areas, and the ground subsidence over abandoned mine workings.

Collapsible soils are a group of soils that can rapidly settle or collapse the ground. Collapsible soils consist of loose, dry, low-density materials that collapse and compact under the addition of water or excessive

#### DEFINITIONS

**Ground Subsidence—** Ground subsidence is the sinking of land over human-caused or natural underground voids and the settlement of native low-density soils.

**Soil Erosion—** Soil erosion is the removal and simultaneous transportation of earth materials from one location to another by water, wind, waves, or moving ice.

**Deposition—** Deposition is the placing of eroded material in a new location.

loading. Soil collapse occurs when the land surface is saturated at depths greater than those reached by typical rain events. This saturation eliminates the clay bonds holding the soil grains together. Similar to expansive soils, collapsible soils result in structural damage such as cracking of the foundation, floors, and walls in response to settlement. These types of soils are associated with some of the alluvial fan deposits found in Chaffee County.

### Abandoned Mine Workings

The underground removal of minerals and rock can undermine underground support systems and lead to void spaces. These voids can then be affected by natural and man-made processes such as caving, changes in flowage, or changes in overlying rock and soil material resulting in collapse or subsidence. Hazards from these abandoned sites are complicated by the fact that many “final mine maps” are inaccurate or incomplete (Colorado Geological Survey 2014). Mines operating after August 1997 were required by federal and state law to take potential surface subsidence into account; however, mining has been an activity in the state since the 1860s (Colorado Geological Survey 2001). There are some mapped, known mine hazard areas in Colorado and in Chaffee County; however, it is likely that there are additional hazard areas for which no records exist.

### Past Events

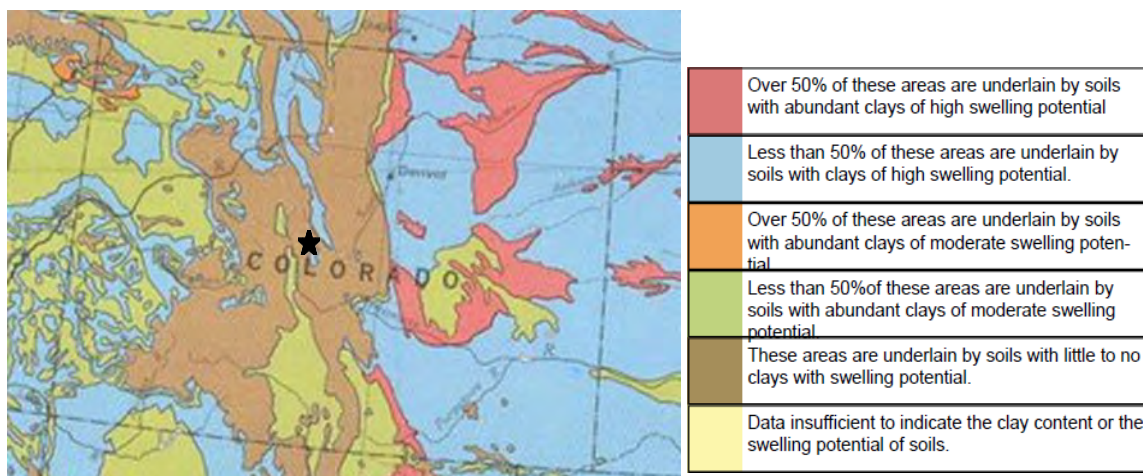
#### Erosion and Deposition

Soil erosion and deposition are ongoing events that can be affected by both natural and human-induced processes. Soil erosion and deposition events are continually occurring throughout the county. Portions of the county vary between highly erodible lands to areas of not highly erodible land. The majority of the highly erodible land is in higher sloped and mountainous areas.

#### Expansive Soil

Chaffee County soils are mostly underlain by soils with little to no clays with swelling potential in the mountains. The lower elevation areas are exposed to low risks from expansive soil. Expanding soils can cause structural damage; however, past events are difficult to identify and measure.

**Figure 4-17 Expansive Soils in the State of Colorado**



★ Chaffee County

Source: USGS. [http://ngmdb.usgs.gov/Prodesc/proddesc\\_10014.htm](http://ngmdb.usgs.gov/Prodesc/proddesc_10014.htm)

### ***Subsidence and Collapsible Soils***

The occurrence of subsidence is an on-going process resulting from natural and human induced causes. Chaffee County Planning reported an incidence of subsidence in June of 2017 where a home was damaged due to collapsible soils in the vicinity of Methodist Mountain near Hwy 50.

### **Location**

#### ***Erosion and Deposition***

Soil erosion and deposition occur in all parts of the county and are more concentrated along waterways and drainages. Point sources of erosion often occur in areas where humans interact with exposed areas of the earth's surface, such as construction sites. Waterways are continually involved in erosion and deposition processes. Areas in Chaffee County that were recently burned are more susceptible to exacerbated erosion and deposition, as noted in the State of Colorado Hazard Mitigation Plan (2018). "As a fire burns, it destroys plant material and the layers of litter that blanket the floor of an ecosystem. These materials, as well as trees, grasses, and shrubs, buffer and stabilize the soil from intense rainstorms. The plant materials slow runoff to give rainwater time to percolate into the ground. When fire destroys this protective layer, rain and wind wash over the unprotected soil and erosion occurs. In areas of Colorado affected by wildfire between 2013 and 2017 – including Archuleta, Rio Grande, Mineral, El Paso, Huerfano, Fremont, Rio Blanco, Jackson, and Boulder Counties – incidences of erosion events were significantly elevated" (Colorado Division of Homeland Security and Emergency Management, 2018). Additionally, areas with high slopes and mountainous regions have a higher susceptibility to soil erosion.

Buena Vista, Salida, and Poncha Springs have low erosion potential, likely because they are in valley regions and not located along high mountain peaks. Erosion does occur in those jurisdictions, though, because of water flow from creeks and rivers.

#### ***Expansive Soil***

The planning area is exposed to minimal risks from expansive soil since this mountainous county has very little underlay of clay soils.

### ***Subsidence and Collapsible Soils***

Collapsible soils are suspected in areas of alluvial fans, notably in the area of Methodist Mountain. Detailed soil mapping was not available during the 2021 update. In the northeast corner of Chaffee County there is one known area of evaporite-bearing bedrock as well as an area of gypsum mining.

### **Frequency and Severity**

Erosion and deposition, subsidence, and sinkholes are occurring continuously throughout the county. Large precipitation events as well as human activity may influence the frequency of these events.

The severity of erosion, deposition, subsidence, and sinkholes is largely related to the extent and location of areas that are impacted. Such events can cause property damage as well as loss of life; however, events may also occur in remote areas of the county where there is little to no impact to people or property. According to the Colorado Geological Survey, "In general, the type and severity of surface subsidence is governed by the amount of ground surface and the location of removal or compression, and the geological conditions of a particular site" (Colorado Geological Survey 2014).

Based on the information in this hazard profile, the magnitude/severity of erosion and deposition, expansive soil, and subsidence is considered to have a low potential impact for the county.

## Warning Time

Subsidence can happen suddenly and without warning or can occur gradually over time. Soil erosion and deposition generally occurs gradually over time; however, these processes may be intensified as a result of natural or human-induced activities. According to Colorado Geological Survey, there are some instances where the rate of subsidence can be calculated, particularly subsidence that occurs as a result of mining activities (Colorado Geological Survey 2001):

*Where longwall mining is active and subsidence is a well-documented and predictable action, surface response to ongoing mining can be accurately estimated. However, in the case of room and pillar mines, especially where they are inaccessible and record-keeping may be inaccurate, predictions of when subsidence will happen are not possible.*

*How much subsidence will occur and the features that will appear at the surface depend not only on the type of mining but on geology and several physical features of the voids left by mining. Some general rules of thumb are:*

- *The larger the mine opening height and width, the larger the subsidence feature at the surface.*
- *The shallower the mine below ground, the more noticeable the surface subsidence evidence; however, in Colorado pits have been found over mines as deep as 350 feet.*
- *The strength of the rock above the coal seam influences whether subsidence will reach the surface and the kind of features that can appear.*

### 4.7.2 Related Hazards

Events that cause damage to improved areas can result in secondary hazards, such as explosions from natural gas lines, loss of utilities such as water and sewer due to shifting infrastructure, and potential failures of reservoir dams. Additionally, these events may occur simultaneously with other natural hazards such as flooding. Erosion can cause undercutting that can result in an increase in landslide or rockfall hazards. Erosion can also cause a loss of topsoil, which can affect agricultural production in the area. Deposition can have impacts that aggravate flooding, bury crops, or reduce capacities of water reservoirs.

### 4.7.3 Climate Change Considerations

Changes in precipitation events and the hydrological cycle may result in changes in the rate of subsidence and soil erosion. Additionally, the future impacts of climate change are expected to influence future erosion and deposition events through changes to the frequency and intensity of wildfires.

### 4.7.4 Vulnerability

#### Population

Population exposure estimates are unavailable. The majority of the population is not exposed to erosion or subsidence. The mountainous regions have a higher risk of erosion. The risk of injury or fatalities as a result of these hazards are limited and would likely be associated with rockfall (see Landslide/debris flow/rockfall hazard profile).

#### Property

Structures and other improvements located in areas prone to subsidence or soil erosion are potentially exposed to risk from these hazards, particularly structures located along streams and other waterways. Additionally, deposition may result in damage to structures and property. Property exposed to subsidence and erosion can range from minor damages or result in complete destruction. According to the Colorado Geological Survey, merely an inch of differential subsidence beneath a residential structure can cause several thousand dollars of damage. Based on historic reports from the Planning Department, one

residential structure has been impacted by collapsible soils. Structures may be condemned as a result of this damage resulting in large losses. Structures exposed to erosion hazard areas may be undermined, resulting in damages. This may also result in the condemnation of a structure. Additionally, physical loss land area may occur as a result of erosion.

### **Critical Facilities and Infrastructure**

Any critical facilities or infrastructure that are located on or near areas prone to subsidence or soil erosion are exposed to risk from the hazard; particularly facilities located along streams and other waterways. Deposition may result in additional exposure to facilities and infrastructure, including dams, bridges, and roads. Public comments received during the Public Review Draft period noted concerns about poor drainage on CR 371, mainly a dirt road, leading to erosion issues which could impede on access for emergency service and the flow of goods.

An analysis of the National Bridge Inventory for Chaffee County resulted in one bridge with a "scour critical" rating, which means is could be susceptible to damage from erosion. The bridge is located on CR 191 over the Arkansas River.

Subsidence can result in serious structural damage to critical facilities and infrastructure such as, roads, irrigation ditches, underground utilities and pipelines. According to the Colorado Geological Survey, large ground displacements caused by collapsing soils can totally destroy roads and structures and alter surface drainage. There is no evidence of extensive subsidence damage in the County.

### **Economy**

Economic impacts typically center around transportation routes temporarily closed by erosion, expansive soils and subsidence. Some roads in the county which could be impacted by these hazards may be used to transport goods across the county or provide access by visitors and tourists. Depending on the amount of damage, the road may simply need some level of reconstruction and affect the local economy indirectly.

### **Historic, Cultural, & Natural Resources**

Subsidence, erosion, and deposition are all naturally occurring processes, but can still cause damage to the natural environment. Environments located in areas prone to subsidence and deposition are exposed. Additionally, areas where sediments are deposited are also exposed.

Ecosystems that are exposed to increased sedimentation as a result of erosion and deposition degrades habitat. However, some erosion and disposition is required for healthful ecosystem functioning. Ecosystems that are already exposed to other pressures, such as encroaching development, may be more vulnerable to impacts from these hazards.

#### **4.7.5 Development Trends**

According to the 2018 Colorado Natural Hazards Mitigation Plan (Colorado Division of Homeland Security and Emergency Management 2018):

*Future development will continue to intersect subsidence hazard areas based on past and projected population growth. Important identification and mitigation strategies are necessary in engineering geology and geotechnical investigations within the evaporite terrain mapped. Avoidance is generally the best mitigation solution where subsidence features are exposed at the surface and properly identified. Many older sinkholes may be hidden. Only subsurface inspections, either by investigative trenching, a series of investigative borings, geophysical means, and/or observations made during over lot grading or utility installation, can ascertain whether sinkholes exist within a development*

*area. Ground-modification and structural solutions can help mitigate the threat of localized subsidence. Drainage issues and proper water management are also important. In Colorado's semi-arid climate, additional increases of fresh water may accelerate dissolution and further destabilize certain subsidence areas.*

Jurisdictions in the planning area should ensure that known hazard areas are regulated under their planning and zoning programs, but a lack of detailed hazard mapping for collapsible soils and fluvial hazard zones is an issue. Understanding the potential hazards are key to addressing them through jurisdictional ordinances and regulations so that future impacts are mitigated or avoided prior to development.

#### **4.7.6 Risk Summary**

The major issues for subsidence, expansive soils, erosion, and deposition are the following:

- There has been little evidence that erosion, expansive soils and subsidence have had much impact on general property in the County, but the potential for issues exists if new development is not carefully sited. Significance is generally low to medium for the participating jurisdictions.
- One bridge has a scour critical rating and is located on CR 191 over the Arkansas River.
- More detailed mapping would allow for analysis for buildings, critical facilities and infrastructure exposed to hazard areas.



## 4.8 Flood

FLOOD HAZARD RANKING	
Chaffee County	Medium
City of Salida	Medium
Town of Buena Vista	High
Town of Poncha Springs	Medium

### 4.8.1 Hazard Profile

#### Flood

The following section is excerpted from the 2018 Colorado State Hazard Mitigation Plan.

A flood is a general and temporary condition of partial or complete inundation of normally dry land areas from:

- The overflow of stream banks
- The unusual and rapid accumulation of runoff of surface waters from any source

Flooding results when the flow of water is greater than the normal carrying capacity of the stream channel. Rate of rise, magnitude (or peak discharge), duration, and frequency of floods are a function of specific physiographic characteristics. Generally, the rise in water surface elevation is quite rapid on small (and steep gradient) streams and slow in large (and flat sloped) streams.

The causes of floods relate directly to the accumulation of water from precipitation, rapid snowmelt, or the failure of man-made structures, such as dams or levees. Floods caused by precipitation are further classified as coming from: rain in a general storm system, rain in a localized intense thunderstorm, melting snow, rain on melting snow, and ice jams. Floods may also be caused by structural or hydrologic failures of dams or levees. A hydrologic failure occurs when the volume of water behind the dam or levee exceeds the structure's capacity resulting in overtopping. Structural failure arises when the physical stability of the dam or levee is compromised due to age, poor construction and maintenance, seismic activity, rodent tunneling, or myriad other causes. For more information on floods resulting from dam and levee failure refer to Chapter 4.4 of this plan.

The potential for flooding can change and increase through various land use changes and changes to 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. These changes are commonly created by human activities (e.g., development). These changes can also be created by other events such as wildfires. Wildfires create hydrophobic soils, a hardening or "glazing" of the earth's surface that prevents rainfall from being absorbed into the ground, thereby increasing runoff, erosion, and downstream sedimentation of channels.

Potential flood impacts include loss of life, injuries, and property damage. Floods can also affect infrastructure (water, gas, sewer, and power utilities), transportation, jobs, tourism, the environment, and ultimately local and regional economies.

#### DEFINITIONS

**Flood**—The inundation of normally dry land resulting from the rising and overflowing of a body of water.

**Floodplain**—The land area along the sides of a river that becomes inundated with water during a flood.

**100-Year Floodplain**—The area of flooding that has a 1% chance of being equaled or exceeded each year. This is a statistical average only; a 100-year flood can occur more than once in a short period of time. The 1% annual chance flood is the standard used by most federal and state agencies.

**Riparian Zone**—The area along the banks of a natural watercourse.

### ***General Rain Floods***

General rain floods can result from moderate to heavy rainfall occurring over a wide geographic area lasting several days. They are characterized by a slow steady rise in stream stage and a peak flood of long duration. As various minor streams empty into larger and larger channels, the peak discharge on the mainstream channel may progress upstream or downstream (or remain stationary) over a considerable length of river. General rain floods can result in considerably large volumes of water. The general rain flood season is historically from the beginning of May through October. Because the rate of rise is slow and the time available for warning is great, few lives are usually lost, but millions of dollars in valuable public and private property are at risk.

### ***Thunderstorm Floods***

Damaging thunderstorm floods are caused by intense rain over basins of relatively small area. They are characterized by a sudden rise in stream level, short duration, and a relatively small volume of runoff. Because there is little or no warning time, the term “flash flood” is often used to describe thunderstorm floods. The average number of thunderstorm days per year in Colorado varies from less than 40 near the western boundary to over 70 in the mountains along the Front Range. The thunderstorm flood season in Colorado is from the middle of July through October.

### ***Snowmelt Floods***

Snowmelt floods result from melting of winter snowpack in the high mountain areas. Snowmelt floods typically begin as spring runoff appears, after the first spring warming trend. If the warming trend continues up to 8 to 10 consecutive days in a basin where the snowpack has a water content more than about 150% of average, serious flooding can develop. The total duration of snowmelt floods is usually over a period of weeks rather than days. They yield a larger total volume in comparison to other types of floods in Colorado. Peak flows, however, are generally not as high as flows for the other types. A single cold day or cold front can interrupt a melting cycle causing the rising water to decline and stabilize until the cycle can begin again. Once snowmelt floods have peaked, the daily decreases are moderate, but fairly constant. Snowmelt flooding usually occurs in May, June, and early July.

### ***Rain on Snowmelt Floods***

Rain on snow flooding occurs most often in Colorado during the month of May. Generally, at this time of year large rainstorms occur over western Colorado. These rainstorms are most often caused when warm moist air from the Gulf of Mexico begins pushing far enough north that it begins to affect western weather. In combination with this movement of air mass is the continued possibility of cold fronts moving into Colorado from the Pacific Northwest. When these weather phenomena collide, long-lasting general rainstorms can often occur. Rain on snowmelt exacerbates an already tenuous situation as snowmelt waters rush down heavily incised stream channels. Any abnormal increase in flow from other sources usually causes streams to leave their banks.

During the summer months of May and June when rivers are running high, there is a potential for flooding due to rain falling on melting snow. Usually such rain is over a small part of a basin, and the resulting flood is of short duration and may often go unnoticed in the lower reaches of a large drainage basin. To some extent, the cloud cover associated with the rain system can slow the melting cycle and offset the compound effect. In some cases, however, rainfall may be heavy and widespread enough to noticeably affect peak flows throughout the basin.

### ***Ice Jam Floods***

Ice jam floods can occur by two phenomena. In the mountain floodplains during extended cold periods of 20 to 40 degrees below zero, the streams ice over. The channels are frozen solid and overbank flow

occurs, which results in ice inundation in the floodplains. Ice jam floods can occur when frozen water in the upper reaches of a stream abruptly begins to melt due to warm Chinook winds. Blocks of ice floating downstream can become lodged at constrictions and form a jam. The jam can force water to be diverted from the stream channel causing a flood. An ice jam can also break up, suddenly causing a surge of water as the “reservoir” that was formed behind it is suddenly released. Ice jamming occurs in slow moving streams where prolonged periods of cold weather are experienced. Sometimes the ice jams are dynamited, allowing a controlled release of the backed-up water to flow downstream.

## **Floodplain**

A floodplain is the area adjacent to a river, creek, or lake that becomes inundated during a flood. Floodplains may be broad, as when a river crosses an extensive flat landscape, or narrow, as when a river is confined in a canyon.

When floodwaters recede after a flood event, they leave behind layers of rock and mud. These gradually build up to create a new floor of the floodplain. Floodplains generally contain unconsolidated sediments (accumulations of sand, gravel, loam, silt, or clay), often extending below the bed of the stream. These sediments provide a natural filtering system, with water percolating back into the ground and replenishing groundwater. These are often important aquifers, the water drawn from them being filtered compared to the water in the stream. Fertile, flat reclaimed floodplain lands are commonly used for agriculture, commerce, and residential development.

Connections between a river and its floodplain are most apparent during and after major flood events. These areas form a complex physical and biological system that not only supports a variety of natural resources but also provides natural flood and erosion control. When a river is separated from its floodplain with levees and other flood control facilities, natural, built-in benefits can be lost, altered, or significantly reduced.

## **Measuring Floods and Floodplains**

The frequency and severity of flooding are measured using a discharge probability, which is the probability that a certain river discharge (flow) level will be equaled or exceeded in a given year. Flood studies use historical records to estimate the probability of occurrence for the different discharge levels. The flood frequency equals 100 divided by the discharge probability. For example, the 100-year discharge has a 1% chance of being equaled or exceeded in any given year. The “annual flood” is the greatest flood event expected to occur in a typical year. These measurements reflect statistical averages only; it is possible for two or more floods with a 100-year or higher recurrence interval to occur in a short time period. The same flood can have different recurrence intervals at different points on a river.

The extent of flooding associated with a 1% annual probability of occurrence (the base flood or 100-year flood) is used as the regulatory boundary by many agencies. Also referred to as the special flood hazard area (SFHA), this boundary is a convenient tool for assessing vulnerability and risk in flood-prone communities. Many communities have maps that show the extent and likely depth of flooding for the base flood. Corresponding water-surface elevations describe the elevation of water that will result from a given discharge level, which is one of the most important factors used in estimating flood damage.

## **Floodplain Ecosystems**

Floodplains can support ecosystems that are rich in plant and animal species. A floodplain can contain 100 or even 1,000 times as many species as a river. Wetting of the floodplain soil releases an immediate surge of nutrients: those left over from the last flood, and those that result from the rapid decomposition of organic matter that has accumulated since then. Microscopic organisms thrive and larger species enter a

rapid breeding cycle. Opportunistic feeders (particularly birds) move in to take advantage. The production of nutrients peaks and falls away quickly, but the surge of new growth endures for some time. This makes floodplains valuable for agriculture. Species growing in floodplains are markedly different from those that grow outside floodplains. For instance, riparian trees (trees that grow in floodplains) tend to be very tolerant of root disturbance and very quick growing compared to non-riparian trees.

### Effects of Human Activities

Because they border water bodies, floodplains have historically been popular sites to establish settlements. Human activities tend to concentrate in floodplains for a number of reasons: water is readily available; land is fertile and suitable for farming; transportation by water is easily accessible; and land is flatter and easier to develop. But human activity in floodplains frequently interferes with the natural function of floodplains.

It can affect the distribution and timing of drainage, thereby increasing flood problems. Human development can create local flooding problems by altering or confining drainage channels. This increases flood potential in two ways: it reduces the stream's capacity to contain flows, and it increases flow rates or velocities downstream during all stages of a flood event. Human activities can interface effectively with a floodplain as long as steps are taken to mitigate the activities' adverse impacts on floodplain functions.

### Past Events

The National Centers for Environmental Information Storm Events Database includes flood and flash flood events that happened in Chaffee County between 1990 and 2020 as listed in the table below Table 4-26. Chaffee County experienced one major flood in 1999, which caused \$2 million in property damages.

**Table 4-26 Chaffee County Flood Events (1990-2020)**

Location	Date	Event Type	Estimated Damage Cost	
			Property	Crops
Monument Ridge	4/30/1999	Flood	\$2,000,000	\$0
Buena Vista	7/22/2002	Flash Flood	\$100,000	\$0
Buena Vista	8/18/2004	Flash Flood	\$0	\$0
Buena Vista	7/5/2007	Flash Flood	\$20,000	\$0
Salida	7/19/2007	Flash Flood	\$0	\$0
Alpine	7/21/2007	Flash Flood	\$1,000,000	\$0
Alpine	8/2/2007	Flash Flood	\$2,000,000	\$0
Poncha Springs	8/16/2007	Flash Flood	\$0	\$0
Buena Vista	07/15/2017	Flash Flood	\$0	\$0
Mt. Princeton Hot Spring	07/19/2017	Flash Flood	\$0	\$0
Salida	07/26/2020	Flash Flood	\$0	\$0
Source: National Centers for Environmental Information, Storm Events Database				

Notable incidents causing damages from the Storm Events Database in Chaffee County are described below:

- **July 21, 2007** – Heavy thunderstorms produced up to 3 inches of rain and caused severe mud flows over sections of county roads 162 and 292 in Chalk Creek Canyon. The Alpine subdivision was in the path of the worst mudflow, where mandatory evacuations occurred. More than 30 houses and over

100 people were evacuated, as mud and boulders as deep as 8 feet moved down the mountain side. At least 15 houses were damaged as well as landscaping and vehicles.

- **August 2, 2007** – Thunderstorms produced very heavy rain in west central Chaffee County. The hardest hit area was in and around Alpine. Mud flows from the south slope of Mt. Princeton were up to six feet deep that caused damage and destruction of roads and houses. Residents were evacuated to Buena Vista, but no one was seriously hurt. The clean-up took several days.

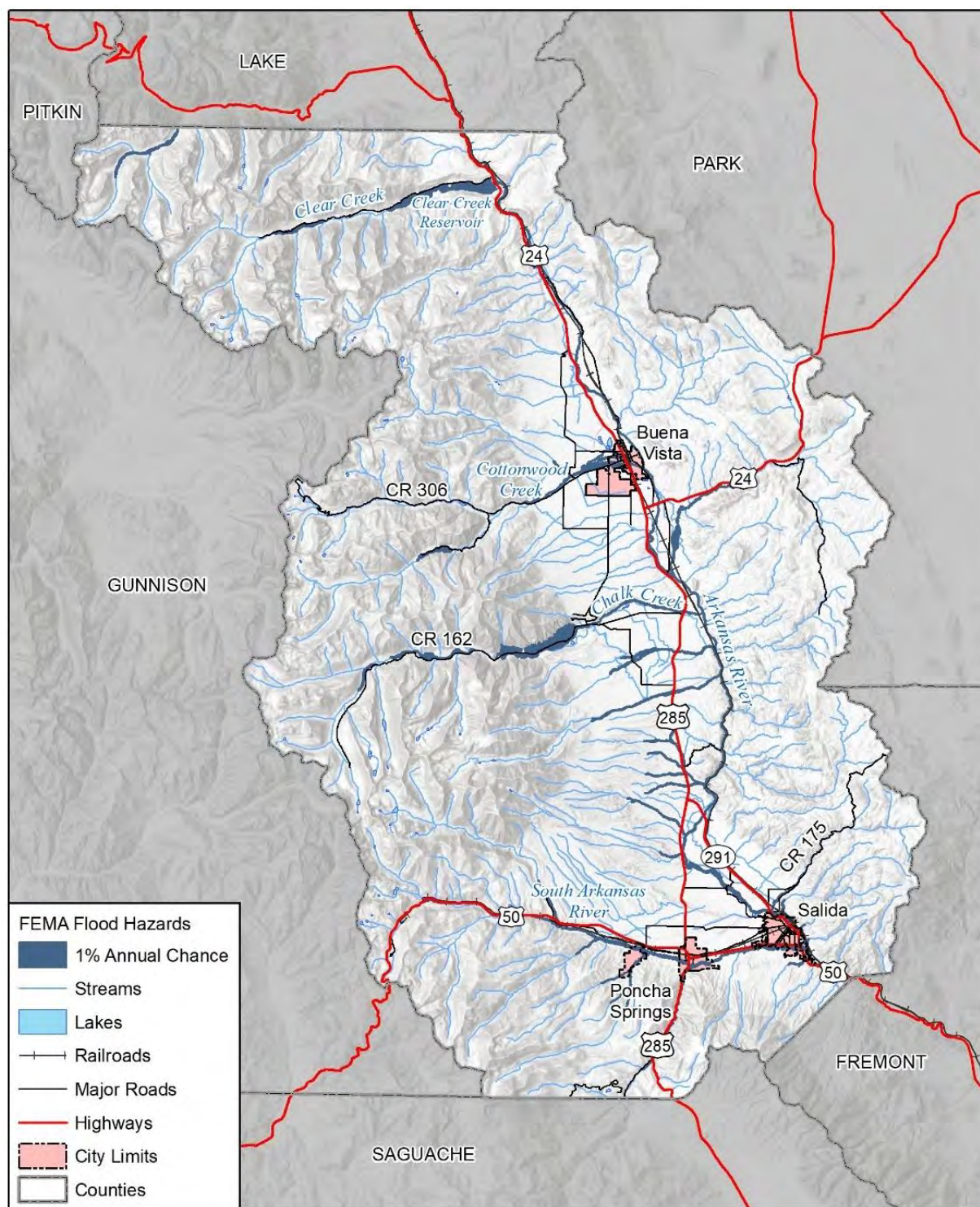
## Location

Chaffee County is in the Arkansas River Basin. The Arkansas River flows roughly north to south through the center of Chaffee County. Of all the river basins in Colorado, the Arkansas River Basin encompasses the greatest surface area of the state at 28,268 square miles.

Figure 4-18 below highlights the extent of the 100-year floodplain countywide in the planning area. The effective date for the current countywide FIRM is December 7, 2017. The Colorado Water Conservation Board is in the process of updating more extensive flood hazard mapping through a base level engineering study in 2021. Figure 4-19 through Figure 4-21 focus on the city of Salida and towns of Buena Vista and Poncha Springs and highlight the locations of exposed properties in the 100-year and 500-year floodplain.



**Figure 4-18 Chaffee County FEMA Flood Hazards**



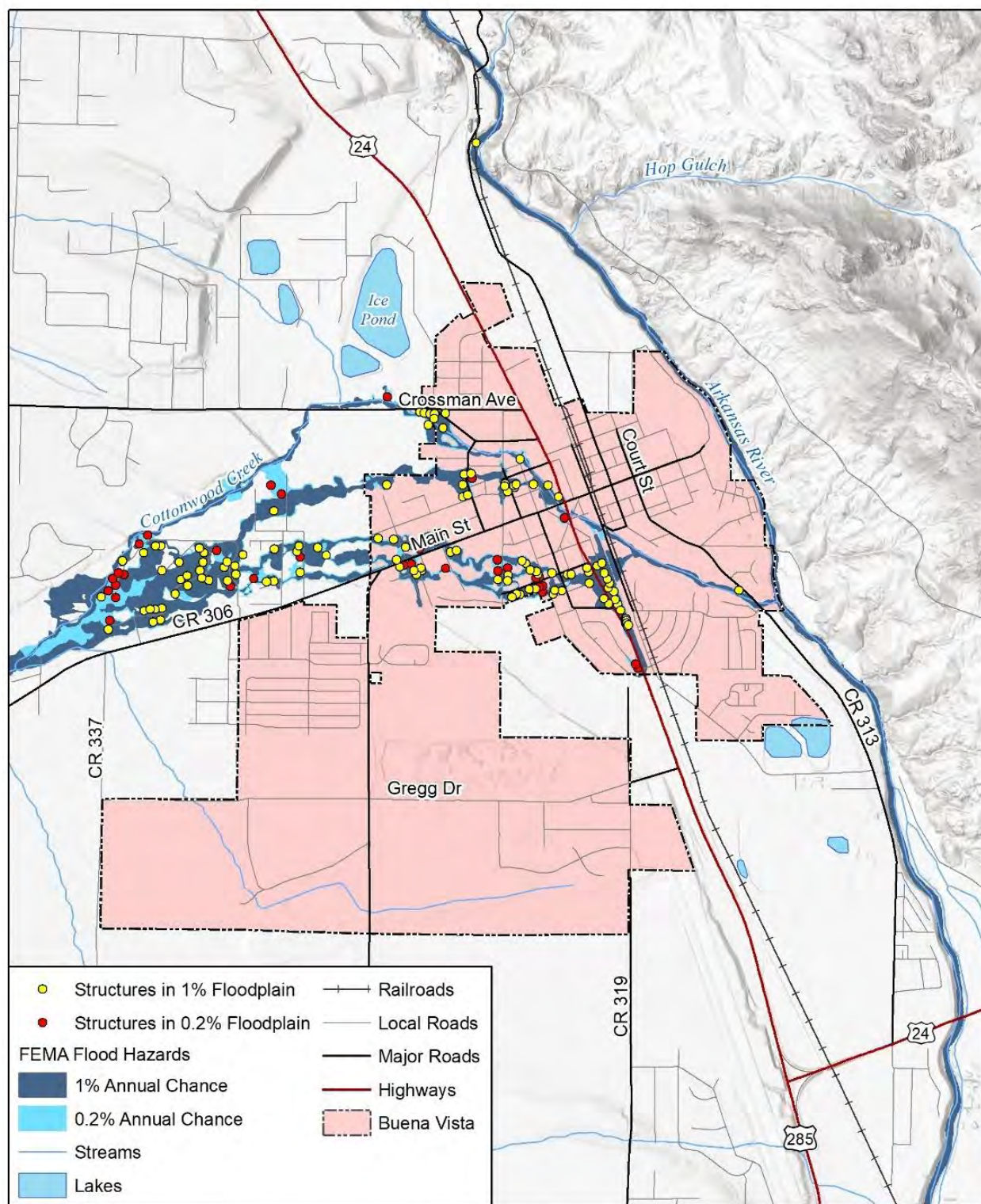
**wood** Map compiled 1/2021;  
intended for planning purposes only.  
Data Source: Chaffee County, CDOT,  
FEMA NFHL 10/09/2019

0 5 10 Miles





**Figure 4-19 Buena Vista Properties in the 100 and 500-year Floodplains**



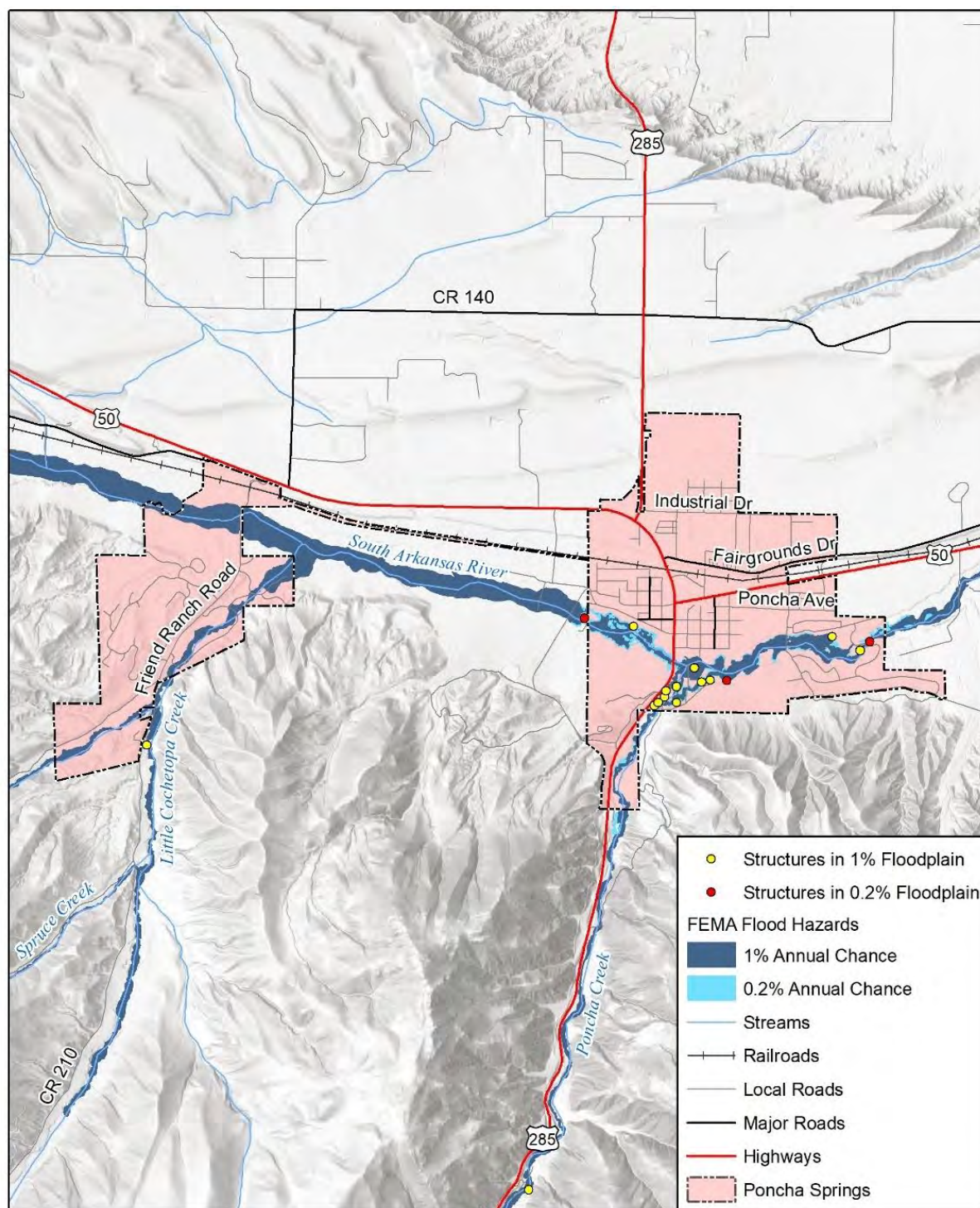
Map compiled 2/2021;  
intended for planning purposes only.  
Data Source: Chaffee County, CDOT,  
FEMA NFHL 10/09/2019

0 0.5 1 Miles





**Figure 4-20 Poncha Springs Properties in the 100 and 500-year Floodplains**



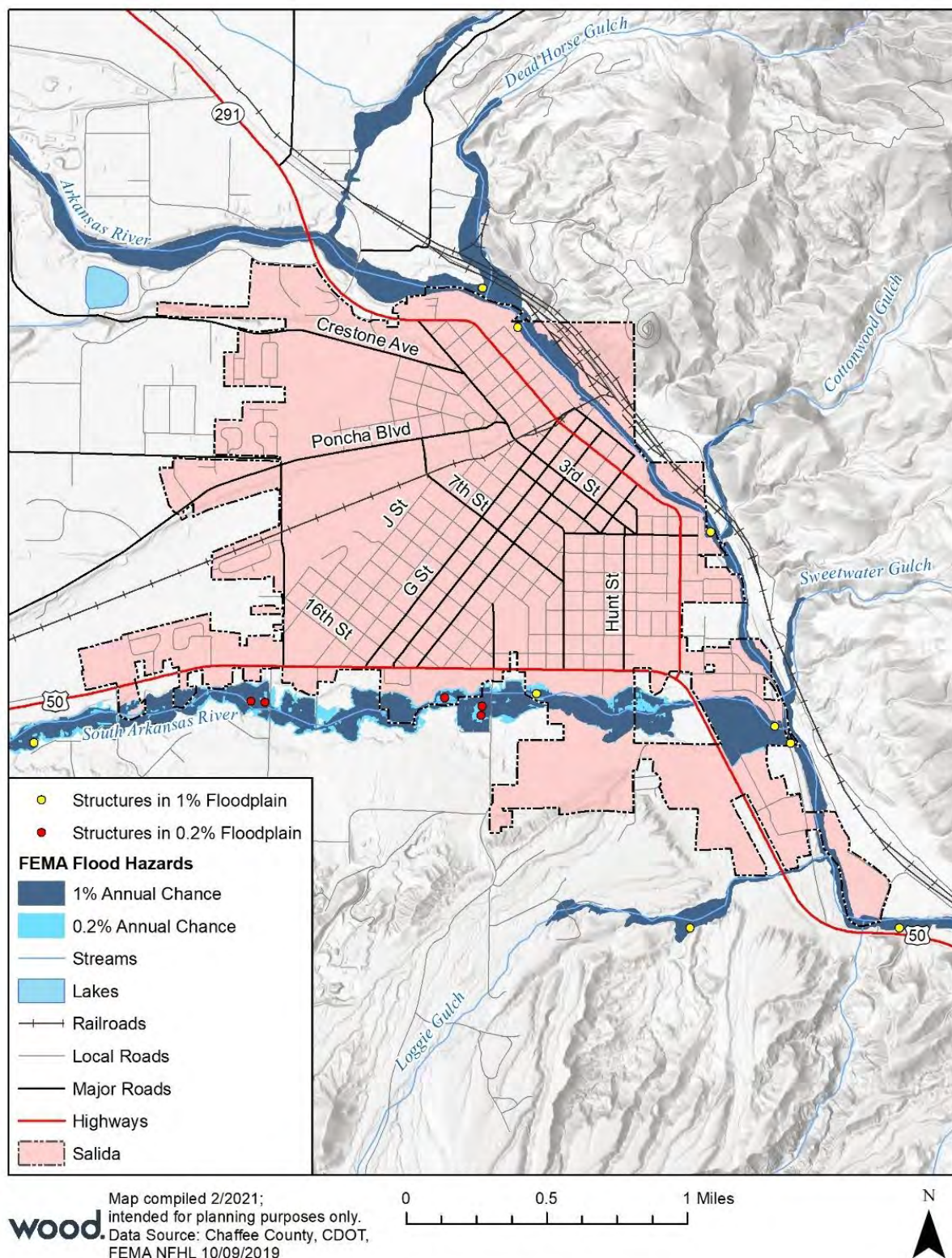
**wood** Map compiled 2/2021;  
intended for planning purposes only.  
Data Source: Chaffee County, CDOT,  
FEMA NFHL 10/09/2019

0 0.5 1 Miles





**Figure 4-21 Salida Properties in the 100 and 500-year Floodplains**



## Frequency and Severity (Extent)

Flash floods and floods, in Chaffee County, are considered to be moderately likely to occur, with years experiencing high snow in the winter having a greater chance for flood in the spring and summer, though the majority of floods have been related to summer thunderstorms. This probability is based on the eleven events that have been reported through 2020, indicating a 55% chance of occurrence in any given year (Table 4-26).

Based on the information in this hazard profile, the magnitude/severity of flooding is moderate to high, for all the planning partners. The loss potential is the highest for the unincorporated county and the Town of Buena Vista (see Table 4-27). The planning committee members ranked flood as a high hazard for the Town of Buena Vista and a medium ranked hazard for the unincorporated county, City of Salida, and the Town of Poncha Springs. This is reflected in the flood hazard maps shown previously and quantified in the vulnerability section.

## Warning Time

Due to the sequential pattern of meteorological conditions needed to cause serious flooding, it is unusual for a flood to occur without warning. Warning times for floods can be between 24 and 48 hours. Flash flooding can be less predictable, but potential hazard areas can be warned in advanced of potential flash flooding danger. Flood warnings are issued by radio and television media, NOAA weather radio, public address systems, emergency sirens, or emergency personnel. Police and fire officials may be on hand to direct evacuations.

The NWS has issued general flood forecasting guidance for the region. Although it can be difficult to predict how much rain will result in a flood event on any given day, there are some general principles regarding when flood events are more likely to occur (NWS 2010):

- If 1 inch or more of rain falls in an urban or mountain area in 1 hour, a flood statement should be issued. In mountain areas, a flash flood warning may be necessary.
- If 2 or more inches of rain falls in an urban or mountain area in 1 hour, a flash flood warning should be issued.
- In rural areas on the plains, if rainfall reaches 2 inches in 1 hour, a flood statement should be issued and if rainfall reaches 3 inches in 1 hour, a flash flood warning should be issued.
- If precipitable water values exceed 150% of normal, this is a good indicator that flash flood-producing rains will develop if precipitation occurs.

### 4.8.2 Related Hazards

The most problematic secondary hazard for flooding is bank erosion, which in some cases can be more harmful than actual flooding. This is especially true in the upper courses of rivers with steep gradients, where floodwaters may pass quickly and without much damage, but scour the banks, edging properties closer to the floodplain or causing them to fall in. Flooding is also responsible for hazards such as landslides and mud flow when high flows over-saturate soils on steep slopes, causing them to fail. Hazardous materials spills are also a secondary hazard of flooding if storage tanks rupture and spill into streams, rivers or storm sewers.

### 4.8.3 Climate Change Considerations

Use of historical hydrologic data has long been the standard of practice for designing and operating water supply and flood protection projects. For example, historical data are used for flood forecasting models and to forecast snowmelt runoff for water supply. This method of forecasting assumes that the climate of the future will be similar to that of the period of historical record. However, the hydrologic record cannot be used to predict changes in frequency and severity of extreme climate events such as

floods. Going forward, model calibration or statistical relation development must happen more frequently, new forecast-based tools must be developed, and a standard of practice that explicitly considers climate change must be adopted. Climate change is already impacting water resources, and resource managers have observed the following:

- Historical hydrologic patterns can no longer be solely relied upon to forecast the water future.
- Precipitation and runoff patterns are changing, increasing the uncertainty for water supply and quality, flood management, and ecosystem functions.
- Extreme climatic events will become more frequent, necessitating improvement in flood protection, drought preparedness, and emergency response.

High frequency flood events (e.g., 10-year floods) in particular will likely increase with a changing climate, as well as the potential for less frequent, more extreme events. With potential increases in the frequency and intensity of wildfires due to climate change, there is potential for more floods following fire, which increase sediment loads and water quality impacts.

#### **4.8.4 Vulnerability**

Many of the areas exposed to flooding as shown on NFIP maps may not experience serious flooding or flood damage. This section describes vulnerabilities in terms of population, property, infrastructure and environment. The vulnerability analysis was performed at the parcel level using GIS during the 2021 update. This methodology improves upon the census-block level analysis done previously, which likely overestimated impacts from both the modelled 100-year and 500-years flood events as it is assumed that both structures and the population are evenly spread throughout census block. This section describes vulnerabilities in terms of population, property, infrastructure, and environment. Results of the analysis for each vulnerability subject are presented in the following sections.

#### **Population**

Injuries or fatalities typically result if people are caught off guard by the flood event, more commonly associated with flash floods. Most fatalities occur when people attempt to drive across flooded areas.

Population counts of those living in the floodplain in the planning area were generated by analyzing tax assessor data and building locations that intersect with the 100-year and 500-year floodplains identified on FIRMs. Since both floodplains are nearly identical spatially (that is, the 100-year and 500-year floodplains overlap), they contain the same number of structures and therefore have the same population distribution. Total populations were estimated by multiplying the number of residential properties exposed to the 100-year floodplain by the average Chaffee County household size of the respective communities (ranging from 2.01 to 2.3 persons per household).

Using this approach, it was estimated that the exposed population for the entire county is 614 within the 100-year floodplain. For the unincorporated portions of the county, it is estimated that the exposed population is 470 within the 100-year floodplain. For the City of Salida, Town of Buena Vista, and the Town of Poncha Springs, it is estimated the exposed population to the 100-year floodplain are 4, 107, and 32, respectively.

#### **Property**

##### ***Structures in the Floodplain***

Table 4-27 summarizes the total number of improved parcels and number of structures in the 100-year floodplains by municipality, which are also illustrated in Figure 4-19, Figure 4-20, and Figure 4-21 for Buena Vista, Poncha Springs, and Salida respectively. Table 4-28 summarizes the total number of

improved parcels and number of structures in the 500-year floodplain by municipality. The analysis determined that there are 326 structures within the 100-year floodplain. Approximately 71.2% of these structures are in unincorporated areas. Approximately 85% of the structures are residential. The parcel analysis revealed there are significantly fewer structures in the 500-year floodplain, with a grand total of 43 structures. The analysis does not account for those structures that might have been more recently constructed in accordance with local floodplain management regulations.

**Table 4-27 Jurisdiction and Property Type in the 1% Annual Chance Flood Hazard**

Jurisdiction	Property Type	Improved Parcels	Building Count	Improved Value	Content Value	Total Value	Estimated Loss
Buena Vista	Commercial	16	23	\$3,758,910	\$3,758,910	\$7,517,820	\$1,879,455
	Exempt	3	3	\$377,468	\$377,468	\$754,936	\$188,734
	Residential	48	49	\$10,815,040	\$5,407,520	\$16,222,560	\$4,055,640
	<b>Total</b>	<b>67</b>	<b>75</b>	<b>\$14,951,418</b>	<b>\$9,543,898</b>	<b>\$24,495,316</b>	<b>\$6,123,829</b>
Poncha Springs	Residential	13	14	\$2,995,559	\$1,497,780	\$4,493,339	\$1,123,335
	Vacant Land	1	1	\$46,078	\$46,078	\$92,156	\$23,039
	<b>Total</b>	<b>14</b>	<b>15</b>	<b>\$3,041,637</b>	<b>\$1,543,858</b>	<b>\$4,585,495</b>	<b>\$1,146,374</b>
Salida	Residential	2	2	\$1,005,738	\$502,869	\$1,508,607	\$377,152
	Vacant Land	2	2	\$165,196	\$165,196	\$330,392	\$82,598
	<b>Total</b>	<b>4</b>	<b>4</b>	<b>\$1,170,934</b>	<b>\$668,065</b>	<b>\$1,838,999</b>	<b>\$459,750</b>
Unincorporated	Agricultural	7	7	\$2,507,450	\$2,507,450	\$5,014,900	\$1,253,725
	Commercial	2	7	\$1,776,724	\$1,776,724	\$3,553,448	\$888,362
	Exempt	3	3	\$6,036,039	\$6,036,039	\$12,072,078	\$3,018,020
	Residential	209	211	\$57,587,047	\$28,793,524	\$86,380,571	\$21,595,143
	Vacant Land	4	4	\$36,339	\$36,339	\$72,678	\$18,170
	<b>Total</b>	<b>225</b>	<b>232</b>	<b>\$67,943,599</b>	<b>\$39,150,076</b>	<b>\$107,093,675</b>	<b>\$26,773,419</b>
<b>Grand Total</b>		<b>310</b>	<b>326</b>	<b>\$87,107,588</b>	<b>\$50,905,896</b>	<b>\$138,013,484</b>	<b>\$34,503,371</b>

Source: Chaffee County Assessor, Wood GIS analysis

**Table 4-28 Jurisdiction and Property Type in the 0.2% Annual Chance Flood Hazard**

Jurisdiction	Property Type	Improved Parcels	Building Count	Improved Value	Content Value	Total Value	Estimated Loss
Buena Vista	Commercial	1	1	\$430,286	\$430,286	\$860,572	\$215,143
	Exempt	1	1	\$225,327	\$225,327	\$450,654	\$112,664
	Residential	16	16	\$3,541,846	\$1,770,923	\$5,312,769	\$1,328,192
	<b>Total</b>	<b>18</b>	<b>18</b>	<b>\$4,197,459</b>	<b>\$2,426,536</b>	<b>\$6,623,995</b>	<b>\$1,655,999</b>



Jurisdiction	Property Type	Improved Parcels	Building Count	Improved Value	Content Value	Total Value	Estimated Loss
Poncha Springs	Agricultural	1	1	\$388,568	\$388,568	\$777,136	\$194,284
	Residential	1	1	\$398,908	\$199,454	\$598,362	\$149,591
	<b>Total</b>	<b>2</b>	<b>2</b>	<b>\$787,476</b>	<b>\$588,022</b>	<b>\$1,375,498</b>	<b>\$343,875</b>
Salida	Residential	1	1	\$489,994	\$244,997	\$734,991	\$183,748
	<b>Total</b>	<b>1</b>	<b>1</b>	<b>\$489,994</b>	<b>\$244,997</b>	<b>\$734,991</b>	<b>\$183,748</b>
Unincorporated	Agricultural	2	3	\$827,638	\$827,638	\$1,655,276	\$413,819
	Commercial	2	2	\$927,279	\$927,279	\$1,854,558	\$463,640
	Residential	17	17	\$6,173,314	\$3,086,657	\$9,259,971	\$2,314,993
	<b>Total</b>	<b>21</b>	<b>22</b>	<b>\$7,928,231</b>	<b>\$4,841,574</b>	<b>\$12,769,805</b>	<b>\$3,192,451</b>
<b>Grand Total</b>		<b>42</b>	<b>43</b>	<b>\$13,403,160</b>	<b>\$8,101,129</b>	<b>\$21,504,289</b>	<b>\$5,376,072</b>

Source: Chaffee County Assessor, Wood GIS analysis

### Exposed Value

Table 4-27 summarizes the estimated value of exposed buildings in the planning area in the 100-year floodplain. This methodology estimated \$138M of building-and-contents exposure in flood hazard areas, representing approximately 2.5% of the total assessed value of the planning area. Losses to properties were estimated at \$34.5M as 25% of the total value of a property exposed to the floodplain, based on typical FEMA depth-damage relationships.

### National Flood Insurance Program Flood Insurance Claims Analysis

Table 4-29 lists flood insurance statistics that help identify vulnerability in the planning area. Chaffee County, the City of Salida, and the Towns of Buena Vista and Poncha Springs all participate in the NFIP.

**Table 4-29 National Flood Insurance Program Statistics**

	Initial FIRM Effective Date	Claims, 11/1978 to 12/31/2020	Value of Claims paid, 11/1978 to 12/31/2020
Buena Vista	9/30/1982	2	\$1,007
Poncha Springs	2/19/1987	0	\$0
Salida	9/30/1982	1	\$1,310
Rest of County	3/04/1987	3	\$304,825
Total	--	6	\$307,142

Properties constructed after a FIRM has been adopted are eligible for reduced flood insurance rates. Such structures are less vulnerable to flooding since they were constructed after regulations and codes were adopted to decrease vulnerability. Properties built before a FIRM is adopted are more vulnerable to flooding because they do not meet code or are located in hazardous areas.

The following information from flood insurance statistics is relevant to reducing flood risk:

- The use of flood insurance in the planning area is below the national average.
- The average claim paid in the planning area is below the national average.



### **Repetitive Loss**

The NFIP defines a repetitive loss property as any insurable building for which two or more claims of more than \$1,000 were paid by the NFIP within any rolling 10-year period since 1978. At least two of the claims must be more than 10 days apart but within 10 years of each other. A repetitive loss property may or may not be currently insured by the NFIP. Chaffee County, the City of Salida, and the Towns of Buena Vista and Poncha Springs have no FEMA repetitive loss or severe repetitive loss properties that meet the FEMA definition.

### **Critical Facilities and Infrastructure**

Transportation routes could be cut off due to floodwaters, isolating portions of the planning area. These impacts may last after the floodwater recedes as flash floods in the area have been known to cause extensive damage to roadway infrastructure. Details on exposed critical facilities by type and FEMA lifeline are shown in Table 4-30 and Table 4-31. For the 100-year flood, the most common at-risk facilities belong to the communications lifeline. The risk to specific critical facilities is minimal beyond the summary below based on mapped floodplains and current exposure.

**Table 4-30 Total Critical Facilities at Risk to 1% Annual Chance Flood Hazard by FEMA Lifeline and Jurisdiction**

<b>Jurisdiction</b>	<b>FEMA Lifeline</b>	<b>Critical Facility Type</b>	<b>Count</b>
Salida	Communications	Land Mobile Private Transmission Tower	2
Unincorporated	Communications	Land Mobile Private Transmission Tower	5
<b>Total</b>			<b>7</b>

**Table 4-31 Total Critical Facilities at Risk to 0.2% Annual Chance Flood Hazard by FEMA Lifeline and Jurisdiction**

<b>Jurisdiction</b>	<b>FEMA Lifeline</b>	<b>Critical Facility Type</b>	<b>Count</b>
Buena Vista	Safety and Security	Public Safety	1
<b>Total</b>			<b>1</b>

### **Economy**

Flooding can have a major economic impact on the economy, including indirect losses such as business interruption, lost wages, and other downtime costs. Flooding often coincides with the busy summer tourism months in Chaffee County.

### **Historic, Cultural, and Natural Resources**

Flooding is a natural event, and floodplains provide many natural and beneficial functions. Nonetheless, with human development factored in, flooding can impact the environment in negative ways. Migrating fish can wash into roads or over dikes into flooded fields, with no possibility of escape. Pollution from roads, such as oil, and hazardous materials can wash into rivers and streams. During floods, these can settle onto normally dry soils, polluting them for agricultural uses. Human development such as bridge abutments can increase stream bank erosion, causing rivers and streams to migrate into non-natural courses.

#### **4.8.5 Development Trends**

Chaffee County and its planning partners regulate growth within flood hazard areas. All municipal planning partners are participants in the NFIP and have adopted flood damage prevention ordinances in

response to its requirements. All municipal planning partners have committed to maintaining their good standing under the NFIP through initiatives identified in this plan.

Urban flooding issues that contribute to flash floods are also a concern in more highly developed areas in Chaffee County. Jurisdictions in the county incorporate stormwater design requirements and rely on the State of Colorado's stormwater permitting program as mandated by the National Pollutant Discharge Elimination System. This program helps jurisdictions apply effective mitigation measures for stormwater runoff.

#### **4.8.6 Risk Summary**

The major issues for flooding are the following:

- According to analysis conducted in the plan update, there are minimal critical facilities countywide exposed to flood risk.
- Countywide an estimated \$34.5 million in property losses is at risk to a 1% annual chance flood hazard. The unincorporated areas of the county together make up the majority of this exposure, with an estimated \$26.7 million in losses.
- Of the municipalities in the County, Buena Vista is at the highest risk with \$6.1 million in estimated losses in a 1% annual chance flood, followed by Poncha Springs and Salida with approximately \$1.1 million and \$460,000 in estimated losses respectively.
- Flash flooding that occurs with little or no warning will continue to impact the planning area.
- Flooding may be exacerbated by other hazards, such as wildfires.
- Flooding may also bring with it other related hazards, such as erosion.
- Damages resulting from flood may impact tourism, which may have significant impacts on the local economy.
- Continued compliance with the NFIP and the promotion of flood insurance as a means of protecting private property owners from the economic impacts of frequent flood events should continue.

## 4.9 Hail, Lightning, and Severe Wind

HAIL, LIGHTNING, AND SEVERE WIND HAZARD RANKING			
	Hail	Lightning	Severe Wind
Chaffee County	Low	Medium	Medium
City of Salida	Medium	Low	Low
Town of Buena Vista	Low	Medium	Medium
Town of Poncha Springs	Medium	Medium	High

### 4.9.1 Hazard Profile

A thunderstorm is a rain event that includes thunder and lightning. A thunderstorm is classified as “severe” when it contains one or more of the following: hail with at least 1” diameter, winds gusting in excess of 50 knots (58 mph), or tornado.

Three factors cause thunderstorms to form: moisture, rising unstable air (air that keeps rising when disturbed), and a lifting mechanism to provide the disturbance. The sun heats the surface of the earth, which warms the air above it. If this warm surface air is forced to rise (hills or mountains can cause rising motion, as can the interaction of warm air and cold air or wet air and dry air), it will continue to rise as long as it weighs less and stays warmer than the air around it. As the air rises, it transfers heat from the surface of the earth to the upper levels of the atmosphere (the process of convection). The water vapor it contains begins to cool and it condenses into a cloud. The cloud eventually grows upward into areas where the temperature is below freezing. Some of the water vapor turns to ice and some of it turns into water droplets. Both have electrical charges. Ice particles usually have positive charges, and rain droplets usually have negative charges. When the charges build up enough, they are discharged in a bolt of lightning, which causes the sound waves we hear as thunder.

Thunderstorms have three stages (see Figure 4-22):

- The developing stage of a thunderstorm is marked by a cumulus cloud that is being pushed upward by a rising column of air (updraft). The cumulus cloud soon looks like a tower (called towering cumulus) as the updraft continues to develop. There is little to no rain during this stage but occasional lightning. The developing stage lasts about 10 minutes.
- The thunderstorm enters the mature stage when the updraft continues to feed the storm, but precipitation begins to fall out of the storm, and a downdraft begins (a column of air pushing downward). When the downdraft and rain-cooled air spread out along the ground, they form a gust front, or a line of gusty winds. The mature stage is the most likely time for hail, heavy rain, frequent lightning, strong winds, and tornadoes. The storm occasionally has a black or dark green appearance.
- Eventually, a large amount of precipitation is produced, and the updraft is overcome by the downdraft beginning the dissipating stage. At the ground, the gust front moves out a long distance from the

### DEFINITIONS

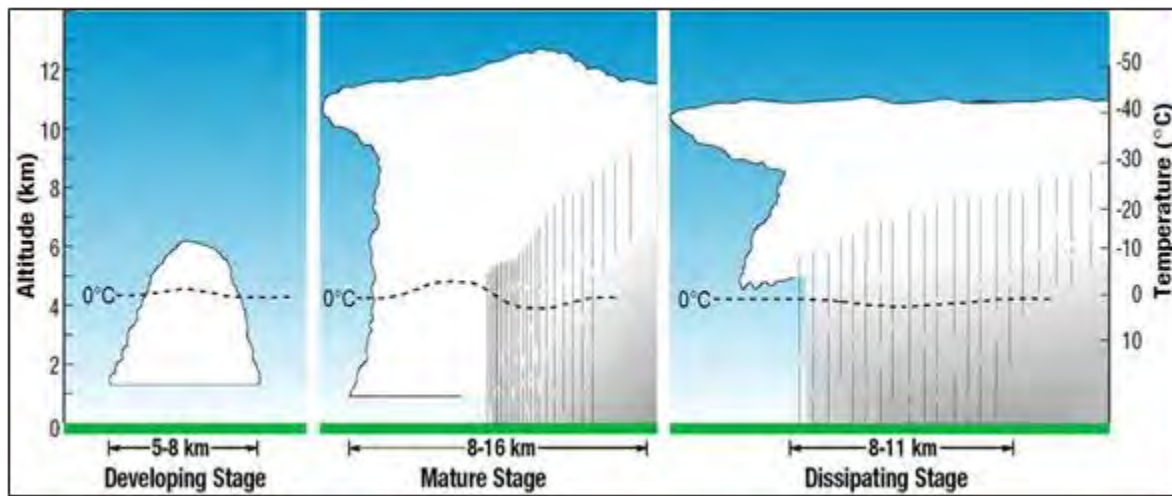
**Severe Local Storm**—Small-scale atmospheric systems, including tornadoes, thunderstorms, windstorms, ice storms, and snowstorms. These storms may cause a great deal of destruction and even death, but their impact is generally confined to a small area. Typical impacts are on transportation infrastructure and utilities.

**Thunderstorm**—A storm featuring heavy rains, strong winds, thunder and lightning, typically about 15 miles in diameter and lasting about 30 minutes. Hail and tornadoes are also dangers associated with thunderstorms. Lightning is a serious threat to human life. Heavy rains over a small area in a short time can lead to flash flooding.

**Windstorm**—A storm featuring violent winds. Windstorms tend to damage ridgelines that face into the winds.

storm and cuts off the warm moist air that was feeding the thunderstorm. Rainfall decreases in intensity, but lightning remains a danger.

**Figure 4-22 Thunderstorm Life Cycle**



There are four types of thunderstorms:

- **Single-Cell Thunderstorms**—Single-cell thunderstorms usually last 20 to 30 minutes. A true single-cell storm is rare, because the gust front of one cell often triggers the growth of another. Most single-cell storms are not usually severe, but a single-cell storm can produce a brief severe weather event. When this happens, it is called a pulse severe storm.
- **Multi-Cell Cluster Storm**—A multi-cell cluster is the most common type of thunderstorm. The multi-cell cluster consists of a group of cells, moving as one unit, with each cell in a different phase of the thunderstorm life cycle. Mature cells are usually found at the center of the cluster and dissipating cells at the downwind edge. Multi-cell cluster storms can produce moderate-size hail, flash floods, and weak tornadoes. Each cell in a multi-cell cluster lasts only about 20 minutes; the multi-cell cluster itself may persist for several hours. This type of storm is usually more intense than a single cell storm.
- **Multi-Cell Squall Line**—A multi-cell line storm, or squall line, consists of a long line of storms with a continuous well-developed gust front at the leading edge. The line of storms can be solid, or there can be gaps and breaks in the line. Squall lines can produce hail up to golf-ball size, heavy rainfall, and weak tornadoes, but they are best known as the producers of strong downdrafts. Occasionally, a strong downburst will accelerate a portion of the squall line ahead of the rest of the line. This produces what is called a bow echo. Bow echoes can develop with isolated cells as well as squall lines. Bow echoes are easily detected on radar but are difficult to observe visually.
- **Super-Cell Storm**—A super-cell is a highly organized thunderstorm that poses a high threat to life and property. It is similar to a single-cell storm in that it has one main updraft, but the updraft is extremely strong, reaching speeds of 150 to 175 miles per hour. Super-cells are rare. The main characteristic that sets them apart from other thunderstorms is the presence of rotation. The rotating updraft of a super-cell (called a mesocyclone when visible on radar) helps the super-cell to produce extreme weather events, such as giant hail (more than 2 inches in diameter), strong downbursts of 80 mph or more, and strong to violent tornadoes.

## Hail

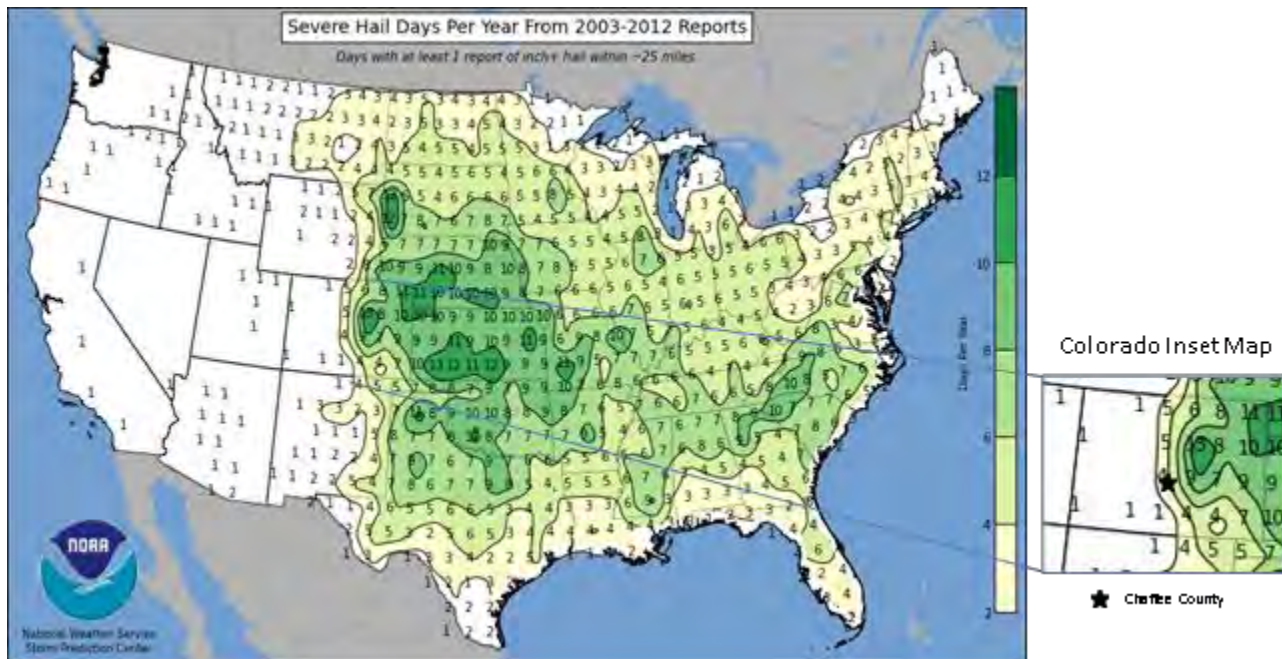
Hail occurs when updrafts in thunderstorms carry raindrops upward into extremely cold areas of the atmosphere where they freeze into ice. Recent studies suggest that super-cooled water may accumulate on frozen particles near the backside of a storm as they are pushed forward across and above the updraft

by the prevailing winds near the top of the storm. Eventually, the hailstones encounter downdraft air and fall to the ground.

Hailstones grow two ways: by wet growth or dry growth. In wet growth, a tiny piece of ice is in an area where the air temperature is below freezing, but not super cold. When the tiny piece of ice collides with a super-cooled drop, the water does not freeze on the ice immediately. Instead, liquid water spreads across tumbling hailstones and slowly freezes. Since the process is slow, air bubbles can escape, resulting in a layer of clear ice. Dry growth hailstones grow when the air temperature is well below freezing and the water droplet freezes immediately as it collides with the ice particle. The air bubbles are “frozen” in place, leaving cloudy ice. Hailstones can have layers like an onion if they travel up and down in an updraft, or they can have few or no layers if they are “balanced” in an updraft. One can tell how many times a hailstone traveled to the top of the storm by counting its layers. Hailstones can begin to melt and then re-freeze together, forming large and very irregularly shaped hail.

The NWS classifies hail as non-severe and severe based on hail diameter size. Descriptions and diameter sizes are provided in Table 4-35. According to the NWS Storm Prediction Center, on average Chaffee County experiences only four to five severe hail days a year (Figure 4-23).

**Figure 4-23 Severe Hail Days per Year (2003-2012)**



Source: National Weather Service

### **Lightning**

Lightning is an electrical discharge between positive and negative regions of a thunderstorm. A lightning flash is composed of a series of strokes with an average of about four strokes per flash. The length and duration of each lightning stroke vary, but typically average about 30 microseconds.

Lightning is one of the more dangerous and unpredictable weather hazards in the United States and in Colorado. Each year, lightning is responsible for deaths, injuries, and millions of dollars in property damage, including damage to buildings, communications systems, power lines and electrical systems. Lightning also causes forest and brush fires as well as deaths and injuries to livestock and other animals. According to the National Fire Protection Association (NFPA), between 2007 and 2011 local fire



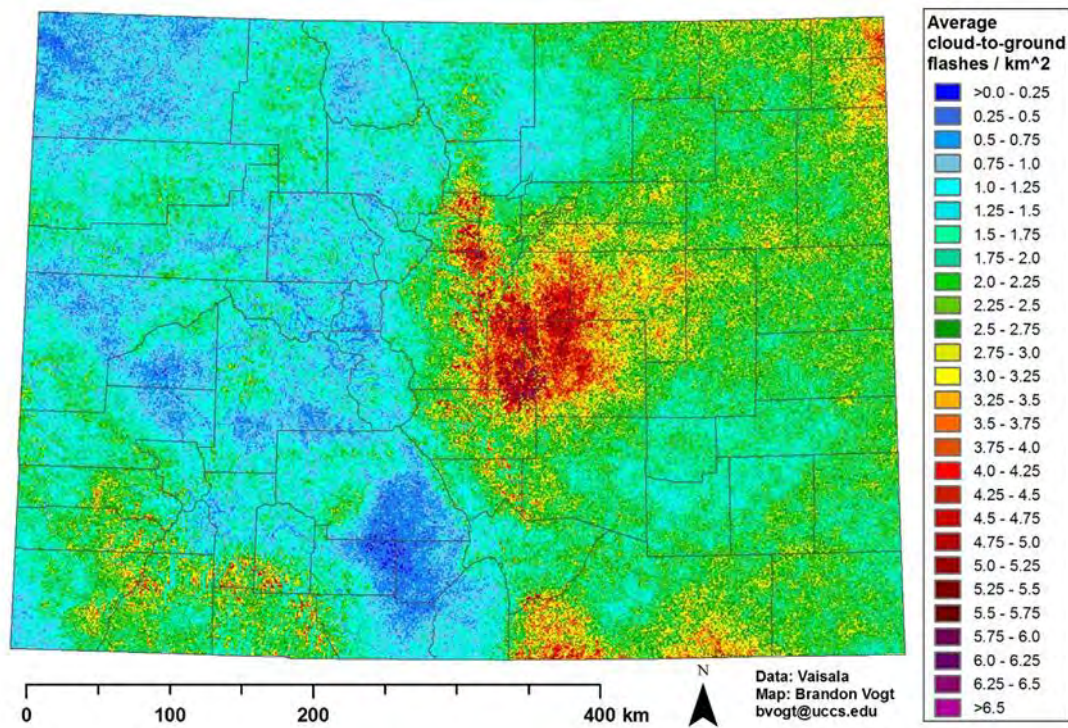
departments in the U.S. responded to an average of 22,600 structural fires per year due to lightning. On average the Rocky Mountain region has a report of 1,395 lightning-caused fires. On average the number of acres burned due to lightning-caused fires is nine times (402 acres) higher than the average acres burned for human-caused fires (45 acres) (NFPA 2013). The National Lightning Safety Institute estimates property damage, increased operating costs, production delays, and lost revenue from lightning and secondary effects to be in excess of \$8-10 billion per year. People or objects can be directly struck, or damage can occur indirectly when the current passes through or near it.

Intra-cloud lightning is the most common type of discharge. This occurs between oppositely charged centers within the same cloud. Usually, it takes place inside the cloud and looks from the outside of the cloud like a diffuse brightening that flickers. However, the flash may exit the boundary of the cloud, and a bright channel can be visible for many miles.

Although not as common, cloud-to-ground lightning is the most damaging and dangerous form of lightning. Most flashes originate near the lower-negative charge center and deliver negative charge to earth. However, a minority of flashes carry positive charge to earth. These positive flashes often occur during the dissipating stage of a thunderstorm's life. Positive flashes are also more common as a percentage of total ground strikes during the winter months. This type of lightning is particularly dangerous for several reasons. It frequently strikes away from the rain core, either ahead or behind the thunderstorm. It can strike as far as 5 or 10 miles from the storm in areas that most people do not consider to be a threat. Positive lightning also has a longer duration, so fires are more easily ignited. And, when positive lightning strikes, it usually carries a high peak electrical current, potentially resulting in greater damage. On average, Chaffee County experiences 2,900 cloud-to-ground lightning flashes annually (NWS).

The ratio of cloud-to-ground and intra-cloud lightning can vary significantly from storm to storm. Depending upon cloud height above ground and changes in electric field strength between cloud and earth, the discharge stays within the cloud or makes direct contact with the earth. If the field strength is highest in the lower regions of the cloud, a downward flash may occur from cloud to earth. Using a network of lightning detection systems, NOAA monitors a yearly average of 25 million strokes of lightning from the cloud-to-ground. Figure 4-24 shows the lightning flash density for the state of Colorado between 1996 and 2016. The map shows the number of Cloud to Ground lightning flashes per square kilometer per year.

**Figure 4-24 Cloud to Ground Lightning Flash Density (1996-2016)**

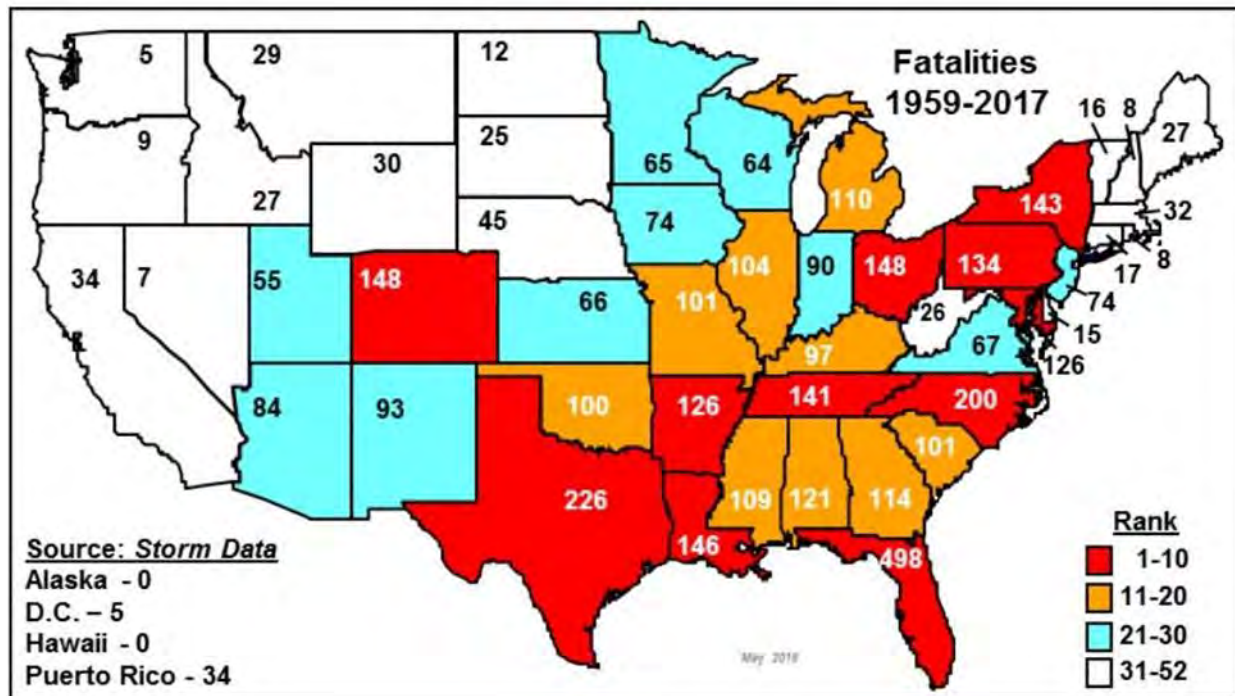


Source: NWS. Dr. Brandon Vogt, University of Colorado, Colorado Springs

Data from the National Lightning Detection Network ranks Colorado 20th in the nation (excluding Alaska and Hawaii) with respect to the number of lightning counts, cloud-to-ground strokes plus cloud pulse, with an average number of more than 3,704,799 lightning counts per year. U.S. lightning statistics compiled by NOAA between 1959 and 1994 indicate that most lightning incidents occur during the summer months of June, July, and August, and during the afternoon hours from between 2 p.m. and 6 p.m. In the Rocky Mountains of Colorado, it is common for afternoon thunderstorms during the summer months to occur with lightning strikes at the higher elevations.

Figure 4-25 shows state-by-state lightning deaths between 1959 and 2017. Colorado ranks fourth for the number of deaths at 148. Florida (498), Texas (226), and North Carolina (200) were ranked higher. Based on National Weather Service data since 1980 an average of 3 people are killed and 12 are injured in Colorado annually.

**Figure 4-25 Lightning Fatalities in the United States (1959-2017)**



Source: National Weather Service, [www.lightningsafety.noaa.gov/](http://www.lightningsafety.noaa.gov/)

### Severe Winds

Damaging winds are classified as those exceeding 60 mph. Damage from such winds accounts for half of all severe weather reports in the lower 48 states and is more common than damage from tornadoes. Wind speeds can reach up to 100 mph and can produce a damage path extending for hundreds of miles. There are seven types of damaging winds:

- **Straight-line winds**—Any thunderstorm wind that is not associated with rotation; this term is used mainly to differentiate from tornado winds. Most thunderstorms produce some straight-line winds as a result of outflow generated by the thunderstorm downdraft.
- **Downdrafts**—A small-scale column of air that rapidly sinks toward the ground.
- **Downbursts**—A strong downdraft with horizontal dimensions larger than 2.5 miles resulting in an outward burst or damaging winds on or near the ground. Downburst winds may begin as a microburst and spread out over a wider area, sometimes producing damage similar to a strong tornado. Although usually associated with thunderstorms, downbursts can occur with showers too weak to produce thunder.
- **Microbursts**—A small, concentrated downburst that produces an outward burst of damaging winds at the surface. Microbursts are generally less than 2.5 miles across and short-lived, lasting only 5 to 10 minutes, with maximum wind speeds up to 168 mph. There are two kinds of microbursts: wet and dry. A wet microburst is accompanied by heavy precipitation at the surface. Dry microbursts, common in places like the high plains and the intermountain west, occur with little or no precipitation reaching the ground.
- **Gust front**—A gust front is the leading edge of rain-cooled air that clashes with warmer thunderstorm inflow. Gust fronts are characterized by a wind shift, temperature drop, and gusty winds out ahead of a thunderstorm. Sometimes the winds push up air above them, forming a shelf cloud or detached roll cloud.

- **Derecho**—A derecho is a widespread thunderstorm wind caused when new thunderstorms form along the leading edge of an outflow boundary (the boundary formed by horizontal spreading of thunderstorm-cooled air). The word “derecho” is of Spanish origin and means “straight ahead.” Thunderstorms feed on the boundary and continue to reproduce. Derechos typically occur in summer when complexes of thunderstorms form over plains, producing heavy rain and severe wind. The damaging winds can last a long time and cover a large area.
- **Bow Echo**—A bow echo is a linear wind front bent outward in a bow shape. Damaging straight- line winds often occur near the center of a bow echo. Bow echoes can be 200 miles long, last for several hours, and produce extensive wind damage at the ground.

## Past Events

### Hail

The National Centers for Environmental Information (NCEI) Storm Events Database lists seven hail events in Chaffee County between 1993 and 2016. Only one event on August 1, 1993 caused reported property damages of \$500. These events are noted in Table 4-32.

**Table 4-32 Chaffee County Hail Events (1993-2016)**

Location	Date	Maximum Hail Size (inches)
Johnson Village	8/1/1993	1.5
Nathrop		
Salida	7/26/2006	0.75
Maysville	7/25/2007	1
Maysville	8/23/2008	0.75
Salida	7/24/2013	1
Brown Canon	7/14/2014	0.88
Brown Canon	6/5/2016	1.75

Source: National Centers for Environmental Information

### Lightning

According to the National Centers for Environmental Information Storm Events Database, eleven lightning events occurred in the Chaffee County between 1981 and 2020. The National Weather Service has records of four additional events between 1981 and 1991 that are not recorded in the Storm Events Database. Note, neither NCEI nor NWS have records of damaging lightning events occurring in Chaffee County after 2015.

Seven lightning events resulted in property damage or injuries. The event with the most reported injuries occurred on July 17, 2015, when four people were struck by lightning while hiking Mount Yale, one of Colorado’s fourteeners. One hiker was killed, one was airlifted to a hospital and the other two were evaluated and released at the trailhead.

**Table 4-33 Chaffee County Lightning Events (1981-2020)**

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
Unknown <sup>2</sup>	6/3/1981	0	1	\$0	\$0
Unknown <sup>2</sup>	7/18/1981	1	0	\$0	\$0
Unknown <sup>2</sup>	7/12/1985	0	1	\$0	\$0

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
Unknown <sup>2</sup>	6/16/1991	0	1	\$0	\$0
Salida <sup>1</sup>	7/24/2003	0	0	\$50,000	\$0
Salida <sup>1</sup>	7/25/2003	0	0	\$0	\$2,000
Monarch <sup>1</sup>	7/19/2004	0	1	\$0	\$0
Buena Vista <sup>1</sup>	7/21/2004	0	0	\$0	\$0
Buena Vista <sup>1</sup>	6/10/2005	0	0	\$50,000	\$0
Brown Canon <sup>1</sup>	6/12/2010	1	0	\$0	\$0
Alpine <sup>1</sup>	7/17/2015	1	3	\$0	\$0
<b>Total</b>		<b>3</b>	<b>7</b>	<b>\$100,000</b>	<b>\$2,000</b>
Source: <sup>1</sup> National Centers for Environmental Information and <sup>2</sup> National Weather Service					

### Severe Winds

High winds can occur year-round in Chaffee County. In the spring and summer, high winds often accompany severe thunderstorms. The varying topography in the area has the potential for continuous and sudden gusting of high winds. According to the State of Colorado Hazard Mitigation Plan, Chinook winds are a fairly common wintertime phenomena in Colorado. These winds develop in well-defined areas and can be quite strong. Atmospheric conditions are expected to continue unchanged with windstorms remaining a perennial occurrence.

Historical severe weather data from the NCEI Storm Events Database includes 69 days with high wind events and five thunderstorm wind events in Chaffee County between 1978 and January 2020, as shown in Table 4-34. However, only one wind-related event had reported property damage. Not included in the NCEI database is the highest recorded wind gust in Colorado of 148 mph (Refer to Table 4-37 Beaufort Wind Scale) taking place along Monarch Pass on February 18, 2016. No impacts were recorded from this event.

**Table 4-34 Chaffee County Wind-Related Events (1978-2020)**

Location	Date	Event Type	Peak Wind Speed (knots)	Estimated Damage Cost	
				Property	Crops
Chaffee County	6/7/1978	Thunderstorm Wind	61	\$0	\$0
Chaffee County	6/28/1979	Thunderstorm Wind	70	\$0	\$0
Chaffee County	7/5/1989	Thunderstorm Wind	Unknown	\$0	\$0
Chaffee County	5/11/1991	Thunderstorm Wind	Unknown	\$0	40
Northern Sangre De Cristo Mountains	1/3/1996	High Wind	59	\$0	\$0
Northern Sangre De Cristo Mountains	1/24/1996	High Wind	62	\$0	\$0
Northern Sangre De Cristo Mountains	1/27/1996	High Wind	68	\$0	\$0
Northern Sangre De Cristo Mountains	2/22/1996	High Wind	76	\$0	\$0
Northern Sangre De Cristo Mountains	4/17/1996	High Wind	50	\$0	\$0



Location	Date	Event Type	Peak Wind Speed (knots)	Estimated Damage Cost	
				Property	Crops
Central Chaffee County	4/18/1996	High Wind	53	\$0	\$0
Eastern Chaffee County			53	\$0	\$0
Northern Sangre De Cristo Mountains	4/19/1996	High Wind	67	\$0	\$0
Northern Sangre De Cristo Mountains	4/24/1996	High Wind	41	\$0	\$0
Northern Sangre De Cristo Mountains	12/5/1996	High Wind	75	\$0	\$0
Northern Sangre De Cristo Mountains	12/21/1996	High Wind	50	\$0	\$0
Northern Sangre De Cristo Mountains	12/26/1996	High Wind	60	\$0	\$0
Monument Ridge	10/11/1997	High Wind	52	\$0	\$0
Monument Ridge	10/31/1997	High Wind	55	\$0	\$0
Monument Ridge	2/25/1998	High Wind	53	\$0	\$0
Eastern San Juan Mountains	4/11/1998	High Wind	52	\$0	\$0
Northern El Paso County	2/3/1999	High Wind	65	\$0	\$0
Northern El Paso County	2/10/1999	High Wind	66	\$40,000	\$0
Alamosa And Vicinity	4/8/1999	High Wind	52	\$0	\$0
Northern San Luis Valley			52	\$0	\$0
Monument Ridge			62	\$0	\$0
Alamosa And Vicinity	4/9/1999	High Wind	65	\$0	\$0
Northern San Luis Valley			60	\$0	\$0
Monument Ridge	4/10/1999	High Wind	62	\$0	\$0
Monument Ridge	1/9/2000	High Wind	50	\$0	\$0
Monument Ridge			68	\$0	\$0
Monument Ridge	1/10/2000	High Wind	47	\$0	\$0
Monument Ridge			56	\$0	\$0
Monument Ridge			60	\$0	\$0
Monument Ridge			56	\$0	\$0
Monument Ridge	1/12/2000	High Wind	51	\$0	\$0
Monument Ridge	1/19/2000	High Wind	59	\$0	\$0
Monument Ridge			57	\$0	\$0
Monument Ridge			54	\$0	\$0
Monument Ridge			44	\$0	\$0
Monument Ridge	3/8/2000	High Wind	73	\$0	\$0
Eastern San Juan Mountains	4/18/2000	High Wind	63	\$0	\$0
La Garita Mountains			61	\$0	\$0
Northern San Luis Valley			61	\$0	\$0
Alamosa And Vicinity			53	\$0	\$0
Monument Ridge			63	\$0	\$0
Monument Ridge	4/19/2000	High Wind	65	\$0	\$0
Monument Ridge	12/15/2000	High Wind	51	\$0	\$0
Monument Ridge	12/20/2000	High Wind	66	\$0	\$0
Monument Ridge	4/6/2001	High Wind	50	\$0	\$0
Northern San Luis Valley	2/9/2002	High Wind	69	\$0	\$0
Monument Ridge			67	\$0	\$0
Monument Ridge	4/18/2002	High Wind	52	\$0	\$0
Monument Ridge			60	\$0	\$0
Monument Ridge	5/21/2002	High Wind	56	\$0	\$0
Northern Sangre De Cristo Mountains	11/8/2002	High Wind	74	\$0	\$0

Location	Date	Event Type	Peak Wind Speed (knots)	Estimated Damage Cost	
				Property	Crops
Northern Sangre De Cristo Mountains	2/9/2003	High Wind	87	\$0	\$0
Northern Sangre De Cristo Mountains	2/10/2003	High Wind	69	\$0	\$0
Northern Sangre De Cristo Mountains	4/15/2003	High Wind	61	\$0	\$0
Northern Sangre De Cristo Mountains	3/6/2004	High Wind	56	\$0	\$0
Northern Sangre De Cristo Mountains			91	\$0	\$0
Northern Sangre De Cristo Mountains			51	\$0	\$0
Western Chaffee County	4/18/2004	High Wind	56	\$0	\$0
Eastern Chaffee County			52	\$0	\$0
Eastern Sawatch Mountains	5/11/2004	High Wind	62	\$0	\$0
Eastern Chaffee County			62	\$0	\$0
Northern Sangre De Cristo Mountains	11/14/2005	High Wind	61	\$0	\$0
Eastern Sawatch Mountains			71	\$0	\$0
Eastern Sawatch Mountains	9/16/2006	High Wind	61	\$0	\$0
Northern Sangre De Cristo Mountains			61	\$0	\$0
Western Chaffee County			61	\$0	\$0
Northern Sangre De Cristo Mountains	6/6/2007	High Wind	62	\$0	\$0
Northern Sangre De Cristo Mountains	1/5/2008	High Wind	65	\$0	\$0
Northern Sangre De Cristo Mountains	12/19/2010	High Wind	61	\$0	\$0
Northern Sangre De Cristo Mountains	4/3/2011	High Wind	67	\$0	\$0
Chaffee Co.	6/30/2011	Thunderstorm Wind	54	\$0	\$0
Central Chaffee County	11/12/2011	High Wind	79	\$0	\$0
Northern Sangre De Cristo Mountains			80	\$0	\$0
Eastern Sawatch Mountains	12/30/2011	High Wind	65	\$0	\$0
Eastern Chaffee County			65	\$0	\$0
Western Chaffee County			96	\$0	\$0
Northern Sangre De Cristo Mountains			65	\$0	\$0
Central Chaffee County	12/31/2011	High Wind	52	\$0	\$0
Northern Sangre De Cristo Mountains	1/18/2012	High Wind	61	\$0	\$0
Eastern Sawatch Mountains			65	\$0	\$0
Western Chaffee County			61	\$0	\$0
Eastern Chaffee County			61	\$0	\$0
Central Chaffee County			61	\$0	\$0
Eastern Sawatch Mountains	2/23/2012	High Wind	65	\$0	\$0
Northern Sangre De Cristo Mountains			65	\$0	\$0
Western Chaffee County			65	\$0	\$0
Eastern Sawatch Mountains	3/26/2012	High Wind	79	\$0	\$0
Eastern Sawatch Mountains	5/26/2012	High Wind	43	\$0	\$0
Northern Sangre De Cristo Mountains	2/15/2014	High Wind	65	\$0	\$0
Northern Sangre De Cristo Mountains Between 8500 & 11000 Ft (Zone)	2/18/2016	High Wind	65	\$0	\$0
Eastern Sawatch Mountains Above 11000 Ft (Zone)		High Wind	129	\$0	\$0
Eastern Sawatch Mountains Above 11000 Ft (Zone)	10/17/2016	High Wind	69	\$0	\$0

Location	Date	Event Type	Peak Wind Speed (knots)	Estimated Damage Cost	
				Property	Crops
Western Chaffee County Between 9000 & 11000 Ft (Zone)		High Wind	65	\$0	\$0
Northern Sangre De Cristo Mountains Between 8500 & 11000 Ft (Zone)		High Wind	65	\$0	\$0
Northern Sangre De Cristo Mountains Between 8500 & 11000 Ft (Zone)	12/16/2016	High Wind	65	\$0	\$0
Northern Sangre De Cristo Mountains Between 8500 & 11000 Ft (Zone)	12/25/2016	High Wind	65	\$0	\$0
Northern Sangre De Cristo Mountains Between 8500 & 11000 Ft (Zone)	1/9/2017	High Wind	74	\$0	\$0
Northern Sangre De Cristo Mountains Between 8500 & 11000 Ft (Zone)	3/6/2017	High Wind	74	\$0	\$0
Northern Sangre De Cristo Mountains Between 8500 & 11000 Ft (Zone)	11/4/2017	High Wind	65	\$0	\$0
Eastern Sawatch Mountains Above 11000 Ft (Zone)	11/17/2017	High Wind	80	\$0	\$0
Eastern Sawatch Mountains Above 11000 Ft (Zone)	12/23/2017	High Wind	65	\$0	\$0
Northern Sangre De Cristo Mountains Between 8500 & 11000 Ft (Zone)	2/18/2018	High Wind	74	\$0	\$0
Northern Sangre De Cristo Mountains Between 8500 & 11000 Ft (Zone)	2/3/2019	High Wind	65	\$0	\$0
Northern Sangre De Cristo Mountains Between 8500 & 11000 Ft (Zone)	2/13/2019	High Wind	65	\$0	\$0
Eastern Sawatch Mountains Above 11000 Ft (Zone)	11/29/2019	High Wind	65	\$0	\$0
Western Chaffee County Between 9000 & 11000 Ft (Zone)		High Wind	65	\$0	\$0
Central Chaffee County Below 9000 Ft (Zone)		High Wind	56	\$0	\$0
Eastern Chaffee County / Western Mosquito Range Above 9000 Ft (Zone)		High Wind	65	\$0	\$0
Northern Sangre De Cristo Mountains Between 8500 & 11000 Ft (Zone)	1/17/2020	High Wind	65	\$0	\$0
Source: National Centers for Environmental Information					

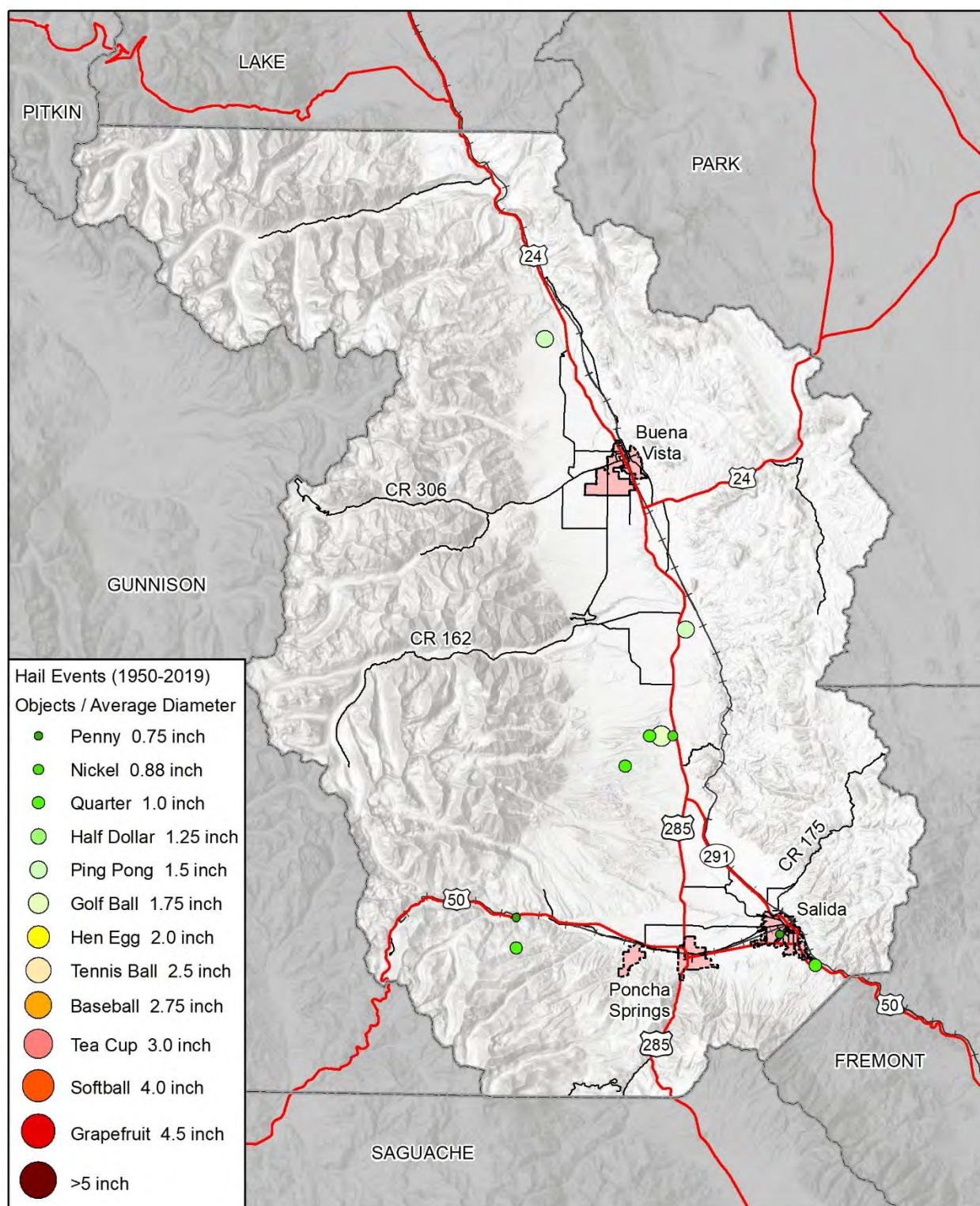
## Location

Severe hail, wind, and lightning events have the potential to happen anywhere in the planning area. Thunderstorms are generally expansive in size. The entire county is susceptible to any of the effects of a severe thunderstorm, including hail, heavy rain, and high winds.

## Hail

While all of Chaffee County is potentially exposed to hail, most hailstorms occur in the southern portions of Chaffee County. Previous instances of hail events in the county are shown in Figure 4-26.

**Figure 4-26 Hail Events in Chaffee County**



Map compiled 1/2021;  
intended for planning purposes only.  
Data Source: Chaffee County, CDOT,  
NOAA, National Weather Service SVRGIS 2020

0 5 10 Miles





## ***Lightning***

The entire extent of Chaffee County is exposed to some degree of lightning hazard, though exposed points of high elevation have significantly higher frequency of occurrence. Since lightning accompanies thunderstorms, it can be assumed that lightning occurs more often than damages are reported.

## ***Severe Winds***

Windstorms could occur anywhere in Chaffee County. Higher elevations could experience the most significant wind speeds, but these areas are generally not developed or populated. Winds impacting walls, doors, windows, and roofs, may cause structural components to fail.

## **Frequency and Severity (Extent)**

The nation has experienced severe storms (wind, tornado, hail) that are occurring with more intensity and affecting more areas of the country. While scientists debate why these storms occur, no one argues with their effects—extensive property damage and, many times, loss of life. The property damage can be as minimal as a few broken shingles to total destruction of buildings.

## ***Hail***

Severe hailstorms can be quite destructive to property and crops. Vehicles, roofs of buildings and homes, and landscaping are the other things most commonly damaged by hail. Hail has been known to cause injury to humans and occasionally has been fatal.

Colorado's severe hail season is between mid-April to mid-September and an average of 119 days per year (NICB 2020). According to the Rocky Mountain Insurance Information Association, hailstorms in the last 10 years have caused more than \$5 billion in insured damaged in Colorado. The May 2017 event alone caused \$3.6 billion in damage (NICB 2020). The costliest hailstorms have been centered in the Denver Metropolitan Area and Colorado Front Range.

According to the National Insurance Crime Bureau (NICB) April 2020 Hail Report, Colorado was second in the number of hail claims from 2017 to 2019 with 380,066 claims. Texas had the highest number of claims every year except 2018, where Colorado topped the states with 191,679 claims that year. The National Weather Service (NWS) classifies hail by diameter size, and corresponding everyday objects to help relay scope and severity to the population. Table 4-35 indicates the hailstone measurements utilized by the NWS.

There is no clear distinction between storms that do and do not produce hailstones. Nearly all severe thunderstorms probably produce hail aloft, though it may melt before reaching the ground. Multi-cell thunderstorms produce many hailstones, but not usually the largest hailstones. In the life cycle of the multi-cell thunderstorm, the mature stage is relatively short so there is not much time for growth of the hailstone. Supercell thunderstorms have sustained updrafts that support large hail formation by repeatedly lifting the hailstones into the very cold air at the top of the thunderstorm cloud. In general, hail 2 inches (5 cm) or larger in diameter is associated with supercells (a little larger than golf ball size which the NWS considers to be 1.75 inch.). Non-supercell storms are capable of producing golf ball size hail.

The largest hailstone recorded in the NCEI database for Chaffee County was 1.75 inches on June 5, 2016 in Brown Canon and the most commonly recorded hailstone size is 1-inch hail. Refer to Table 4-35 for a summary of recorded hail events in Chaffee County.



**Table 4-35 National Weather Service Hail Severity**

Severity	Description	Hail Diameter Size (in inches)
Non-Severe Hail Does not typically cause damage and does not warrant severe thunderstorm warning from NWS.	Pea	1/4"
	Marble/mothball	1/2"
	Penny	3/4"
	Nickel	7/8"
Severe Hail Research has shown that damage occurs after hail reaches around 1" in diameter and larger. Hail of this size will trigger a severe thunderstorm warning from NWS.	Quarter	1" (severe)
	Half Dollar	1 1/4"
	Walnut/Ping Pong Ball	1 1/2"
	Golf Ball	1 3/4"
	Hen Egg/Lime	2"
	Tennis Ball	2 1/2"
	Baseball	2 3/4"
	Teacup/Large Apple	3"
	Softball	4"
	Grapefruit	4 1/2"

Source: National Weather Service

### Lightning

Lightning is measured by the Lightning Activity Level (LAL) scale, created by the National Weather Service to define lightning activity into a specific categorical scale. The LAL is a common parameter that is part of fire weather forecasts nationwide. Due to the high elevation and varied topography of the County, Chaffee is at risk to experience lightning in any of these categories. The LAL is reproduced in Table 4-36.

**Table 4-36 Lightning Activity Level Scale**

Lightning Activity Level	
LAL 1	No thunderstorms
LAL 2	Isolated thunderstorms. Light rain will occasionally reach the ground. Lightning is very infrequent, 1 to 5 cloud to ground strikes in a five-minute period
LAL 3	Widely scattered thunderstorms. Light to moderate rain will reach the ground. Lightning is infrequent, 6 to 10 cloud to ground strikes in a five-minute period.
LAL 4	Scattered thunderstorms. Moderate rain is commonly produced. Lightning is frequent, 11 to 15 cloud to ground strikes in a five-minute period.
LAL 5	Numerous thunderstorms. Rainfall is moderate to heavy. Lightning is frequent and intense, greater than 15 cloud to ground strikes in a five-minute period.
LAL 6	Dry lightning (same as LAL 3 but without rain). This type of lightning has the potential for extreme fire activity and is normally highlighted in fire weather forecasts with a Red Flag warning.

Source: National Weather Service

The number of reported injuries from lightning is likely to be low, but since lightning accompanies thunderstorms, it can be assumed that lightning occurs more often than damages are reported.

The relationship of lightning to wildfire ignitions in the county increases the significance of this hazard. Lightning strikes are more likely at higher elevations, such as mountain peaks and may pose a threat to hikers, climbers, and other recreational users in the county.

### **Severe Winds**

High winds, often accompanying severe thunderstorms, can cause significant property and crop damage, threaten public safety, and have adverse economic impacts from business closures and power loss. Windstorms in Chaffee County are rarely life threatening, but do disrupt daily activities, cause damage to buildings, and structures, and increase the potential for other hazards, such as wildfire. Winter winds can also cause damage, close highways (blowing snow), and induce avalanches. Winds can also cause trees to fall, particularly those killed by pine beetles or wildfire, creating a hazard to property or those outdoors.

Damaging wind is measured using the Beaufort Wind Scale as shown in Table 4-37. This scale only reflects land-based effects and does not take into consideration the effects of wind over water.

**Table 4-37 Beaufort Wind Scale**

Beaufort Number	Description	Windspeed (MPH)	Land Conditions
0	Calm	< 1	Calm. Smoke rises vertically.
1	Light air	1 – 3	Wind motion visible in smoke.
2	Light breeze	3 – 7	Wind felt on exposed skin. Leaves rustle.
3	Gentle breeze	8 – 12	Leaves and smaller twigs in constant motion.
4	Moderate breeze	13 – 17	Dust and loose paper raised. Small branches begin to move.
5	Fresh breeze	18 – 24	Branches of a moderate size move. Small trees begin to sway.
6	Strong breeze	25 – 30	Large branches in motion. Whistling heard in overhead wires. Umbrella use becomes difficult. Empty plastic garbage cans tip over.
7	High wind, Moderate gale, Near gale	31 – 38	Whole trees in motion. Effort needed to walk against the wind. Swaying of skyscrapers may be felt, especially by people on upper floors.
8	Gale, Fresh gale	39 – 46	Some twigs broken from trees. Cars veer on road. Progress on foot is seriously impeded.
9	Strong gale	47 – 54	Some branches break off trees, and some small trees blow over. Construction/temporary signs and barricades blow over. Damage to circus tents and canopies.
10	Storm, Whole gale	55 – 63	Trees are broken off or uprooted, saplings bent and deformed. Poorly attached asphalt shingles and shingles in poor condition peel off roofs.
11	Violent storm	64 – 72	Widespread vegetation damage. Many roofing surfaces are damaged; asphalt tiles that have curled up and/or fractured due to age may break away completely.
12	Hurricane	≥ 73	Very widespread damage to vegetation. Some windows may break; mobile homes and poorly constructed sheds and barns are damaged. Debris may be hurled about.

Source: National Oceanographic and Atmospheric Association

## **Warning Time**

Meteorologists can often predict the likelihood of a severe storm. This can give several days of warning time. However, meteorologists cannot predict the exact time of onset or severity of the storm. Some storms may come on more quickly and have only a few hours of warning time. Weather forecasts for the planning area are limited. At times warning for the onset of severe weather may be limited.

### **4.9.2 Related Hazards**

The most significant secondary hazards associated with severe local storms are floods, falling and downed trees, landslides, and downed power lines. Rapidly melting snow combined with heavy rain can overwhelm both natural and man-made drainage systems, causing overflow and property destruction. Landslides occur when the soil on slopes becomes oversaturated and fails. Fires can occur as a result of lightning strikes. Many locations in the region have minimal vegetative ground cover and the high winds can create a large dust storm, which becomes a hazard for travelers and a disruption for local services. High winds in the winter can turn small amount of snow into a complete whiteout and create drifts in roadways. Debris carried by high winds can also result in injury or damage to property. A wildland fire can be accelerated and rendered unpredictable by high winds, which makes a dangerous environment for firefighters.

### **4.9.3 Climate Change Considerations**

As the atmosphere warms further due to climate change, the increased heat in the atmosphere provides more energy for severe storms. The frequency of severe weather events has increased steadily over the last century. The number of weather-related disasters during the 1990s was four times that of the 1950s, and cost 14 times as much in economic losses. Historical data shows that the probability for severe weather events increases in a warmer climate. The changing hydrograph caused by climate change could have a significant impact on the intensity, duration and frequency of storm events. All of these impacts could have significant economic consequences.

### **4.9.4 Vulnerability**

#### **Population**

It can be assumed that the entire planning area is exposed to some extent to thunderstorm, high wind, and hail events. Certain areas are more exposed due to geographic location and local weather patterns. Populations living at higher elevations with large stands of trees or power lines may be more susceptible to wind damage and black out, while populations in low-lying areas are at risk for possible flooding. It is not uncommon for residents living in more remote areas of the county to be isolated after such events.

Vulnerable populations are the elderly, low income or linguistically isolated populations, people with life-threatening illnesses, and residents living in areas that are isolated from major roads. Power outages can be life threatening to those dependent on electricity for life support. In Chaffee County, 11% of Medicare Beneficiaries rely on electricity to live independently in their homes. Isolation of these populations is a significant concern. Isolation of these populations is a significant concern. These populations face isolation and exposure during thunderstorm, wind, and hail events and could suffer more secondary effects of the hazard. Hikers and climbers in the area may also be more vulnerable to severe weather events. Visitors to the area may not be aware of how quickly a thunderstorm can build in the mountains.

#### **Property**

All property is vulnerable during thunderstorm, wind, and hail events, but properties in poor condition or in particularly vulnerable locations may risk the most damage. Generally, damage is minimal and goes unreported. Property located at higher elevations and on ridges may be more prone to wind damage.

Property located under or near overhead lines or near large trees may be damaged in the event of a collapse.

Older building stock in the planning area is built to low code standards or none at all. These structures could be highly vulnerable to severe weather events such as windstorms. Wind pressure can create a direct and frontal assault on a structure, pushing walls, doors, and windows inward. Conversely, passing currents can create lift and suction forces that act to pull building components and surfaces outward. The effects of winds are magnified in the upper levels of multi-story structures. As positive and negative forces impact the building's protective envelope (doors, windows, and walls), the result can be roof or building component failures and considerable structural damage.

All of these buildings are considered to be exposed to the thunderstorm, wind, and hail hazard, but structures in poor condition or in particularly vulnerable locations (located on hilltops or exposed open areas) may risk the most damage. The frequency and degree of damage will depend on specific locations.

### **Hail**

A total of seven hail events have taken place in Chaffee County between 1993 and 2016. The loss estimates for the hail events in the City of Salida, the Towns of Buena Vista and Poncha Springs, and the rest of the county outside of the defined jurisdictions are listed in Table 4-38. These losses likely do not include insured losses, and thus underestimate the expected annualized loss.

**Table 4-38 Loss Estimates for Hail Events in Chaffee County**

Community	Annual Rate of Occurrence	Average Loss Expectancy	Annualized Loss
Buena Vista	--	--	--
Salida	0.1 events/year	\$0	\$0
Poncha Springs	--	--	--
Rest of County	0.3 events/year	\$83.33/event	\$25
Entire Chaffee County	0.3 event/year	\$71/event	\$21
Note: Loss estimates based on historical record of 1 loss events and 7 total events. Source: NOAA National Centers for Environmental Information. 1993-2016.			

### **Lightning**

A total of three damaging lightning events have taken place in Chaffee County between 1981 and 2020. The loss estimates for the lightning events in the City of Salida, the Towns of Buena Vista and Poncha Springs, and the rest of the county outside of the defined jurisdictions are listed in Table 4-39.

**Table 4-39 Loss Estimates for Lightning Events in Chaffee County**

Community	Annual Rate of Occurrence	Average Loss Expectancy	Annualized Loss
Salida	0.1 events/year	\$25,000/event	\$2,500
Buena Vista	0.1 events/year	\$25,000/event	\$2,500
Poncha Springs	-	-	-
Rest of County	0.2 events/year	--	--
Entire Chaffee County	0.3 events/year	\$9,091/event	\$2,727
Note: Loss estimates based on historical record of 11 lightning events that caused damage. Source: NOAA National Centers for Environmental Information. 1981 - 2015.			

## Severe Winds

A total of 55 days of severe wind events have taken place in Chaffee County between 1978 and 2020. The loss estimates for severe wind events for Chaffee County are listed in Table 4-40.

**Table 4-40 Loss Estimates for Severe Wind Events in Chaffee County**

Community	Annual Rate of Occurrence	Average Loss Expectancy	Annualized Loss
Chaffee County	1.8 events/year	\$541/event	\$974
Note: Loss estimates based on historical record of 74 wind-related events. Source: NOAA National Centers for Environmental Information. 1978 - 2020.			

## Critical Facilities and Infrastructure

Transportation infrastructure can be affected by thunderstorms, wind, and hail, mostly associated with secondary hazards. Landslides caused by heavy prolonged rains can block roads. High winds can cause significant damage to trees and power lines, blocking roads with debris, incapacitating transportation, isolating population, and disrupting ingress and egress. Of particular concern are roads providing access to isolated areas and to the elderly. Prolonged obstruction of major routes due to landslides, debris, or floodwaters can disrupt the shipment of goods and other commerce. Large, prolonged storms can have negative economic impacts for an entire region. Severe windstorms and downed trees can create serious impacts on power and above-ground communication lines. Loss of electricity and phone connection would leave certain populations isolated because residents would be unable to call for assistance. Lightning events in the county can have destructive effects on power and information systems. Failure of these systems would have cascading effects throughout the county and could possibly disrupt critical facility functions.

Facilities on higher ground may also be exposed to wind damage or damage from falling trees. The most common problems associated with these weather events are loss of utilities. Downed power lines can cause blackouts, leaving large areas isolated. Phone, water, and sewer systems may not function. Roads may become impassable due to secondary hazards such as landslides. Lightning and wind can impact communications infrastructure, damaging towers or temporarily disrupting services.

## Economy

Economic impact of a severe thunderstorm is typically short term. Lightning and high wind events can cause power outages and fires. Generally, long-term economic impacts center more around hazards that cascade from a severe thunderstorm, including wildfires ignited by lightning, and flooding (refer to the Wildfire and Flood sections). In general, all severe thunderstorms pose a risk to the tourism economy in the county. These events can disrupt travel into and out of all areas of the county and create perilous conditions for residents, tourists and nature alike.

## Historic, Cultural, and Natural Resources

The environment is highly exposed to lightning, winds, and hail. Natural habitats such as streams and trees risk major damage. Prolonged rains can saturate soils and lead to slope failure. Flooding events can produce river channel migration or damage riparian habitat. Large swaths of tree blowdowns can occur, particularly in the beetle-killed forests prevalent in the county.

### 4.9.5 Development Trends

All future development will be exposed to severe storms. The ability to withstand impacts lies in sound land use practices and consistent enforcement of codes and regulations for new construction. The



planning partners have adopted the International Building Code. This code is equipped to deal with the impacts of severe weather events. Land use policies identified in master plans and enforced through zoning code and the permitting process also address many of the secondary impacts (flood and landslide) of the severe weather hazard. With these tools, the planning partnership is well equipped to deal with future growth and the associated impacts of severe weather.

#### **4.9.6 Risk Summary**

- There have been 92 recorded hail, lightning and severe wind events in Chaffee County since 1978, resulting in over \$142,500 in property and crop damages.
- Lightning events have caused 3 injuries and 7 deaths since 1981.
- The highest wind gust recorded (148 mph) in Colorado history took place along Monarch Pass on February 18, 2016.
- 11% of Medicare Beneficiaries in the County rely on electricity dependent medical equipment to live independently in their own homes making them vulnerable to lightning and severe wind events that may result in power outages.
- Related hazards: Flood, Wildfire, Avalanche, Landslide, Mud/Debris Flow

## 4.10 Landslide, Mud/Debris Flow, Rockfall

LANDSLIDE, MUD/DEBRIS FLOW, ROCKFALL HAZARD RANKING	
Chaffee County	Low
City of Salida	Low
Town of Buena Vista	Medium
Town of Poncha Springs	High

### 4.10.1 Hazard Profile

#### Landslide

A landslide is a general term for a variety of mass-movement processes that generate a downslope movement of soil, rock, and vegetation under

gravitational influence. Some of the natural causes of ground instability are stream and lakeshore erosion, heavy rainfall, and poor-quality natural materials. In addition, many human activities tend to make the earth materials less stable and, thus, increase the chance of ground failure. Human activities contribute to soil instability through grading of steep slopes or overloading them with artificial fill, by extensive irrigation, construction of impermeable surfaces, excessive groundwater withdrawal, and removal of stabilizing vegetation. Landslides typically have a slower onset and can be predicted to some extent by monitoring soil moisture levels and ground cracking or slumping in areas of previous landslide activity.

Landslides are caused by one or a combination of the following factors: change in slope of the terrain, increased load on the land, shocks and vibrations, change in water content, groundwater movement, frost action, weathering of rocks, and removing or changing the type of vegetation covering slopes. In general, landslide hazard areas are where the land has characteristics that contribute to the risk of the downhill movement of material, such as the following:

- A slope greater than 30%.
- A history of landslide activity or movement during the last 10,000 years.
- Stream or wave activity, which has caused erosion, undercut a bank, or cut into a bank to cause the surrounding land to be unstable.
- The presence or potential for snow avalanches.
- The presence of an alluvial fan, indicating vulnerability to the flow of debris or sediments.
- The presence of impermeable soils, such as silt or clay, which are mixed with granular soils such as sand and gravel.

Flows and slides are commonly categorized by the form of initial ground failure. Figure 4-27 through Figure 4-30 show common types of slides. The most common is the shallow colluvial slide, occurring particularly in response to intense, short-duration storms. The largest and most destructive are deep-seated slides, although they are less common than other types.

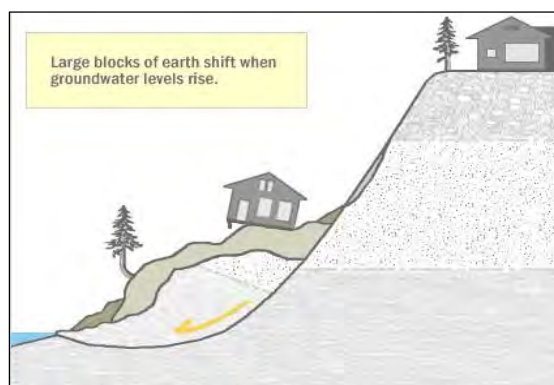
#### DEFINITIONS

**Landslide**—The sliding movement of masses of loosened rock and soil down a hillside or slope. Such failures occur when the strength of the soils forming the slope is exceeded by the pressure, such as weight or saturation, acting upon them.

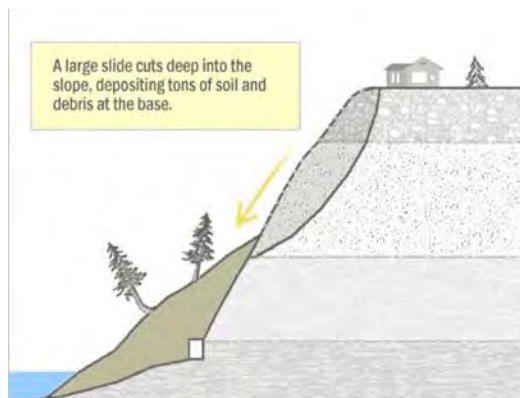
**Mass Movement**—A collective term for landslides, debris flows, falls and sinkholes.

**Mudslide (or Mudflow or Debris Flow)**—A river of rock, earth, organic matter and other materials saturated with water.

**Figure 4-27 Deep Seated Slide**



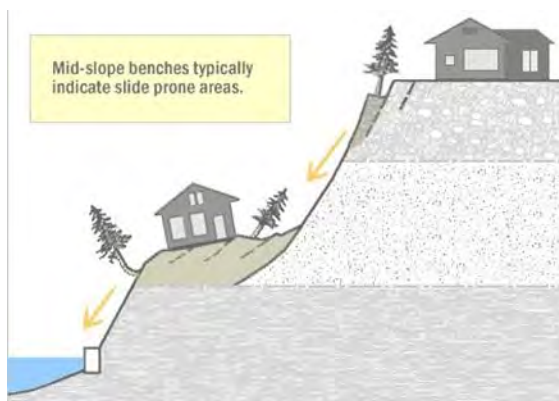
**Figure 4-30 Large Slide**



**Figure 4-28 Shallow Colluvial Slide**



**Figure 4-29 Bench Slide**



Slides and earth flows can pose serious hazard to property in hillside terrain. They tend to move slowly and thus rarely threaten life directly. When they move—in response to such changes as increased water content, earthquake shaking, addition of load, or removal of downslope support—they deform and tilt the ground surface. The result can be destruction of foundations, offset of roads, breaking of underground pipes, or overriding of downslope property and structures.

### **Mud and Debris Flow**

According to the Colorado Geological Survey, a mudslide is a mass of water and fine-grained earth that flows down a stream, ravine, canyon, arroyo, or gulch. If more than half of the solids in the mass are larger than sand grains (rocks, stones, boulders), the event is called a debris flow. A debris fan is a conical landform produced by successive mud and debris flow deposits, and the likely spot for a future event. Mud and debris flow problems can be exacerbated by wildfires that remove vegetation that serves to stabilize soil from erosion. Heavy rains on the denuded landscape can lead to rapid development of destructive mudflows.

### **Rockfall**

A rockfall is the falling of a detached mass of rock from a cliff or down a very steep slope. Weathering and decomposition of geological materials produce conditions favorable to rockfalls. Rockfalls are caused by the loss of support from underneath through erosion or triggered by ice wedging, root growth, or ground shaking. Changes to an area or slope such as cutting, and filling activities can also increase the risk of a rockfall. Rocks in a rockfall can be of any dimension, from the size of baseballs to houses. Rockfalls can threaten human life, impact transportation corridors and communication systems and result in other property damage. Spring is typically the landslide/rockfall season in Colorado as snow melts and saturates soils and temperatures enter into freeze/thaw cycles. Rockfalls and landslides are influenced by seasonal patterns, precipitation, and temperature patterns. Earthquakes could trigger rockfalls and landslides too.

### **Past Events**

The National Centers for Environmental Information does not list any landslide events that impacted Chaffee County between 1996 and 2020. According to the USGS, there have been many recorded landslide events in Chaffee County. The majority of the events have been focused in high mountainous areas, however. There have been two recorded landslide events that have occurred close to Salida. This is primarily from water erosion. Buena Vista and Poncha Springs have no recorded landslide events.

A mudslide event occurred on July 2, 2015, at Cottonwood Lake Camp. The mudslide forced the evacuation of the campground due to heavy thunderstorms. A total of six slides were recorded in the area of County Road 344. The slides were at least 100 feet long and from 3 to 15 feet deep. There were no injuries or damage from the mudslides. Another notable mudslide event occurred on August 1, 2014 on Highway 285 south of Poncha Springs. The slide blocked one southbound lane of Highway 285 and affected travel along the route while crews worked to clear the debris. The 2018 Colorado State Hazard Mitigation Plan notes another event in Chaffee County in which 5 hikers were killed by a rockslide near Mt. Princeton above Agnes Vaille Falls on September 30, 2013.

CR 162 is a popular area and the Chalk Cliffs make such an impact with periodic debris flows into roads and streams, including the St. Elmo area. According to the HMPC the Chaffee County Road & Bridge crews often fix these areas when there is a debris flow.

## Location

According to the 2018 Colorado State Hazards Mitigation Plan, landslides, mud/debris flows, and rock fall events occur largely in the mountainous areas of the state, such as Chaffee County, with the threat generally increasing with slope and susceptibility. Additionally, the plan highlighted that “Many of Colorado’s landslides occur along transportation networks because soil and rock along the transportation corridor has been disturbed by roadway construction. Construction along roads can occur with or without proper landslide hazard mitigation procedures. The cost to maintain, cleanup, monitor, and repair roads and highways from landslide activity is difficult to assess, but the best records come from CDOT, which is responsible for maintaining Colorado roads and highways” (Colorado Division of Emergency Management 2018).

The best available predictor of where movement of slides and earth flows might occur is the location of past movements. Past landslides can be recognized by their distinctive topographic shapes, which can remain in place for thousands of years. Most landslides recognizable in this fashion range from a few acres to several square miles. Most show no evidence of recent movement and are not currently active. A small proportion of them may become active in any given year, with movements concentrated within all or part of the landslide masses or around their edges. Figure 4-31 below shows the locations of landslide deposits in Chaffee County based on various mapping studies compiled by the CGS.

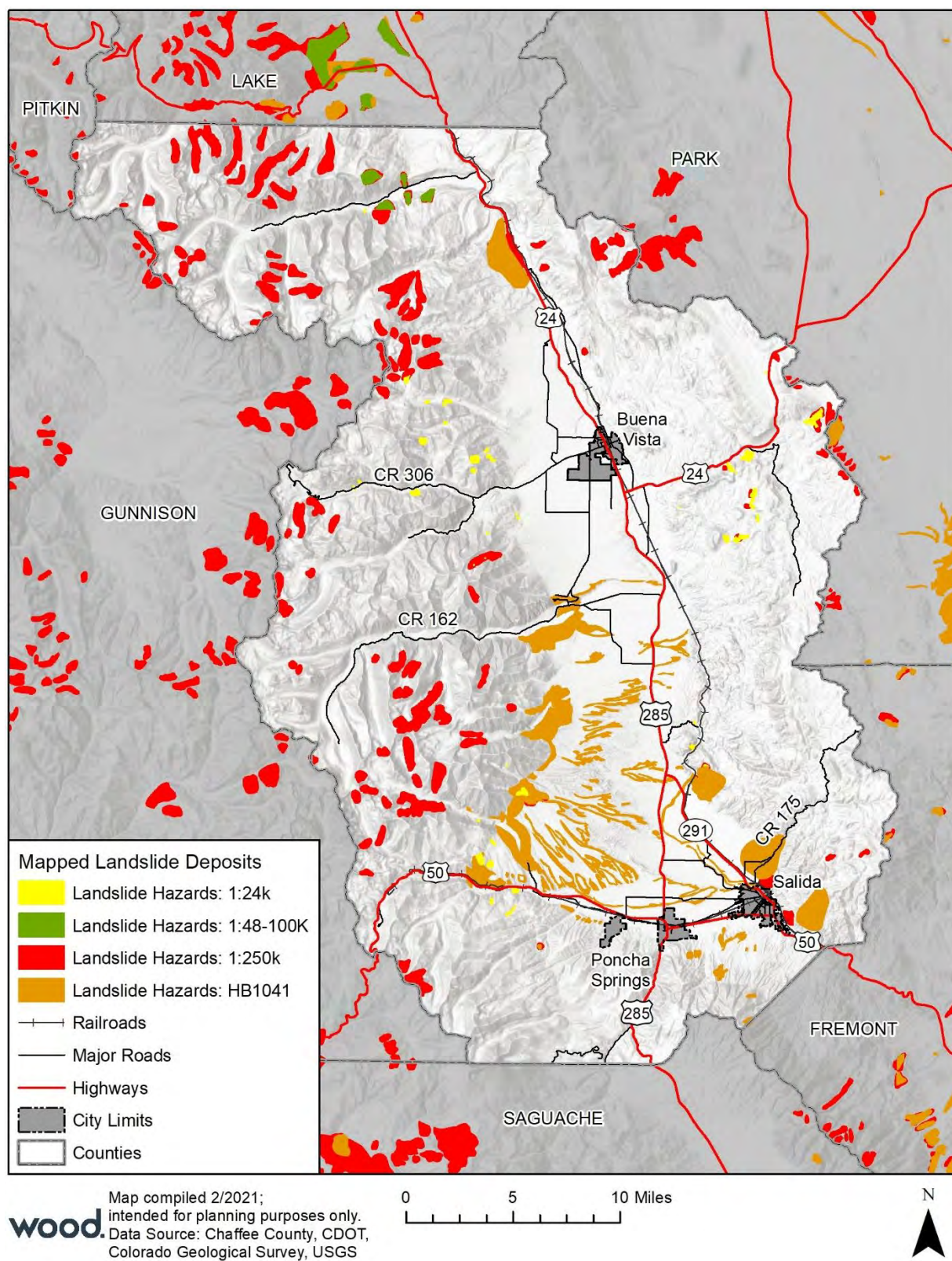
The recognition of ancient dormant mass movement sites is important in the identification of areas susceptible to flows and slides because they can be reactivated by earthquakes or by exceptionally wet weather. Also, because they consist of broken materials and frequently involve disruption of groundwater flow, these dormant sites are vulnerable to construction-triggered sliding.

The geographic location of landslides and rockfalls throughout Chaffee County is isolated. Of the three participating jurisdictions in Chaffee County, the City of Salida is the most likely jurisdiction to be impacted by landslides, mud/debris flows, or rockfalls. There is the potential for landslides, mud/debris flows, and rockfalls along State Highway 24, north of Buena Vista.

The Decker Fire has resulted in increased flood and debris flow potential in the southern part of the county.



**Figure 4-31 Mapped Chaffee County Landslide Deposits**



## Frequency and Severity

The frequency of landslide events within the county are difficult to ascertain due to a lack of information regarding past events, but given the number of historic accounts it is evident that landslides, rockfall and debris flows occur on an annual basis, with damaging events happening less frequently.

The HMPC members rated landslides, mud debris flow, and rockfall hazards as low for the unincorporated County and the City of Salida, moderate for the Town of Buena Vista and the Town of Poncha Springs.

## Warning Time

Mass movements can occur suddenly or slowly. The velocity of movement may range from a slow creep of inches per year to many feet per second, depending on slope angle, material and water content. Some methods used to monitor mass movements can provide an idea of the type of movement and the amount of time prior to failure. It is also possible to identify what areas are at risk during general time periods. Assessing the geology, vegetation, and amount of predicted precipitation for an area can help in these predictions. However, there is no practical warning system for individual landslides. The current standard operating procedure is to monitor situations on a case-by-case basis and respond after the event has occurred. Generally accepted warning signs for landslide activity include:

- Springs, seeps, or saturated ground in areas that have not typically been wet before
- New cracks or unusual bulges in the ground, street pavements, or sidewalks
- Soil moving away from foundations
- Ancillary structures such as decks and patios tilting or moving relative to the main house
- Tilting or cracking of concrete floors and foundations
- Broken water lines and other underground utilities
- Leaning telephone poles, trees, retaining walls, or fences
- Offset fence lines
- Sunken or down-dropped roadbeds
- Rapid increase in creek water levels, possibly accompanied by increased soil content
- Sudden decrease in creek water levels though rain is still falling or just recently stopped
- Sticking doors and windows and visible gaps indicating jambs and frames out of plumb
- A faint rumbling sound that increases in volume as the landslide nears
- Unusual sounds, such as trees cracking or boulders knocking together

### 4.10.2 Related Hazards

Landslides and rockfalls can also be triggered by earthquakes. Debris flow events are often associated with flooding and are more likely to occur on areas burned by wildfires. Large landslides in steep mountain valleys may have the potential to cause landslide, causing flooding, damage to rivers or streams, and potentially harming water quality, fisheries, and spawning habitat.

### 4.10.3 Climate Change Considerations

Climate change may impact storm patterns, increasing the probability of more frequent, intense storms with varying duration. Increases in global temperature could affect the snowpack and its ability to hold and store water. Warming temperatures also could increase the occurrence and duration of droughts, which would increase the probability of wildfire, reducing the vegetation that helps to support steep slopes. All of these factors would increase the probability for landslide occurrences.

### 4.10.4 Vulnerability

Major landslides in the planning area typically occur as a result of soil conditions that have been affected by wildfire, natural erosion, severe storms, groundwater, or human development. The worst-case scenario

for landslide hazards in the planning area would generally correspond to a severe storm that had heavy rain and caused flooding in burn scar areas. Landslides are most likely during late spring and summer months. After heavy spring and summer rains, soils become saturated with water. As water seeps downward through upper soils that may consist of permeable sands and gravels and accumulates on impermeable silt, it will cause weakness and destabilization in the slope. A short intense storm could cause saturated soil to move, resulting in landslides. As rains continue, the groundwater table rises, adding to the weakening of the slope. Burn scars, gravity, poor drainage, a rising groundwater table, and poor soil exacerbate hazardous conditions.

Mass movements are becoming more of a concern as development moves outside of town centers and into areas less developed in terms of infrastructure. Most mass movements would be isolated events affecting specific areas. It is probable that private and public property, including infrastructure, will be affected. Mass movements could affect bridges that pass over landslide prone ravines and knock out transportation corridors through the county. Road obstructions caused by mass movements would create isolation problems for residents and businesses in sparsely developed areas. Property owners exposed to steep slopes may suffer damage to property or structures. Landslides carrying vegetation such as shrubs and trees may cause a break in utility lines, cutting off power, and communication access to residents.

## Population

Population exposure to landslide hazard areas is likely limited. While exposed populations are included in Table 4-41 below, those numbers do not reflect imminent risk. The only mapped hazard areas within incorporated jurisdictions are in the southeastern portion of the county, east of the City of Salida. It is most likely that individuals exposed to landslide, mud/debris flow, and rockfall hazards would be in recreation areas or driving on roadways. In 2013, five hikers were killed in a rockslide at Mt. Princeton.

## Property

There are no reports of property damage in association with landslides, mud/debris flows, and rockfalls in Chaffee County. Areas of higher susceptibility are mainly located away from population centers in the mountainous areas. During July 2007 a slow-moving thunderstorm triggered about 45 debris flows due to heavy rains causing surface water runoff. This event didn't cause any property damage; however, a road was washed out and there was damage to multiple vacant subdivided lots. This highlights the potential risk for property damage from debris flow events. Mudslides have caused road and camp site closures in the recent years; however, these mudslides did not cause property damage or injuries.

An analysis of the potential total exposure of property types and values was conducted to explore the potential losses in the event of a landslide in at risk portions of the City of Salida and the unincorporated county. These figures are summarized in Table 4-41.

**Table 4-41 Landslide Exposure by Property Type and Jurisdiction**

Jurisdiction	Property Type	Improved Parcels	Building Count	Improved Value	Content Value	Total Value	Population
Salida	Commercial	1	1	\$188,576	\$188,576	\$377,152	
	Residential	36	36	\$13,000,387	\$6,500,194	\$19,500,581	72
	<b>Total</b>	<b>37</b>	<b>37</b>	<b>\$13,188,963</b>	<b>\$6,688,770</b>	<b>\$19,877,733</b>	<b>72</b>
Unincorporated Chaffee County	Agricultural	63	65	\$17,763,694	\$17,763,694	\$35,527,388	
	Commercial	5	6	\$18,049,112	\$18,049,112	\$36,098,224	
	Exempt	5	5	\$13,366,868	\$13,366,868	\$26,733,736	



Jurisdiction	Property Type	Improved Parcels	Building Count	Improved Value	Content Value	Total Value	Population
	Residential	477	481	\$164,933,065	\$82,466,533	\$247,399,598	1,072
	Vacant Land	3	3	\$30,798	\$30,798	\$61,596	
	<b>Total</b>	<b>553</b>	<b>560</b>	<b>\$214,143,537</b>	<b>\$131,677,005</b>	<b>\$345,820,542</b>	<b>1,072</b>
	<b>Grand Total</b>	<b>590</b>	<b>597</b>	<b>\$227,332,500</b>	<b>\$138,365,774</b>	<b>\$365,698,274</b>	<b>1,144</b>

### Critical Facilities and Infrastructure

Several critical facilities are in areas that have the potential for landslides, mud/debris flows, and rockfalls, specifically communications facilities. There have been several documented incidents of damage to roads from debris flows, landslides, and rockfalls which may temporarily close transportation routes or completely destroy them. A more in-depth analysis of the mitigation measures taken by these facilities to prevent damage from mass movements should be done to evaluate whether they could withstand impacts of a mass movement.

Several types of infrastructure are exposed to mass movements, including transportation, water and sewer and power infrastructure. Highly susceptible areas of the county include mountain roads and transportation infrastructure, and these have periodically been impacted. Public comments received during the Public Review Draft period noted concerns of landslide, mudflow and rockfall blocking CR 371 due to the steep slopes above the northern portion of the road.

Exposure analysis of Critical Facilities in the county revealed that some communications facilities are located in areas of the unincorporated county that are considered at risk to landslide events. These are summarized below in Table 4-42.

**Table 4-42 Critical Facility Landslide Vulnerability by FEMA Lifeline**

Jurisdiction	FEMA Lifeline	Critical Facility Type	Count
Unincorporated	Communications	Cellular Tower	4
		Land Mobile Private Transmission Tower	3
		Microwave Transmission Tower	6
		<b>Total</b>	<b>13</b>

### Economy

Economic impacts typically center around transportation routes temporarily closed by rockfall, debris flow, mudflow, or landslide activity. These roads may be used to transport goods across the county or provide access by visitors and tourists. Depending on the amount of damage, the road may simply need to be cleaned off, or may need some level of reconstruction and affect the local economy indirectly.

### Historic, Cultural, and Natural Resources

The environment vulnerable to landslide hazard is the same as the environment exposed to the hazard. While typically a natural process, some environmental problems can result from mass movements. Landslides that fall into streams may significantly impact fish and wildlife habitat, as well as affecting water quality. Hillsides that provide wildlife habitat can be lost for prolonged periods of time.

#### 4.10.5 Development Trends

The severity of landslide problems is directly related to the extent of human activity in hazard areas. Adverse effects can be mitigated by early recognition and avoiding incompatible land uses in these areas

or by corrective engineering. The mountainous topography of the county presents considerable constraints to development, most commonly in the form of steeply sloped areas, but also in the abundance of federal lands.

Continued adherence to the land development codes and regulations in the planning area will decrease the risk of future development to landslide hazard areas. Development of lands within identified hazard areas are limited to meet the requirements set forth by the planning and zoning offices or the building departments of the jurisdiction at the time of construction. Most construction has been limited to areas that are not in these hazard areas.

#### **4.10.6 Risk Summary**

Important issues associated with landslides in the planning area include the following:

- Exposure analyses on best available landslide hazard mapping indicates existing homes in landslide risk areas throughout the county. The degree of vulnerability of these structures depends on the codes and standards the structures were constructed to. Information to this level of detail is not currently available.
- As incidents of wildfires increase and hillsides are void of vegetation, rain-soaked hillsides are more likely to slide and produce debris flows, resulting in increased damage countywide.
- Many existing roads and bridges in the County may be at risk to landslides, debris flows, and rockfalls, including CR 162 which has been impacted frequently.
- Future development outside of the existing towns and city could lead to more homes in landslide risk areas.
- Mapping and assessment of landslide hazards are constantly evolving. As new data and science become available, assessments of landslide risk should be reevaluated.
- Landslides may cause negative environmental consequences, including water quality degradation.
- The risk associated with the landslide hazard overlaps the risk associated with other hazards such as earthquake, flood, and wildfire. This provides an opportunity to seek mitigation alternatives with multiple objectives that can reduce risk for multiple hazards.



## 4.11 Tornado

TORNADO RANKING	
Chaffee County	Low
City of Salida	Low
Town of Buena Vista	Low
Town of Poncha Springs	Low

### DEFINITIONS

**Tornado**— A tornado is a narrow, violently rotating column of air that extends from the base of a cumulonimbus cloud to the ground. They are measured using the Fujita Scale, ranging from F0 to F5, or the Enhanced Fujita Scale.

### 4.11.1 Hazard Profile

A tornado is a narrow, violently rotating column of

air that extends from the base of a cumulonimbus cloud to the ground. The visible sign of a tornado is the dust and debris that is caught in the rotating column made up of water droplets. Tornadoes are the most violent of all atmospheric storms. The following are common ingredients for tornado formation:

- Very strong winds in the mid and upper levels of the atmosphere
- Clockwise turning of the wind with height (i.e., from southeast at the surface to west aloft)
- Increasing wind speed in the lowest 10,000 feet of the atmosphere (i.e., 20 mph at the surface and 50 mph at 7,000 feet)
- Very warm, moist air near the ground with unusually cooler air aloft
- A forcing mechanism such as a cold front or leftover weather boundary from previous shower or thunderstorm activity

Tornadoes can form from individual cells within severe thunderstorm squall lines. They also can form from an isolated super-cell thunderstorm. Weak tornadoes can sometimes occur from air that is converging and spinning upward, with little more than a rain shower occurring in the vicinity.

In 2007, the NWS began rating tornadoes using the Enhanced Fujita Scale (EF-scale). The EF-scale is a set of wind estimates (not measurements) based on damage. It uses three-second gusts estimated at the point of damage based on a judgment of 8 levels of damage to the 28 indicators listed in Table 4-43. These estimates vary with height and exposure. Standard measurements are taken by weather stations in open exposures. Table 4-43 describes the EF-scale ratings versus the previous Fujita Scale used prior to 2007 (NOAA 2007).

The U.S. experiences more tornadoes than any other country. In a typical year, approximately 1,000 tornadoes affect the U.S. The peak of the tornado season is April through June, with the highest concentration of tornadoes in the central U.S. Figure 4-32 shows the annual average number of tornadoes between 1991 and 2010. Colorado experienced an average of 53 tornado events annually in that period. Colorado ranks 9th among the 50 states in frequency of tornadoes, but 38th for the number of deaths. Nationwide, Colorado ranks 31st for injuries and 30th for the cost of repairing the damages due to tornadoes. When these statistics are compared to other states by the frequency per square mile, Colorado ranks 28th for injuries per area and 37th for costs per area.

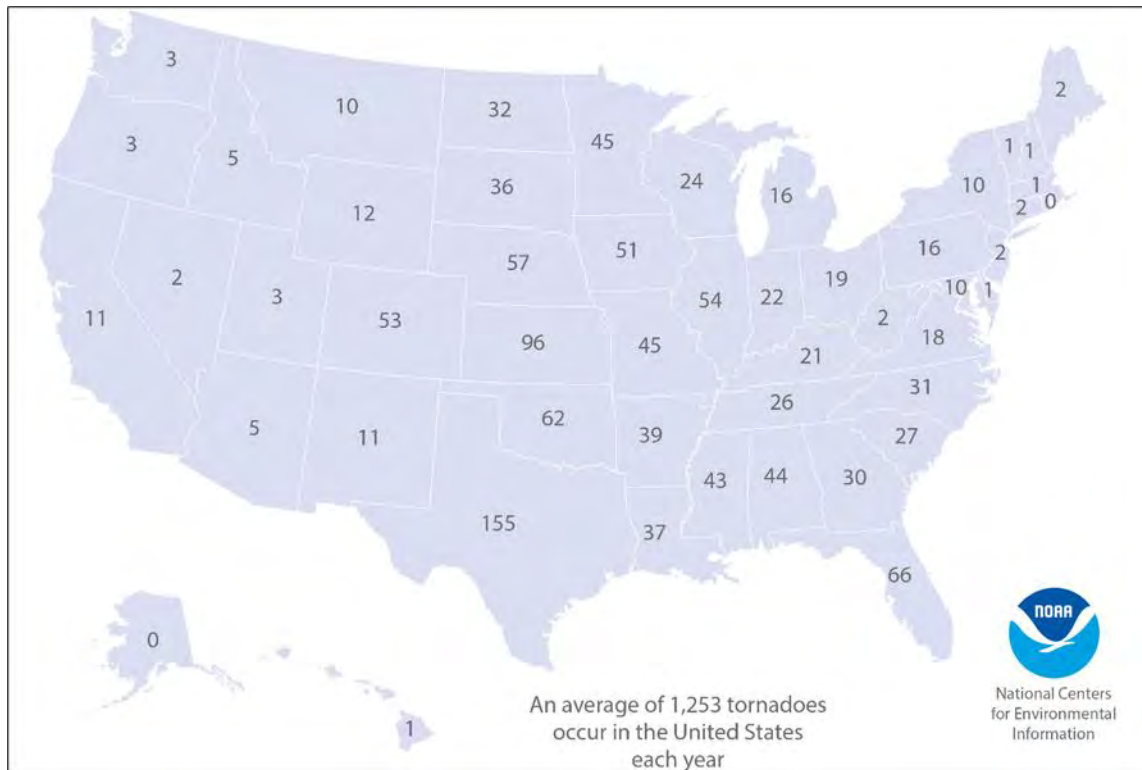
A study from NOAA's National Severe Storms Laboratory used historical data to estimate the daily probability of tornado occurrences across the U.S., regardless of tornado magnitude. Figure 4-33 shows the estimates. The density per 25 square miles in the map's legend indicates the probable number of tornadoes for each 25 square mile cell within the contoured zone that can be expected over a similar period of record. It should be noted that the density number does NOT indicate the number of events that can be expected across the entire zone on the map.

**Table 4-43 The Fujita Scale and Enhanced Fujita Scale**

Fujita Scale		Derived		Operational EF Scale		
F Number		Fastest ¼ mile (mph)	3-second gust (mph)	EF Number	3-second gust (mph)	EF Number
0		40-72	45-78	0	65-85	0
1		73-112	79-117	1	86-109	1
2		113-157	118-161	2	110-137	2
3		158-207	162-209	3	138-167	3
4		208-260	210-261	4	168-199	4
5		261-318	262-317	5	200-234	5

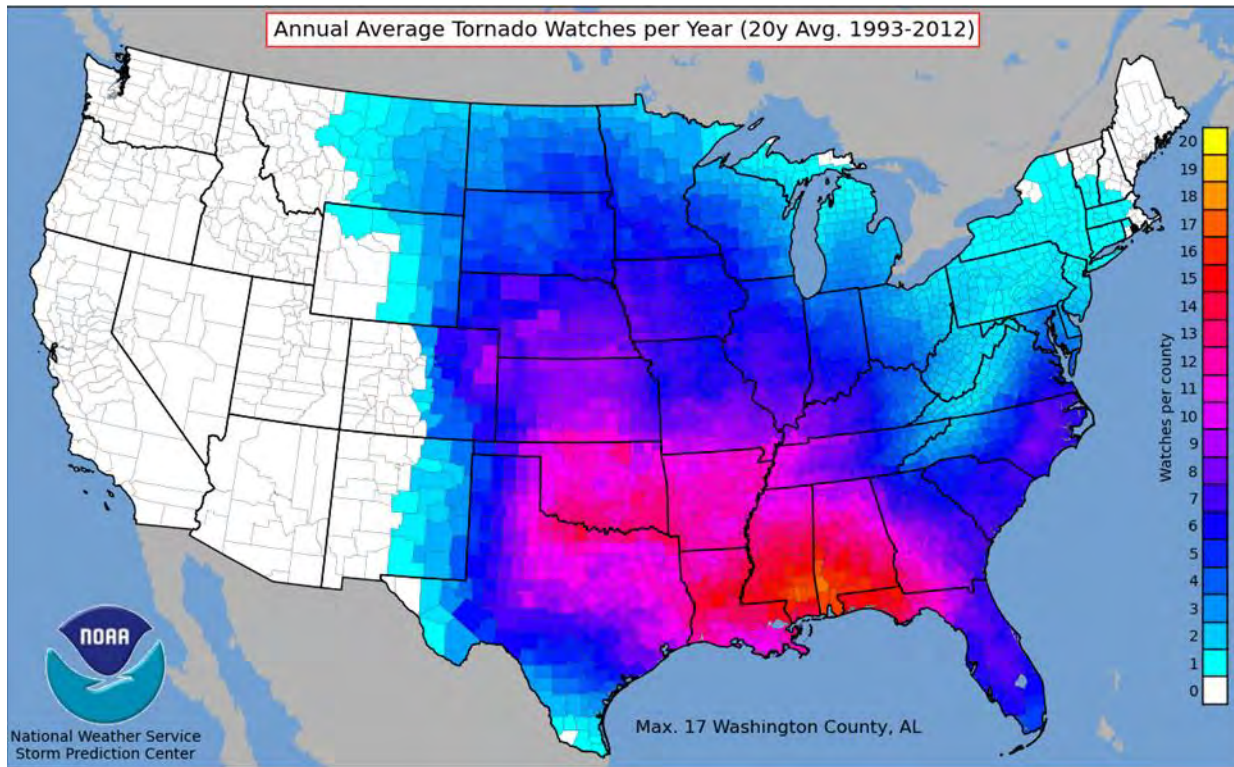
Notes:  
 EF Enhanced Fujita  
 F Fujita  
 mph Miles per Hour

**Figure 4-32 Annual Average Number of Tornadoes in the U.S. (1991-2010)**



Source: NOAA

**Figure 4-33 Total Annual Tornado Watches in the U.S. (1993-2012)**



Source: NOAA

## Past Events

Table 4-44 lists the past tornado events in Chaffee County recorded by the NCEI Storm Events Database between 1950 to 2020. One tornado that caused damage in Chaffee County was recorded. This tornado occurred in 1991 and caused \$25,000 in property damages. The narrative from NCEI database notes that “residents watched as a small tornado briefly touched down in Salida, long enough to take the roof off a home and caused considerable damage to the inside” (NOAA, NCEI). One funnel cloud event is also recorded in the database. The event took place on August 3, 2011 and was reported near Poncha Springs. It did not cause any reported damages.

**Table 4-44 Tornadoes in Chaffee County (1950-2020)**

Date	Tornado Rating	Injuries	Property Damage	Tornado Length (miles)	Tornado Width (yards)
5/5/1991	F0	0	\$25,000	0.2	10
Notes: F Fujita					

## Location

Recorded tornadoes in the planning area are typically rare. The only recorded tornado from 1950 to present, happened near Salida in 1991, the event is described above. One funnel cloud event was also recorded in 2011, as taking place between Nathrop and Poncha Springs.

## Frequency and Severity (Extent)

Tornadoes have been reported 9 months of the year in Colorado, with peak occurrences between May through August. Statewide, June is by far the month with the most recorded tornadoes. Table 4-44 lists the one recorded tornado between 1950 and 2020, therefore, an average of 0.01 tornadoes occur each year in Chaffee County.

Tornadoes are potentially the most dangerous of local storms. If a major tornado were to strike within the populated areas of Chaffee County, damage could be widespread. Businesses could be forced to close for an extended period or permanently, fatalities could be high, many people could be homeless for an extended period, and routine services such as telephone or power could be disrupted. Buildings may be damaged or destroyed. Historically, tornadoes have not typically been severe in the planning area and would likely be in the EF0 to EF1 range, though stronger tornados could be possible. The reported F0 tornado that occurred on May 5, 1991, was located east of the City of Salida and caused property damage.

Based on the information in this hazard profile, the overall significance of tornadoes in Chaffee County is minimal and the Steering Committee members rated it a low hazard for all planning partners.

## Warning Time

The NOAA's storm prediction center issues tornado watches and warnings for Chaffee County:

- Tornado Watch—Tornadoes are possible. Remain alert for approaching storms. Watch the sky and stay tuned to NOAA Weather Radio, commercial radio, or television for information.
- Tornado Warning—A tornado has been sighted or indicated by weather radar. Take shelter immediately.

Once a warning has been issued, residents may have only a matter of seconds or minutes to seek shelter.

### 4.11.2 Related Hazards

Tornadoes may cause loss of power if utility service is disrupted. Additionally, fires may result from damages to natural gas infrastructure. Hazardous materials may be released if a structure is damaged that houses such materials or if such a material is in transport.

### 4.11.3 Climate Change Considerations

Climate change impacts on the frequency and severity of tornadoes are unclear. NASA's Earth Observatory has conducted studies which aim to understand the interaction between climate change and tornadoes. Based on these studies meteorologists are unsure why some thunderstorms generate tornadoes and others don't, beyond knowing that they require a certain type of wind shear. Tornadoes spawn from approximately one percent of thunderstorms, usually supercell thunderstorms that are in a wind shear environment that promotes rotation. Some studies show a potential for a decrease in wind shear in mid-latitude areas. The level of significance of this hazard should be revisited over time.

### 4.11.4 Vulnerability

## Population

It can be assumed that the entire planning area is exposed to some extent to tornadoes. Certain areas are more exposed due to geographic location and local weather patterns. Likelihood of injuries and fatalities would increase if warning time was limited before the event or if residents were unable to find adequate shelter.

Vulnerable populations are the elderly, low income or linguistically isolated populations, people with life-threatening illnesses, and residents living in areas that are isolated from major roads. Power outages can be life threatening to those dependent on electricity for life support. Isolation of these populations is a significant concern. As noted in the Hail, Lightning and Severe Wind vulnerability assessment section 4.9, 11% of Medicare Beneficiaries in the County rely on electricity-dependent medical equipment to be able to live independently in their homes. These populations face isolation and exposure after tornado events and could suffer more secondary effects of the hazard. These populations face isolation and exposure after tornado events and could suffer more secondary effects of the hazard.

Individuals caught in the path of a tornado who are unable to seek appropriate shelter are especially vulnerable. This may include individuals who are out in the open, in cars, or who do not have access to basements, cellars, or safe rooms.

## **Property**

All property is vulnerable during tornado events, but properties in poor condition or in particularly vulnerable locations may risk the most damage. There are a total of 11,594 buildings in Chaffee County, but it is unlikely many of these structures will be affected. Construction practices and building codes can help maximize the resistance of the structures to damage. Mobile homes are more vulnerable to the impacts of a tornado event compared to housing types due to methods of construction. Statewide, mobile homes represent about 4% of total housing. While in Chaffee County, 8.6% of total housing stock is mobile homes and in Poncha Springs mobile homes represent 8.3% of the housing in the Town. If an EF3 or higher tornado were to hit populated areas of the county, such as the City of Salida or the Town of Buena Vista, substantial damage to property.

Tornadoes occur very infrequently in Chaffee County. Based on historic tornado data, an average of 0.01 tornadoes occur each year in Chaffee County. The average loss expectancy for each event is \$25,000, but because of the infrequency of tornado occurrences in Chaffee County, the annualized loss is only \$1,000.

## **Critical Facilities and Infrastructure**

All critical facilities and infrastructure are likely exposed to tornadoes. The most common problems associated with this hazard are utility losses. Downed power lines can cause blackouts, leaving large areas isolated. Phone, water, and sewer systems may not function. Roads may become impassable due to downed trees or other debris.

Tornadoes can cause significant damage to trees and power lines, blocking roads with debris, incapacitating transportation, isolating population, and disrupting ingress and egress. Of particular concern are roads providing access to isolated areas and to the elderly. Any facility that is in the path of a tornado is likely to sustain damage.

The most serious damage would be seen in the direct path of the tornado, but secondary effects could impact the rest of the county through loss of government services and interruptions in the transportation network.

## **Economy**

Tornado events are generally short-lived, but the impacts may last longer. Damages to commercial structures have the potential to be significant. Debris from the tornado would need to be collected and properly disposed. Such an event would likely have substantial negative effects on the local economy. Tourism may also be interrupted after a tornado event.



## **Historic, Cultural and Natural Resources**

Environmental features are exposed to tornado risk, although damages are generally localized to the path of the tornado. Historic buildings built prior to modern building codes would be more prone to damage.

### **4.11.5 Development Trends**

All future development will be affected by tornadoes, particularly development that occurs at lower elevations. Development regulations that require safe rooms, basements, or other structures that reduce risk to people would decrease vulnerability. Tornadoes that cause damage are uncommon in the county, so mandatory regulations may not be cost-effective. Growth trends are not anticipated to increase exposure of people or buildings to the tornado hazard substantially.

### **4.11.6 Risk Summary**

- There has been 1 recorded tornado event in the County (in Salida) since 1950, resulting damages to a home and a total of \$25,000 in property damages.
- Elderly and individuals who depend on electricity for medical needs are vulnerable to power outages caused by a tornado. 11% of Medicare Beneficiaries in the County rely on electricity-dependent equipment.
- All property is potentially vulnerable during tornado events, but mobile homes are disproportionately at risk due to the design of the homes. 8.6% of total housing in the County and 8.3% in Poncha Springs are mobile homes.
- Due to the low probability and generally low intensity, tornadoes are considered a low significance hazard.

## 4.12 Wildfire

WILDFIRE HAZARD RANKING	
Chaffee County	High
City of Salida	Medium
Town of Buena Vista	High
Town of Poncha Springs	High

### 4.12.1 Hazard Profile

A wildfire is any uncontrolled fire occurring on undeveloped land that requires fire suppression. Wildfires can be ignited by lightning or by human activity such as smoking, campfires, equipment use, and arson.

Fire hazards present a considerable risk to vegetation and wildlife habitats. Short-term loss caused by a wildfire can include the destruction of timber, wildlife habitat, scenic vistas, and watersheds. Long-term effects include smaller timber harvests, reduced access to affected recreational areas, and destruction of cultural and economic resources and community infrastructure. Vulnerability to flooding increases due to the destruction of watersheds. The potential for significant damage to life and property exists in areas designated as wildland urban interface (WUI) areas, where development is adjacent to densely vegetated areas.

Generally, there are three major factors that sustain wildfires and predict a given area's potential to burn. These factors are fuel, topography, and weather.

- **Fuel** – Fuel is the material that feeds a fire and is a key factor in wildfire behavior. Fuel is generally classified by type and by volume. Fuel sources are diverse and include everything from dead tree needles, leaves, twigs, and branches to dead standing trees, live trees, brush, and cured grasses. Structures such as homes and associated combustibles are also potential fuel sources. The type of prevalent fuel directly influences the behavior of wildfire. Light fuels such as grasses burn quickly and serve as a catalyst for fire spread. "Ladder fuels" are fuels low to the ground that can spread a surface fire upward through brush and into treetops. These fires, known as crown fires, burn in the upper canopy of forests and are nearly impossible to control. The volume of available fuel is described in terms of fuel loading. Many parts of the planning area are extremely vulnerable to wildfires, as a result of dense vegetation combined with urban interface living. Fuel loads within the County have been exacerbated by beetle infestations that have resulted in 80 to 90% spruce tree mortality (CWPP 2020).
- **Topography** – An area's terrain and land slopes affect its susceptibility to wildfire spread. Both the fire intensity and the rate of spread increase as slope increases due to the tendency of heat from a fire to rise via convection. The arrangement and types of vegetation throughout a hillside can also contribute to increased fire activity on slopes. In addition, topography impacts the ability of firefighters to combat the blaze by hampering access for equipment, supplies, materials and personnel.
- **Weather** – Weather components such as temperature, relative humidity, wind, and lightning also affect the potential for wildfires. High temperatures and low relative humidity dry out the fuels that feed the wildfire, increasing the odds that fuel will more readily ignite and burn more intensely. Wind is the most treacherous weather factor. The greater the wind, the faster a fire will spread, and the

### DEFINITIONS

**Interface Area**—An area susceptible to wildfires and where wildland vegetation and urban or suburban development occur together. An example would be smaller urban areas and dispersed rural housing in forested areas.

**Wildfire**—Fires that result in uncontrolled destruction of forests, brush, field crops, grasslands, and real and personal property in non-urban areas. Because of their distance from firefighting resources, they can be difficult to contain and can cause a great deal of destruction.

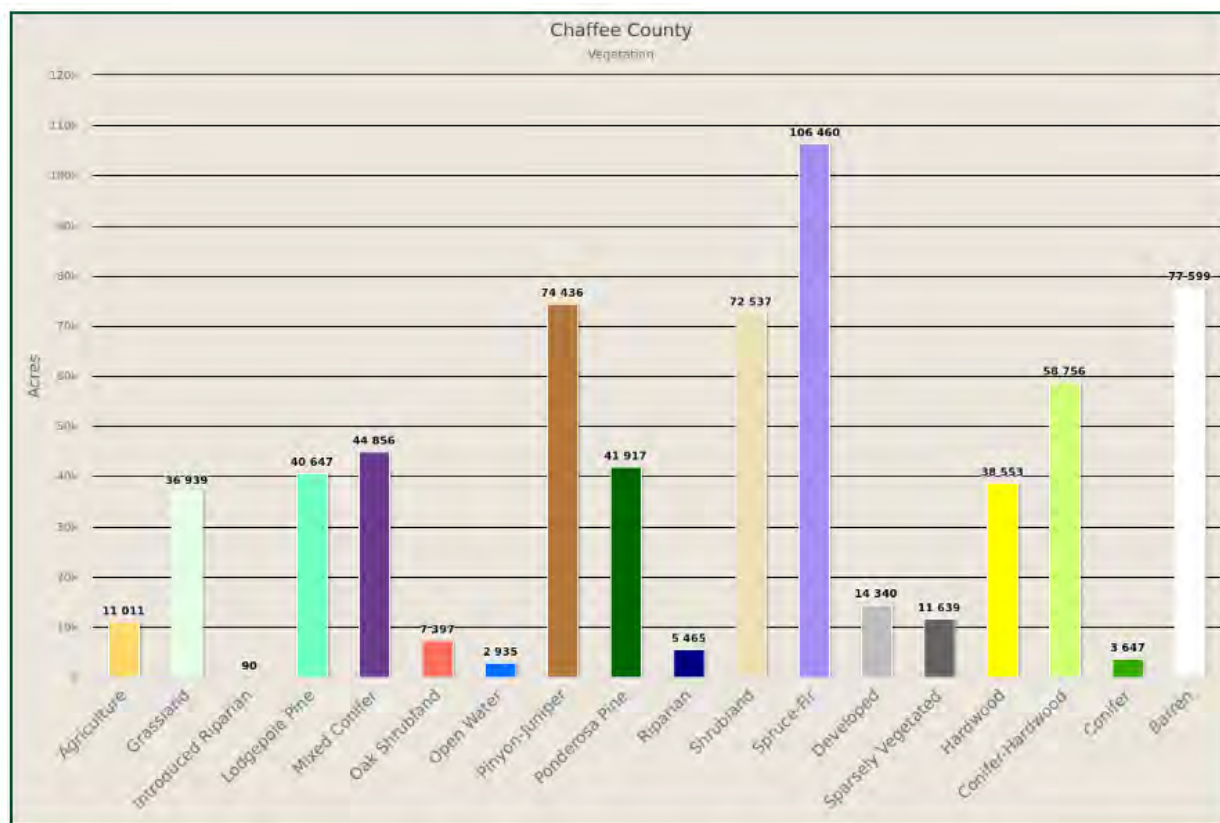
more intense it will be. In addition to wind speed, wind shifts can occur suddenly due to temperature changes or the interaction of wind with topographical features such as slopes or steep hillsides. Lightning also ignites wildfires, which are often in terrain that is difficult for firefighters to reach. Drought conditions contribute to wildfire vulnerability and susceptibility. During periods of drought, low fuel moisture and lack of precipitation increase the threat of wildfire. There are no known effective measures for human mitigation of weather conditions. Careful monitoring of weather conditions that drive the activation and enforcement of fire-safety measures and programs, such as bans on open fires, are ongoing weather-related mitigation activities.

Wildfires are of significant concern throughout Colorado. According to the Colorado State Forest Service, vegetation fires occur on an annual basis; most are controlled and contained early with limited damage. For those ignitions that are not readily contained and become wildfires, damage can be extensive. According to the 2018 State of Colorado Hazard Mitigation Plan, a century of aggressive fire suppression combined with cycles of drought and changing land management practices has left many of Colorado's forests, including those in Chaffee County, unnaturally dense and ready to burn. Further, the threat of wildfire and potential losses is constantly increasing as human development and population increases and the WUI expands. Another contributing factor to fuel loads in the forest are standing trees killed by pine bark beetles, which have been affecting the forests of Colorado since 2002, becoming more widespread and a serious concern. According to the Chaffee County public survey conducted in 2020 (see Appendix E), Chaffee County residents believe that wildfire is the one of their greatest threat to their safety.

### ***Vegetation Classes in Chaffee County***

General vegetation for Chaffee County is described in Figure 4-34. The most common vegetation classes in the county are Spruce-Fir, Pinyon-Juniper and Shrubland comprising over 39% of the acreage in the county.

**Figure 4-34 Chaffee County Vegetation Classes and Acres**



Source: CSFS COWRAP Report 2017

## Past Events

Table 4-45 lists all federally reported wildfires in Chaffee County that burned 10 acres or larger between 1980 and 2019. The locations and burn areas of those fires are shown in Figure 4-35. Between them, these 10 fires burned 9,143 acres.

The 2019 Decker Fire was the largest fire in the past 40 years to affect Chaffee County. The fire was caused by lightning in early September and was allowed to burn while being supervised in the Sangre de Cristo Wilderness. The wildfire flared up jumping Methodist Mt. threatening homes south of Salida, but only one home was lost. It was declared 100% contained on October 24, 2019 with help from snow that fell on the burn scar area.

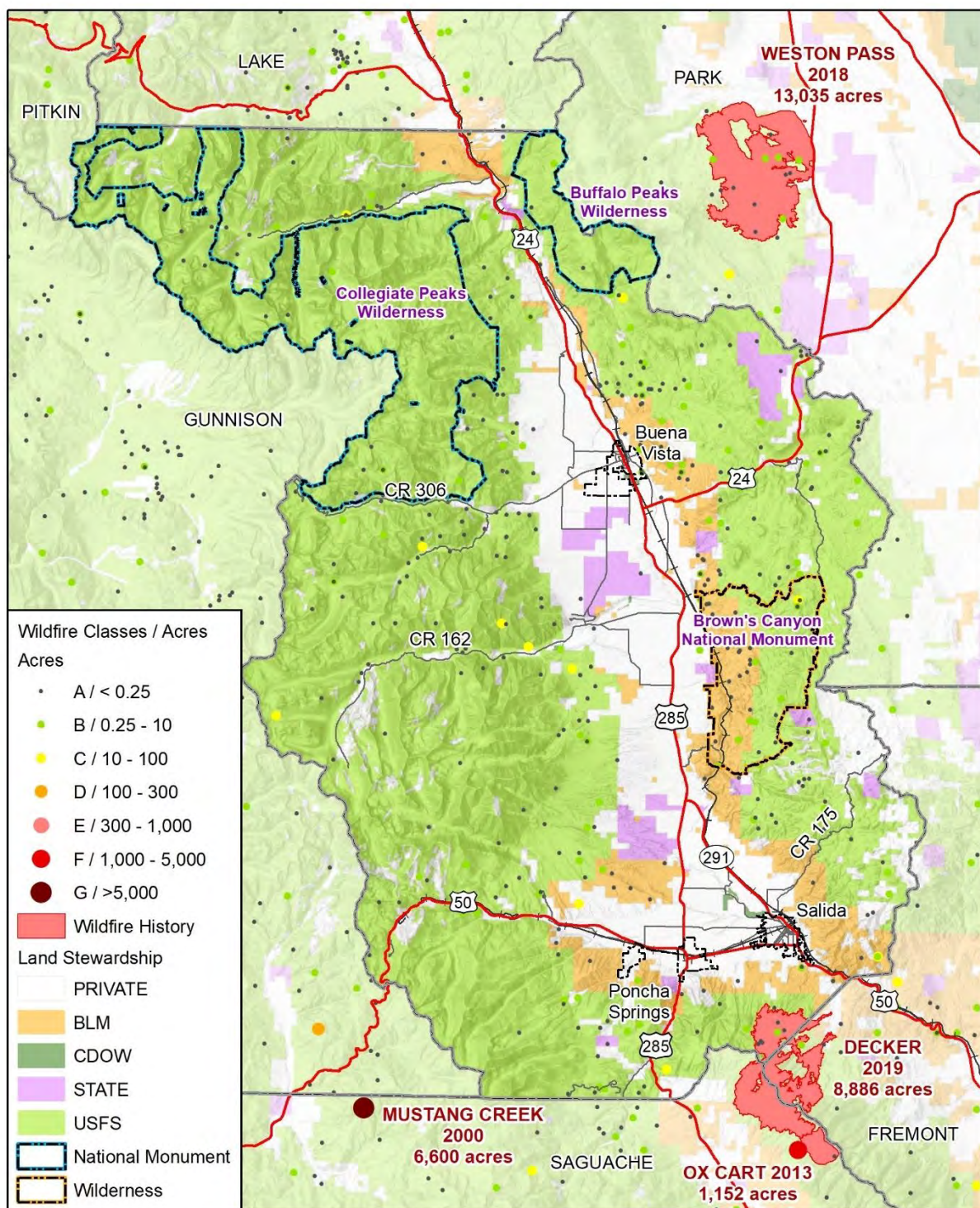
**Table 4-45 Wildfires over 10 acres in Chaffee County (1980-2019)**

Class	Acres	Percent (%)
Decker	8,886	2019
Rainbow	10.4	2016
Chalk Cliff	14	2001
Bullgrass	38	1996
Towerridge	12	1996
-	80	1994

Class	Acres	Percent (%)
-	16	1994
-	13	1993
-	60	1988
Bear Gulch	14	1981
Source: National Interagency Fire Center (NIFC), USGS: BLM, USFS		



**Figure 4-35 Chaffee County Wildfire History 1980-2019**



Map compiled 1/2021;  
intended for planning purposes only.  
Data Source: Chaffee County, CDOT,  
National Interagency Fire Center (NIFC),  
USGS: BLM, FS, NPS

0 5 10 Miles



## Location

Wildfire risk represents the possibility of loss or harm occurring from a wildfire. Risk is derived by combining the wildfire threat and the fire effects assessment outputs. It identifies areas with the greatest potential impacts from a wildfire. As part of the CWPP update in 2020 the Colorado Forest Restoration Institute at Colorado State University quantified and mapped risk to community priorities and added a county-wide assessment of:

- Asset locations, such as power lines, evacuation routes, cell towers, water supply and infrastructure, critical bighorn sheep winter range, etc.
- Burn probability, or where fire is most likely to happen. Lower elevation forests that are dry during much of the year and areas impacted by insect epidemics show up on this map.
- Fire Behavior, or how intense fire is likely to be if it occurs, ranges from knee-high flames in grasslands to towering crown fires in various forest types depending on moisture levels, fuel types, slope, and other factors.

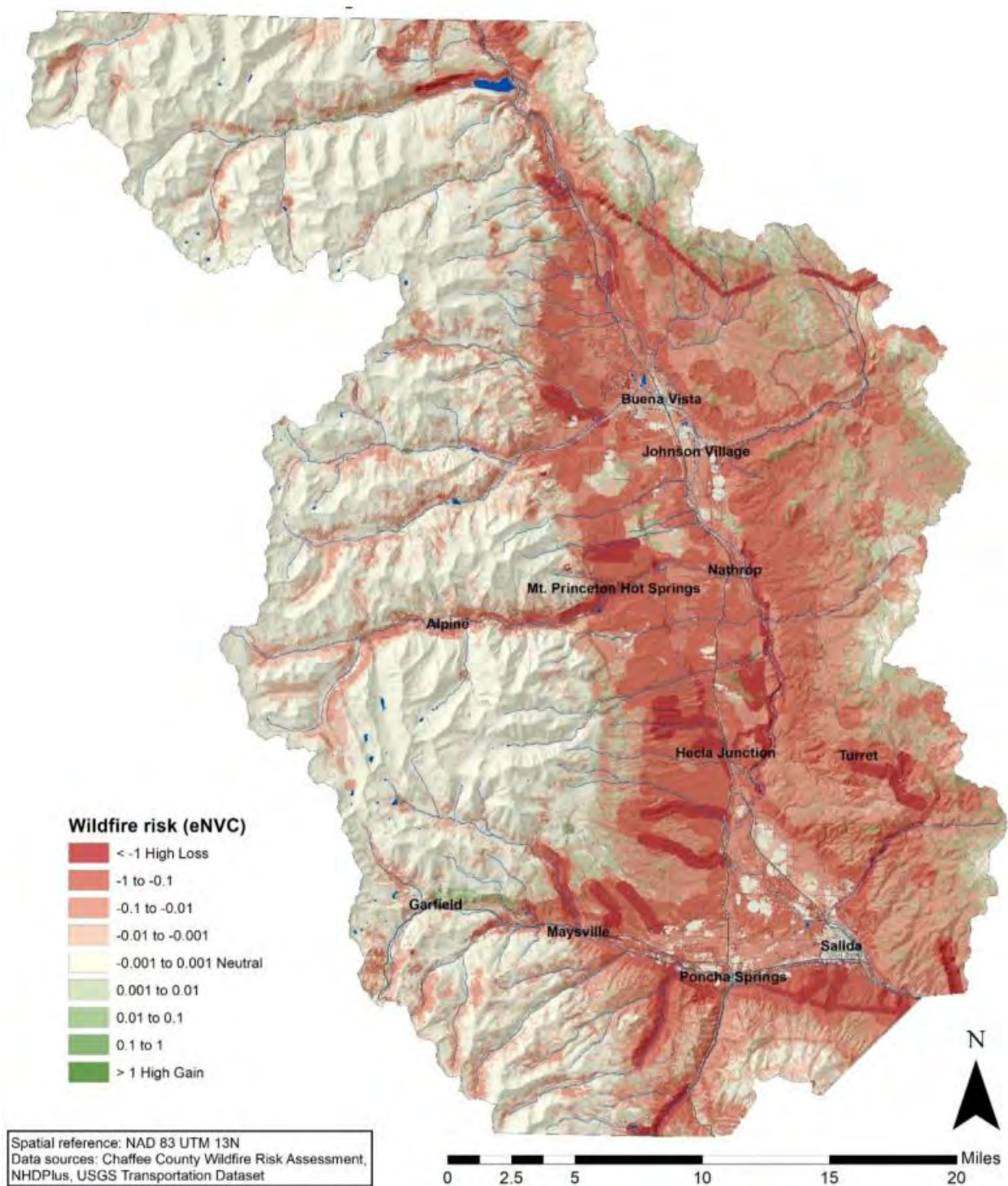
All of these factors combine to estimate Composite Wildfire Risk. Figure 4-36 shows the wildfire risks for areas within Chaffee County. This map shows where the community's valued assets are at the highest risk from severe wildfire (red) and areas where moderate wildfire may be of net benefit (green).

The CWPP risk assessment ultimately results in a focus on priority areas for fuels treatments designed to reduce the composite risk, with a focus on cost effectiveness. According to the analysis treatment of 5 to 10% of the landscape can reduce risk to community assets by 50 to 70%. Refer to the CWPP for additional details.

Colorado overall is one of the fastest growing states in the nation. Much of this growth is occurring in the WUI area, where structures and other human improvements meet and mix with undeveloped wildland or vegetative fuels. Population growth within the WUI substantially increases the risk from wildfires. Figure 4-37 shows the Chaffee County WUI as determined in the CWPP. The WUI is where people live, work, shop and go to school. WUI risk therefore represents the potential for wildfire to harm numerous assets and to disrupt human lives.

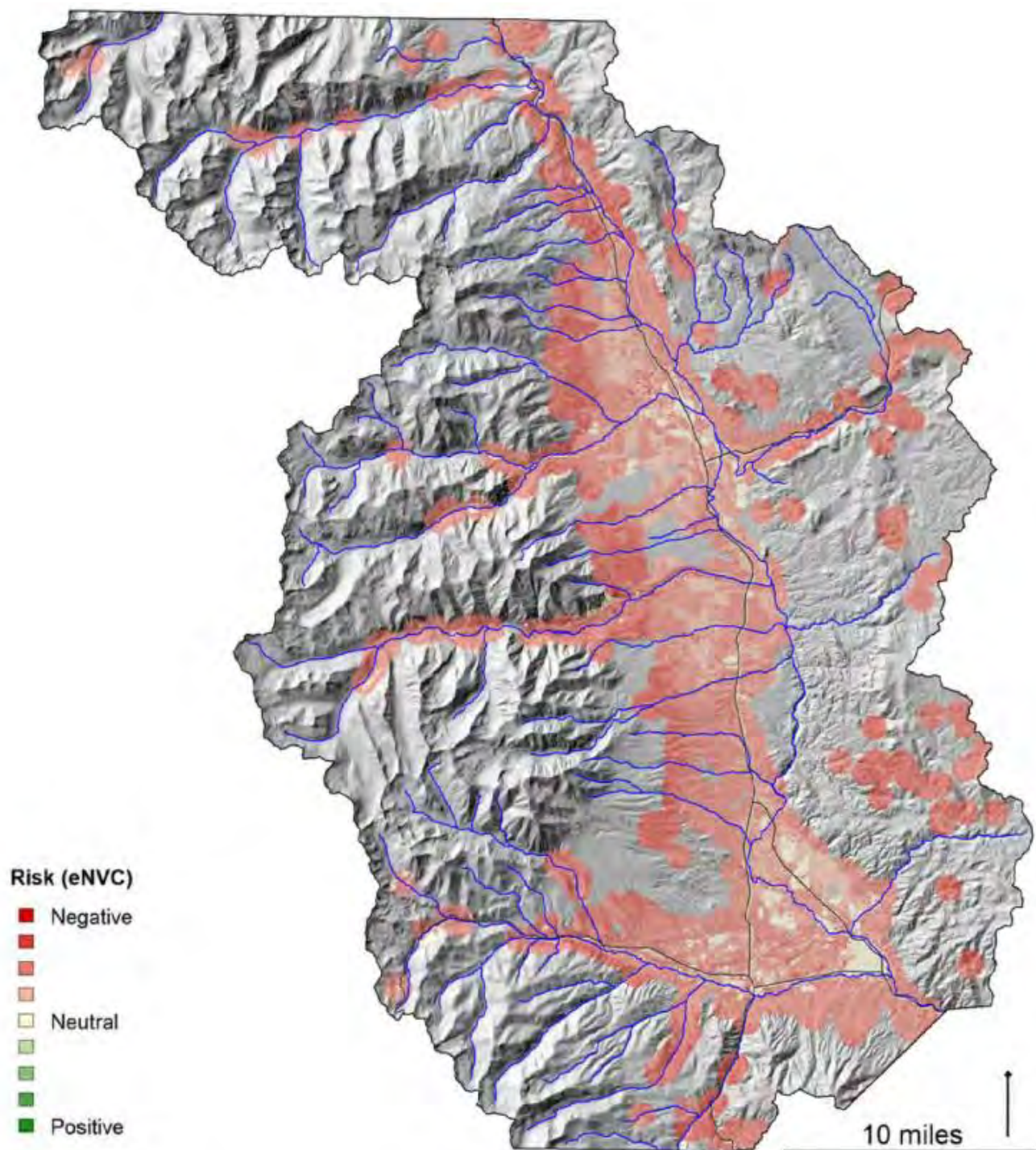


**Figure 4-36 Composite Wildfire Risk- Chaffee County CWPP**



Source: Chaffee County CWPP 2020

**Figure 4-37 Wildland Urban Interface from the Chaffee County CWPP**



Source: Chaffee County CWPP 2020

### Frequency and Severity (Extent)

According to the Colorado State Wildfire Risk Assessment Report for Chaffee County, there is a strong probability that at least one wildfire will occur each year in Chaffee County. Many of these fires will be 5 acres or less. Based on the data shown in Table 4-45, over the past 38 years the County has experienced



10 wildfires that burned more than 10 acres; this equates to roughly 26% chance of a fire at least this size any given year.

Based on the information in this hazard profile and the widespread impacts, the magnitude/severity of severe wildfires is considered moderate, unlikely to cause isolated deaths and multiple injuries, but could have major or long-term property damage that threatens structural stability; or interruption of essential facilities and services for 24 to 72 hours—as well as moderate duration economic impact due to interrupted tourism, which plays a major part in the economy of Chaffee County and its municipalities. Overall significance of the hazard is considered high.

The Planning Committee members rated the wildfire hazard as high in the unincorporated county, and the Towns of Buena Vista and Poncha Springs, but the City of Salida rated it as moderate hazard overall.

## **Warning Time**

Wildfires are often caused by humans, intentionally or accidentally. There is no way to predict when one might break out. Because fireworks often cause brush fires, extra diligence is warranted around the Fourth of July when the use of fireworks is highest. Dry seasons and droughts are factors that greatly increase fire likelihood. Dry lightning may trigger wildfires. Severe weather can be predicted, so special attention can be paid during weather events that may include lightning. Reliable NWS lightning warnings are available on average 24 to 48 hours before a significant electrical storm.

If a fire does break out and spreads rapidly, residents may need to evacuate within days or hours. A fire's peak burning period generally is between 1 p.m. and 6 p.m. Once a fire has started, fire alerting is reasonably rapid in most cases. The rapid expansion of cellular and two-way radio communications in recent years has further contributed to a significant improvement in warning time.

### **4.12.2 Related Hazards**

Wildfires can generate a range of secondary effects, which in some cases may cause more widespread and prolonged damage than the fire itself. Fires can cause direct economic losses in the reduction of harvestable timber and indirect economic losses in reduced tourism. Wildfires cause the contamination of reservoirs, destroy transmission lines, and contribute to flooding. They strip slopes of vegetation, exposing them to greater amounts of runoff. This in turn can weaken soils and cause failures on slopes. Major debris flows can occur several years after a wildfire. Most wildfires burn hot and for long durations that can bake soils, especially those high in clay content, thus increasing the imperviousness of the ground. This increases the runoff generated by storm events, thus increasing the chance of flooding and debris flows for a number of years until the watershed recovers.

### **4.12.3 Climate Change Impacts**

Fire in western ecosystems is affected by climate variability, local topography, and human intervention. Climate change has the potential to affect multiple elements of the wildfire system: fire behavior, ignitions, fire management, and vegetation fuels. Hot, dry spells create the highest fire risk. Increased temperatures may intensify wildfire danger by warming and drying out vegetation. When climate alters fuel loads and fuel moisture, forest susceptibility to wildfires changes. Climate change also may increase winds that spread fires. Faster fires are harder to contain, and thus are more likely to expand into residential neighborhoods.

Historically, drought patterns in the West are related to large-scale climate patterns in the Pacific and Atlantic Oceans. The El Niño–Southern Oscillation in the Pacific varies on a 5- to 7-year cycle, the Pacific Decadal Oscillation varies on a 20- to 30-year cycle, and the Atlantic Multidecadal Oscillation varies on a



65- to 80-year cycle. As these large-scale ocean climate patterns vary in relation to each other, drought conditions in the U.S. shift from region to region.

Climate scenarios project summer temperature increases between 2 degrees Celsius (°C) and 5°C and precipitation decreases of up to 15%. Such conditions would exacerbate summer drought and further promote high-elevation wildfires, releasing stores of carbon and further contributing to the buildup of greenhouse gases. Forest response to increased atmospheric carbon dioxide—the so-called “fertilization effect”—could also contribute to more tree growth and thus more fuel for fires, but the effects of carbon dioxide on mature forests are still largely unknown. High carbon dioxide levels should enhance tree recovery after fire and young forest regrowth, as long as sufficient nutrients and soil moisture are available, although the latter is in question for many parts of the western United States because of climate change.

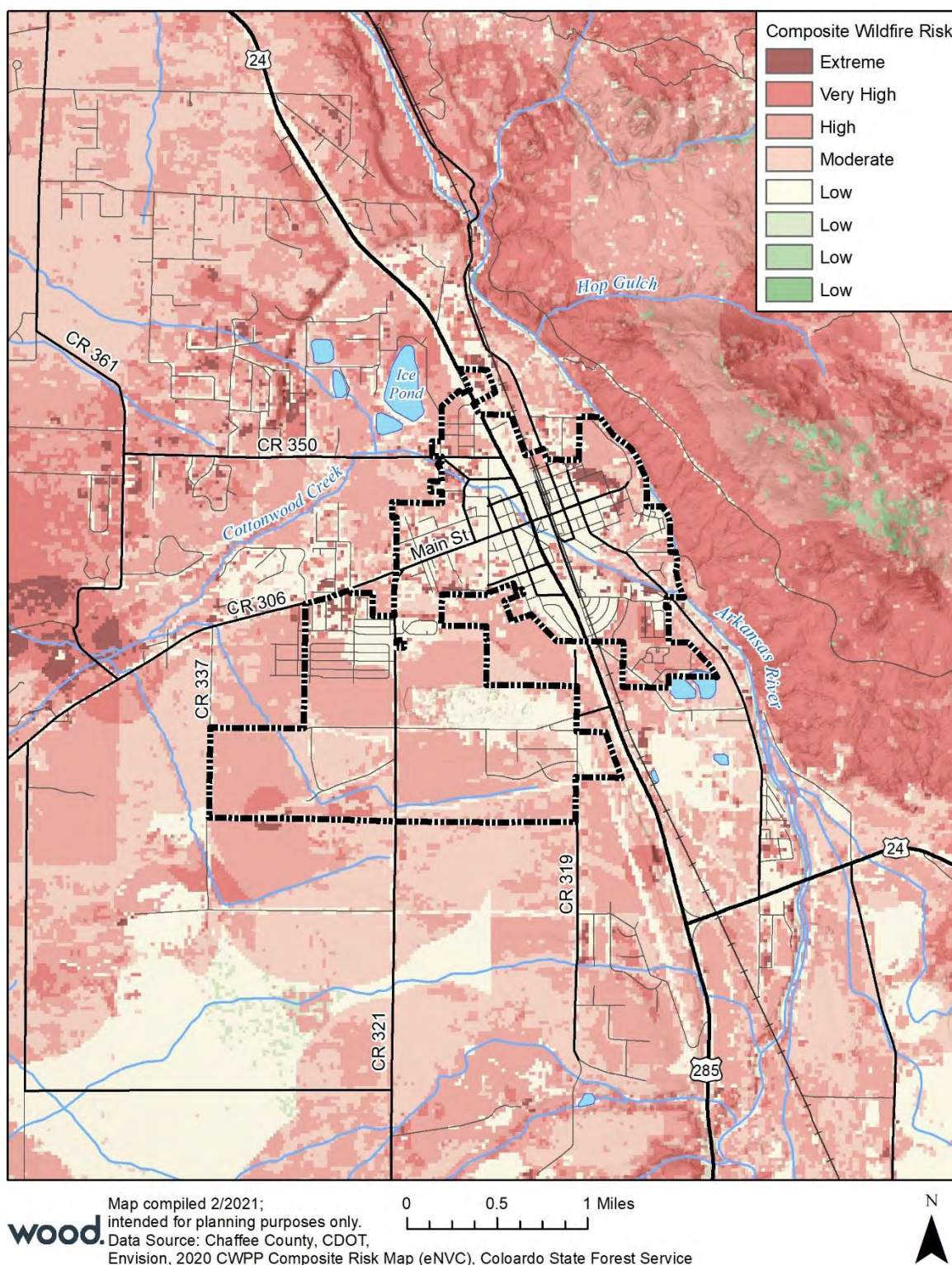
#### 4.12.4 Vulnerability

Information for the exposure analyses provided in the sections below is based on the 2020 CWPP. Figure 4-38 through Figure 4-40 shows the wildfire risks for areas within Chaffee County. The CWPP identifies assets to be protected from severe fire and post-fire flooding. The seven assets, in order, are firefighter lives, human life, drinking water, infrastructure, homes, wildlife, Arkansas River recreation, scenic views and trail systems. The highly valued resources and assets (HVRAs), combined with the burn probability and fire behavior modeling, are quantified in the composite wildfire risk map shown previously in Figure 4-36, which represents the empirical net value change (eNVC). Negative eNVC means high risk. Positive eNVC means there is an expected benefit from fire. For the purposes of displaying the composite risk rating on municipal level maps and to analyze risk to critical facilities the eNVC values were assigned descriptive risk ratings as shown in the table below. Composite risk maps were made to illustrate the risk by jurisdiction in the following maps.

**Table 4-46 CWPP Wildfire Risk (eNVC) Grouping**

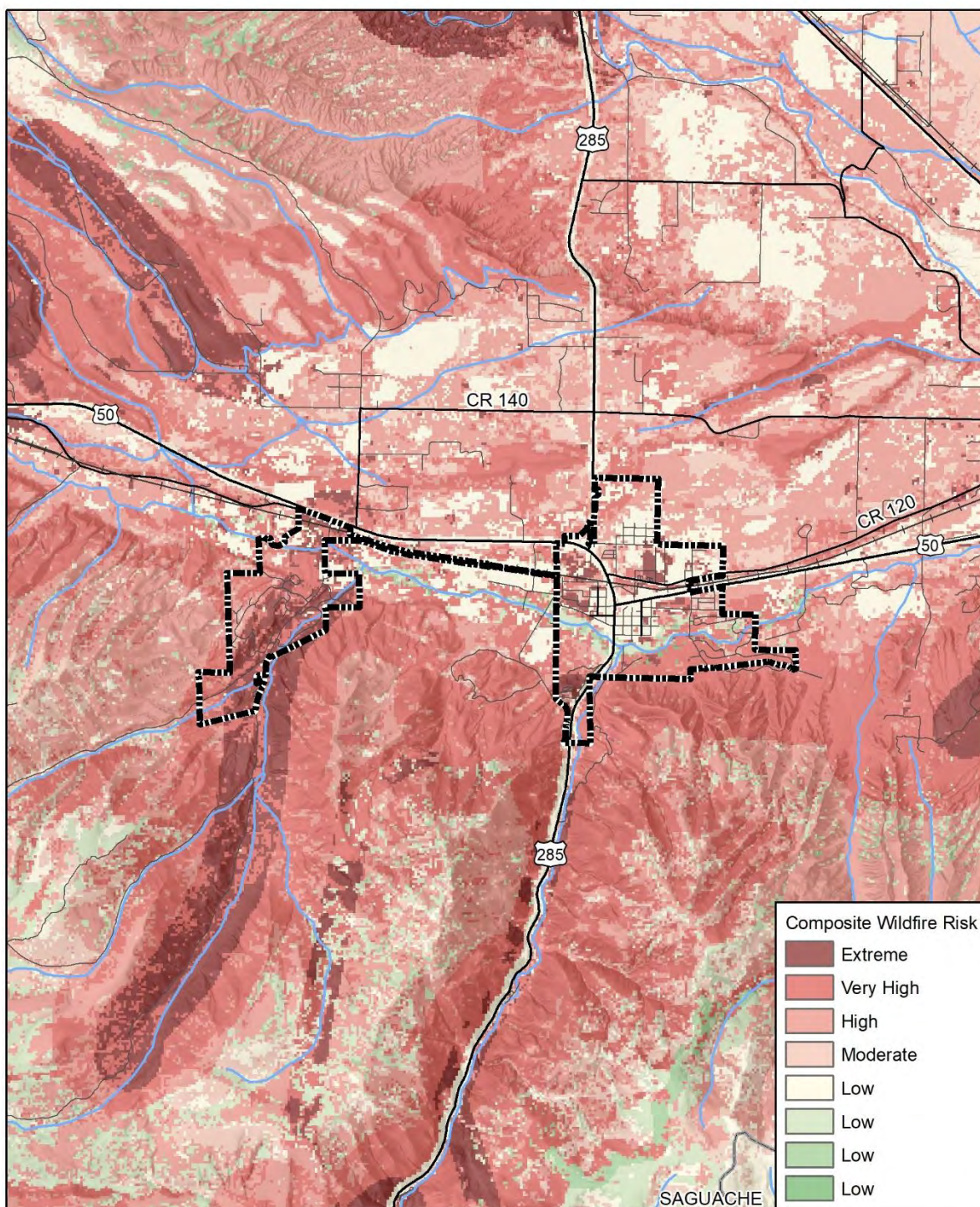
CWPP eNVC value	CWPP Description	HMP Description
<- 1	High Loss	Extreme
-1 to -0.1	-	Very High
-0.1 to -0.01	-	High
-0.01 to -0.001	-	Medium
-0.001 to 0.0001	Neutral	Low
0.001 to 0.01	-	Low
0.01 to 0.1	-	Low
0.1 to 1	-	Low
>1	High Gain	Low
Source: CWPP and Wood		

**Figure 4-38 Composite Wildfire Risk in the Town of Buena Vista**





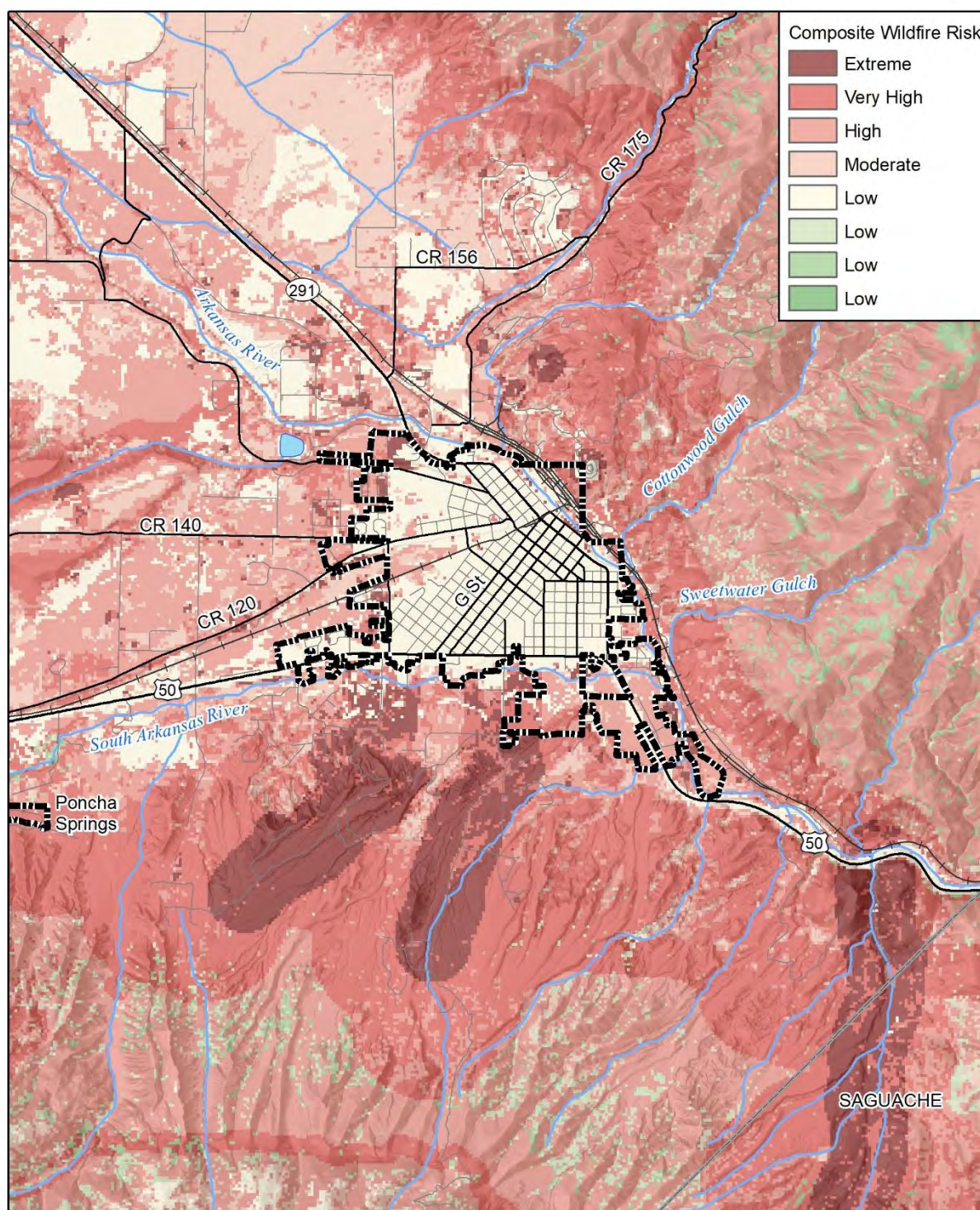
**Figure 4-39 Composite Wildfire Risk in the Town of Poncha Springs**



Map compiled 2/2021;  
intended for planning purposes only.  
Data Source: Chaffee County, CDOT,  
Envision, 2020 CWPP Composite Risk Map (eNVC), Colorado State Forest Service



**Figure 4-40 Composite Wildfire Risk in the City of Salida**



Map compiled 2/2021;  
intended for planning purposes only.  
Data Source: Chaffee County, CDOT,  
Envision, 2020 CWPP Composite Risk Map (eNVC), Colorado State Forest Service

0 0.5 1 Miles



## Population

The Chaffee County CWPP defines wildfire risk to life safety. Human life and safety refers to the lives of firefighters, residents and visitors during a wildfire. Components reflect: 1) the risk of entrapment because of difficulties that residents and/or visitors may have evacuating due to, for instance, single ingress/egress points and narrow roads, and 2) restrictions on WUI area access by firefighters due to, for instance, steep, tight turns that firefighting equipment cannot easily navigate. Access and evacuation routes in the county that would present hazardous conditions during a wildfire were identified by CWPP Leaders. The results of the GIS analysis are shown in the following figure.

Smoke and air pollution from wildfires can be a severe health hazard, especially for sensitive populations, including children, the elderly, and those with respiratory and cardiovascular diseases. Smoke generated by wildfire consists of visible and invisible emissions that contain particulate matter (soot, tar, water vapor, and minerals), gases (carbon monoxide, carbon dioxide, nitrogen oxides), and toxics (formaldehyde, benzene). Emissions from wildfires depend on the type of fuel, the moisture content of the fuel, the efficiency (or temperature) of combustion, and the weather. Public health impacts associated with wildfire include difficulty in breathing, odor, and reduction in visibility.

Wildfire may also threaten the health and safety of those fighting the fires. First responders are exposed to the dangers from the initial incident and after-effects from smoke inhalation and heat stroke.

Population was estimated using the structure count of buildings in the WUI area and applying the census value of 2.23 persons per household for unincorporated Chaffee County, 2.19 for Buena Vista, 2.30 for Poncha Springs and 2.01 for Salida. These estimates are shown in Table 4-47. Based on the analysis, 494 people are estimated to be living in extreme wildfire risk areas. The greatest number of residential populations in these extreme areas are located to Buena Vista (184) and Poncha Springs (182).

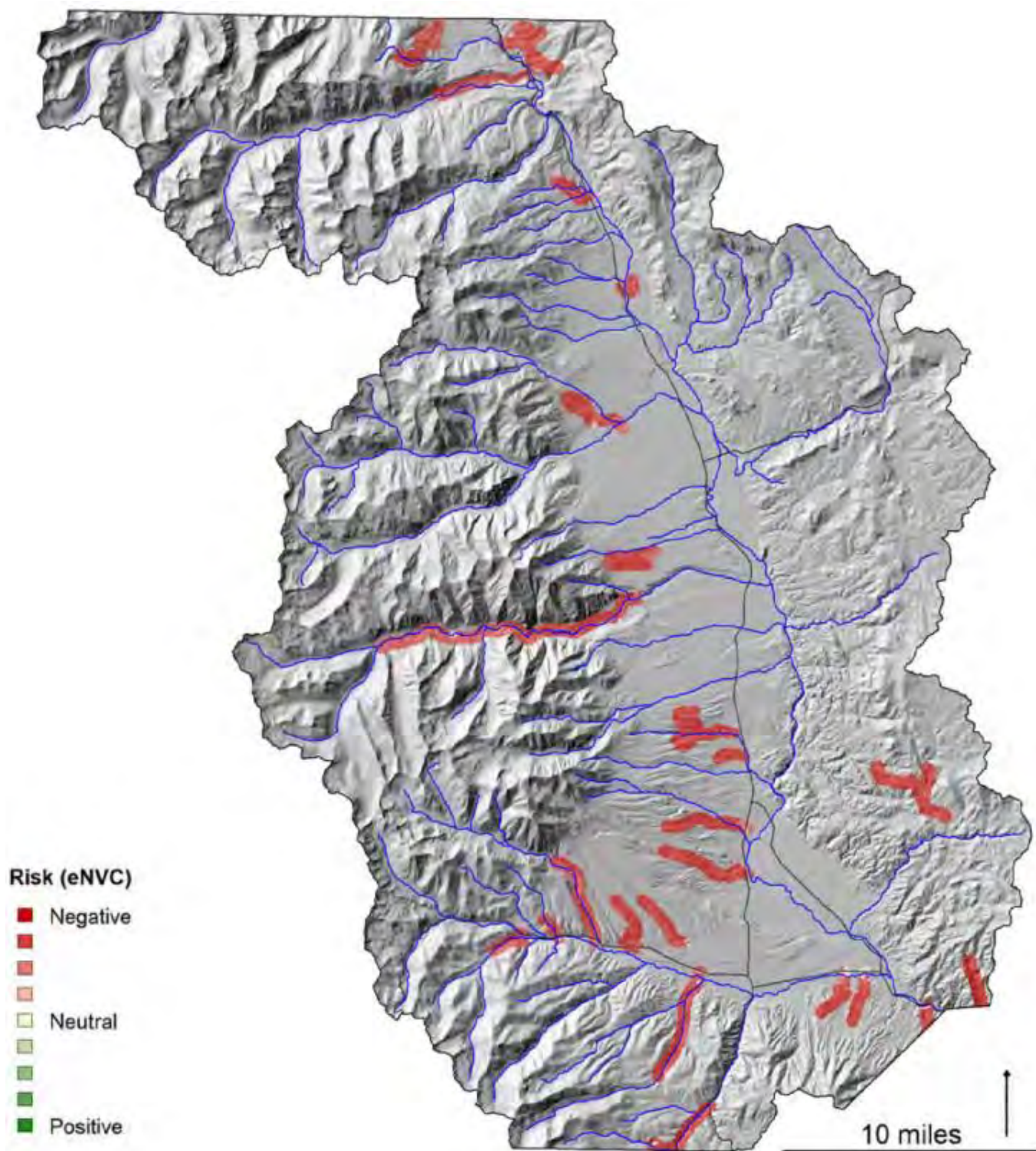
**Table 4-47 Population Within Wildfire Threat Areas**

Jurisdiction	Population
Buena Vista	881
Poncha Springs	673
Salida	461
Unincorporated County	4,589
<b>Total</b>	<b>6,604</b>

Source: DOLA, Envision, 2020 Chaffee County CWPP Composite Risk Map, Wood Analysis



**Figure 4-41 Wildfire Life Safety Risks Chaffee County CWPP**



Source: Chaffee County CWPP 2020

## Property

Property damage from wildfires can be severe and can significantly alter entire communities. Table 4-49 through Table 4-50 display the number of structures and their values in the various wildfire risk areas within the planning area and their values. Loss estimations for the wildfire hazard are not based on damage functions, because no such damage functions have been generated. Instead, damage estimates have been made by intersecting the CWPP Composite Risk data with 2020 County Assessor data.

Within the unincorporated areas of the County there are 2,058 homes with a total value \$912,495,591. The greatest number of homes are located in moderate (1,858) wildfire risk areas followed by high (1,347) risk areas. There are an additional 1,045 buildings located in the incorporated jurisdictions that are exposed to wildfire risk, 923 of which are residential. The greatest number of total buildings at risk (468) are in the Town of Buena Vista.

The Colorado State Forest Service (CSFS) is in the process of conducting a detailed risk assessment at the parcel level within unincorporated Chaffee County. The assessment identifies potential wildfire risk within the community based on topography, vegetation, and building factors as well as other factors that may have an impact on response and evacuation. Data from these assessments were not available for analysis or incorporation into this planning process.

**Table 4-48 Unincorporated County Count of Residential Structures in Wildfire Risk Areas**

Community/Location	Extreme	Very High	High	Moderate	Low	Not Assessed	Total Homes
Base of Princeton	0	14	13	19	5	3	54
Cedar Gate Estates	0	4	4	17	0	1	26
Chalk Creek	4	95	97	64	3	1	264
CR-210	0	3	8	8	1	2	22
CR-251	0	6	16	16	0	0	38
Garfield	3	26	12	16	2	1	60
Eagles Roost/Shadow Ln.	0	19	13	4	0	0	36
Game Trail	1	22	66	117	32	0	238
Lost Creek	0	21	9	8	0	0	38
Maysville/North Fork	0	12	31	63	12	2	120
Meadow Lakes Mountain Estates	0	3	15	24	2	0	44
Methodist Mountain	0	30	44	87	42	3	206
Mesa Antero	0	20	50	87	22	2	181
Mesa Antero Estates	0	11	10	10	0	0	31
Monarch River Estates	0	0	3	5	0	0	8
Mt. Harvard Estates/Colorado Midland	0	11	20	37	1	0	69
Mt. Princeton HOA	1	9	18	26	0	0	54
Pinon Acres/Cielo Vista	0	6	29	23	6	1	65
Pinion Hills	1	16	33	100	25	0	175
St. Elmo	1	49	14	6	0	0	70
Three Elk	0	7	20	11	4	0	42
Trail West	0	9	48	44	0	2	103
Wapiti/Four Elk	0	23	17	4	2	0	46

Community/Location	Extreme	Very High	High	Moderate	Low	Not Assessed	Total Homes
Weldon Creek/Eureka Ranch/Hayden Springs Ranch	0	3	10	11	1	0	25
Yale Lakes Estate/Lakeside Estates	2	4	4	26	7	0	43
<b>Total</b>	<b>13</b>	<b>423</b>	<b>604</b>	<b>833</b>	<b>167</b>	<b>18</b>	<b>2,058</b>

Source: County Assessor, Envision 2020 Chaffee County CWPP Composite Risk Map, Wood Analysis

**Table 4-49 Unincorporated County Exposure and Value of Residential Structures in Wildfire Risk Areas**

Community/Location	Extreme	Very High	High	Moderate	Low	Not Assessed	Total Home Values	Estimated Content Value	Total Value
Base of Princeton	\$0	\$4,138,302	\$3,842,709	\$5,616,267	\$1,477,965	\$886,779	\$15,962,022	\$7,981,011	\$23,943,033
Cedar Gate Estates	\$0	\$1,182,372	\$1,182,372	\$5,025,081	\$0	\$295,593	\$7,685,418	\$3,842,709	\$11,528,127
Chalk Creek	\$1,182,372	\$28,081,335	\$28,672,521	\$18,917,952	\$886,779	\$295,593	\$78,036,552	\$39,018,276	\$117,054,828
CR-210	\$0	\$886,779	\$2,364,744	\$2,364,744	\$295,593	\$591,186	\$6,503,046	\$3,251,523	\$9,754,569
CR-251	\$0	\$1,773,558	\$4,729,488	\$4,729,488	\$0	\$0	\$11,232,534	\$5,616,267	\$16,848,801
Garfield	\$886,779	\$7,685,418	\$3,547,116	\$4,729,488	\$591,186	\$295,593	\$17,735,580	\$8,867,790	\$26,603,370
Eagles Roost/Shadow Ln.	\$0	\$5,616,267	\$3,842,709	\$1,182,372	\$0	\$0	\$10,641,348	\$5,320,674	\$15,962,022
Game Trail	\$295,593	\$6,503,046	\$19,509,138	\$34,584,381	\$9,458,976	\$0	\$70,351,134	\$35,175,567	\$105,526,701
Lost Creek	\$0	\$6,207,453	\$2,660,337	\$2,364,744	\$0	\$0	\$11,232,534	\$5,616,267	\$16,848,801
Maysville/North Fork	\$0	\$3,547,116	\$9,163,383	\$18,622,359	\$3,547,116	\$591,186	\$35,471,160	\$17,735,580	\$53,206,740
Meadow Lakes Mountain Estates	\$0	\$886,779	\$4,433,895	\$7,094,232	\$591,186	\$0	\$13,006,092	\$6,503,046	\$19,509,138
Methodist Mountain	\$0	\$8,867,790	\$13,006,092	\$25,716,591	\$12,414,906	\$886,779	\$60,892,158	\$30,446,079	\$91,338,237
Mesa Antero	\$0	\$5,911,860	\$14,779,650	\$25,716,591	\$6,503,046	\$591,186	\$53,502,333	\$26,751,167	\$80,253,500
Mesa Antero Estates	\$0	\$3,251,523	\$2,955,930	\$2,955,930	\$0	\$0	\$9,163,383	\$4,581,692	\$13,745,075
Monarch River Estates	\$0	\$0	\$886,779	\$1,477,965	\$0	\$0	\$2,364,744	\$1,182,372	\$3,547,116
Mt. Harvard Estates/Colorado Midland	\$0	\$3,251,523	\$5,911,860	\$10,936,941	\$295,593	\$0	\$20,395,917	\$10,197,959	\$30,593,876
Mt. Princeton HOA	\$295,593	\$2,660,337	\$5,320,674	\$7,685,418	\$0	\$0	\$15,962,022	\$7,981,011	\$23,943,033
Pinon Acres/Cielo Vista	\$0	\$1,773,558	\$8,572,197	\$6,798,639	\$1,773,558	\$295,593	\$19,213,545	\$9,606,773	\$28,820,318
Pinion Hills	\$295,593	\$4,729,488	\$9,754,569	\$29,559,300	\$7,389,825	\$0	\$51,728,775	\$25,864,388	\$77,593,163
St. Elmo	\$295,593	\$14,484,057	\$4,138,302	\$1,773,558	\$0	\$0	\$20,691,510	\$10,345,755	\$31,037,265
Three Elk	\$0	\$2,069,151	\$5,911,860	\$3,251,523	\$1,182,372	\$0	\$12,414,906	\$6,207,453	\$18,622,359
Trail West	\$0	\$2,660,337	\$14,188,464	\$13,006,092	\$0	\$591,186	\$30,446,079	\$15,223,040	\$45,669,119
Wapiti/Four Elk	\$0	\$6,798,639	\$5,025,081	\$1,182,372	\$591,186	\$0	\$13,597,278	\$6,798,639	\$20,395,917
Weldon Creek/Eureka Ranch/Hayden Springs Ranch	\$0	\$886,779	\$2,955,930	\$3,251,523	\$295,593	\$0	\$7,389,825	\$3,694,913	\$11,084,738

Community/Location	Extreme	Very High	High	Moderate	Low	Not Assessed	Total Home Values	Estimated Content Value	Total Value
Yale Lakes Estate/Lakeside Estates	\$591,186	\$1,182,372	\$1,182,372	\$7,685,418	\$2,069,151	\$0	\$12,710,499	\$6,355,250	\$19,065,749
<b>Total</b>	<b>\$3,842,709</b>	<b>\$125,035,839</b>	<b>\$178,538,172</b>	<b>\$246,228,969</b>	<b>\$49,364,031</b>	<b>\$5,320,674</b>	<b>\$608,330,394</b>	<b>\$304,165,197</b>	<b>\$912,495,591</b>

Source: County Assessor, Envision 2020 Chaffee County CWPP Composite Risk Map, Wood Analysis



**Table 4-50 Jurisdictional Exposure and Value of Structures in Wildfire Risk Areas**

Jurisdiction	Property Type	Improved Parcel Count	Building Count Extreme	Building Count Very High	Building Count High	Building Count Moderate	Total Building Count	Improved Value	Estimated Content Value	Total Value
Buena Vista	Commercial	48	2	19	17	10	48	\$12,679,754	\$12,679,754	\$25,359,508
	Exempt	13	1	1	5	6	13	\$9,179,516	\$9,179,516	\$18,359,032
	Industrial	1	0	0	1	0	1	\$76,964	\$115,446	\$192,410
	Residential	390	84	152	124	42	402	\$94,249,573	\$47,124,787	\$141,374,360
	Vacant Land	3	1	1	2	0	4	\$18,532	\$18,532	\$37,064
	<b>Total</b>	<b>455</b>	<b>88</b>	<b>173</b>	<b>149</b>	<b>58</b>	<b>468</b>	<b>\$116,204,339</b>	<b>\$69,118,035</b>	<b>\$185,322,374</b>
Poncha Springs	Agricultural	2	2	0	0	0	2	\$918,502	\$918,502	\$1,837,004
	Commercial	19	3	5	6	6	20	\$9,432,562	\$9,432,562	\$18,865,124
	Exempt	8	2	4	1	2	9	\$4,470,092	\$4,470,092	\$8,940,184
	Industrial	1	1	0	0	0	1	\$51,243	\$76,865	\$128,108
	Residential	287	79	132	67	14	292	\$84,893,985	\$42,446,993	\$127,340,978
	Vacant Land	1	0	0	0	1	1	\$75,733	\$75,733	\$151,466
	<b>Total</b>	<b>318</b>	<b>87</b>	<b>141</b>	<b>74</b>	<b>23</b>	<b>325</b>	<b>\$99,842,117</b>	<b>\$57,420,746</b>	<b>\$157,262,863</b>
Salida	Agricultural	3	1	0	2	1	4	\$6,494	\$6,494	\$12,988
	Commercial	8	3	3	2	0	8	\$5,949,323	\$5,949,323	\$11,898,646
	Exempt	5	2	2	6	0	10	\$58,739,806	\$58,739,806	\$117,479,612
	Residential	229	49	64	92	24	229	\$81,067,024	\$40,533,512	\$121,600,536
	Vacant Land	1	0	0	1	0	1	\$149,236	\$149,236	\$298,472
	<b>Total</b>	<b>246</b>	<b>55</b>	<b>69</b>	<b>103</b>	<b>25</b>	<b>252</b>	<b>\$145,911,883</b>	<b>\$105,378,371</b>	<b>\$251,290,254</b>
<b>Grand Total</b>		<b>1,019</b>	<b>230</b>	<b>383</b>	<b>326</b>	<b>106</b>	<b>1,045</b>	<b>\$361,958,339</b>	<b>\$231,917,152</b>	<b>\$593,875,491</b>

Source: County Assessor, Envision 2020 Chaffee County CWPP Composite Risk Map, Wood Analysis

## Critical Facilities and Infrastructure

Table 4-51 identifies critical facilities exposed to the wildfire hazard in the county, based on a GIS overlay analysis with the CWPP composite wildfire risk layer.

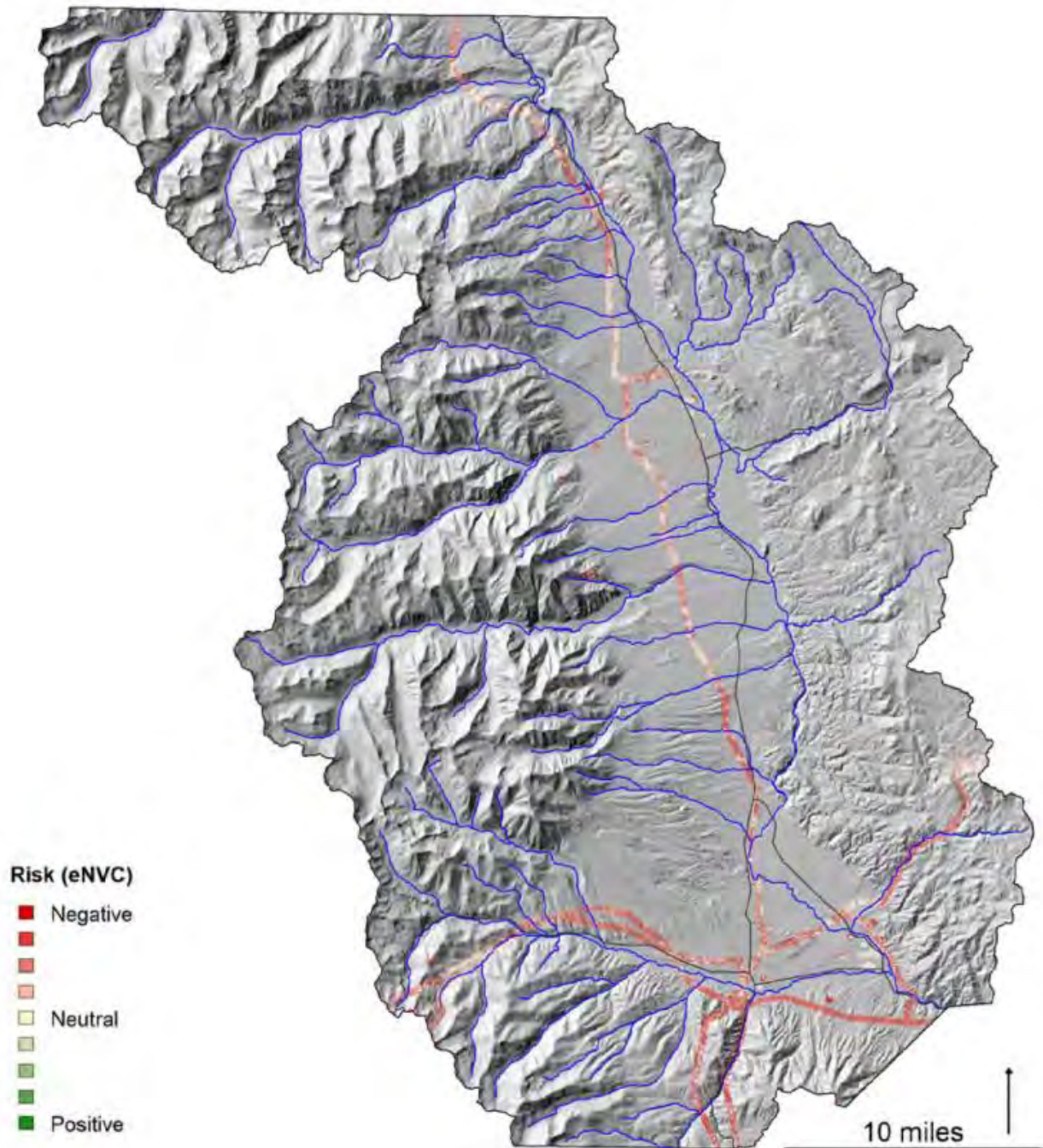
**Table 4-51 Critical Facilities and Infrastructure in Wildfire Risk Areas**

Wildfire Risk Rating	Jurisdiction	FEMA Lifeline	Critical Facility Type	Count
Extreme	Buena Vista	Communications	Land Mobile Private Transmission Tower	1
Extreme	Poncha Springs	Communications	Cellular Tower	2
Extreme	Poncha Springs	Communications	Land Mobile Private Transmission Tower	2
Extreme	Poncha Springs	Communications	Microwave Transmission Tower	3
Extreme	Poncha Springs	Health and Medical	Medical/Healthcare	1
Extreme	Salida	Food, Water, Shelter	Wastewater Treatment Plant	1
Extreme	Salida	Health and Medical	Air Ambulance	1
Extreme	Salida	Health and Medical	Medical/Healthcare	2
Extreme	Salida	Safety and Security	Government Support	1
Extreme	Unincorporated	Communications	Cellular Tower	6
Extreme	Unincorporated	Communications	FM Transmission Tower	5
Extreme	Unincorporated	Communications	Land Mobile Private Transmission Tower	16
Extreme	Unincorporated	Communications	Microwave Transmission Tower	20
Extreme	Unincorporated	Hazardous Material	Tier II	2
Extreme	Unincorporated	Safety and Security	Public Safety	2
<b>Sub Total</b>				<b>65</b>
Very High	Buena Vista	Communications	Microwave Transmission Tower	2
Very High	Poncha Springs	Food, Water, Shelter	Water Tank	2
Very High	Salida	Health and Medical	Medical/Healthcare	1
Very High	Unincorporated	Communications	Land Mobile Private Transmission Tower	19
Very High	Unincorporated	Communications	Microwave Transmission Tower	2
Very High	Unincorporated	Food, Water, Shelter	Wastewater Treatment Plant	1
Very High	Unincorporated	Food, Water, Shelter	Water Tank	2

Wildfire Risk Rating	Jurisdiction	FEMA Lifeline	Critical Facility Type	Count
Very High	Unincorporated	Food, Water, Shelter	Water Treatment Plant	1
Very High	Unincorporated	Hazardous Material	Tier II	1
Very High	Unincorporated	Safety and Security	EOC	1
Very High	Unincorporated	Safety and Security	Public Safety	2
<b>Sub Total</b>				<b>34</b>
High	Buena Vista	Communications	Land Mobile Private Transmission Tower	1
High	Buena Vista	Health and Medical	Medical/Healthcare	2
High	Buena Vista	Safety and Security	Public Safety	2
High	Salida	Communications	Land Mobile Private Transmission Tower	2
High	Salida	Safety and Security	Government Support	1
High	Unincorporated	Communications	Land Mobile Private Transmission Tower	18
High	Unincorporated	Communications	Paging Transmission Tower	1
High	Unincorporated	Transportation	Airport	1
<b>Sub Total</b>				<b>28</b>
Moderate	Buena Vista	Communications	Microwave Transmission Tower	1
Moderate	Poncha Springs	Hazardous Material	Tier II	1
Moderate	Unincorporated	Communications	Land Mobile Private Transmission Tower	7
Moderate	Unincorporated	Food, Water, Shelter	Water Tank	2
Moderate	Unincorporated	Hazardous Material	Tier II	1
<b>Sub Total</b>				<b>12</b>
<b>Grand Total</b>				<b>139</b>

Source: Wood Analysis

The County CWPP assessed linear infrastructure risk including power transmission corridors. Critical facilities of wood frame construction are especially vulnerable during wildfire events. In the event of wildfire, there would likely be little damage to most infrastructure. Most roads and railroads would be without damage except in the worst scenarios. Power lines are the most at risk from wildfire because most poles are made of wood and susceptible to burning. Fires can create conditions that block or prevent access and can isolate residents and emergency service providers. Wildfire typically does not have a major direct impact on bridges, but it can create conditions in which bridges are obstructed. Many bridges in areas of high to moderate fire risk are important because they provide the only ingress and egress to large areas and in some cases to isolated neighborhoods. Infrastructure Wildfire Risk – Chaffee County CWPP



Source: Chaffee County CWPP 2020

## Economy

Tourism, farming and ranching are important components of Chaffee County's economy. Wildland fires can have a direct impact on agricultural lands and the County's scenery, adversely affecting the ability of the County's residents to earn a living from these industries. Chaffee County's scenic beauty is a main draw for tourism, so the County can (and has) suffered economic losses from tourists not coming to the area due to wildfires. Fire suppression may also require increased cost to local and state government for

water acquisition and delivery, especially during periods of drought when water resources are scarce. Fires can cause direct economic losses in the reduction of harvestable timber.

### Historic, Cultural and Natural Resources

Fire is a natural and critical ecosystem process in most terrestrial ecosystems, dictating in part the types, structure, and spatial extent of native vegetation. However, wildfires can cause severe environmental impacts:

- **Damaged Fisheries**—Critical fisheries can suffer from increased water temperatures, sedimentation, and changes in water quality.
- **Soil Erosion**—The protective covering provided by foliage and dead organic matter is removed, leaving the soil fully exposed to wind and water erosion. Accelerated soil erosion occurs, causing landslides and threatening aquatic habitats.
- **Spread of Invasive Plant Species**—Non-native woody plant species frequently invade burned areas. When weeds become established, they can dominate the plant cover over broad landscapes, and become difficult and costly to control.
- **Disease and Insect Infestations**—Unless diseased or insect-infested trees are swiftly removed, infestations and disease can spread to healthy forests and private lands. Timely active management actions are needed to remove diseased or infested trees.
- **Destroyed Wildlife and Endangered Species Habitat**—Catastrophic fires can have devastating consequences for endangered species.
- **Soil Sterilization**—Topsoil exposed to extreme heat can become water repellant, and soil nutrients may be lost. It can take decades or even centuries for ecosystems to recover from a fire. Some fires burn so hot that they can sterilize the soil.

Many ecosystems are adapted to historical patterns of fire occurrence. These patterns, called “fire regimes,” include temporal attributes (e.g., frequency and seasonality), spatial attributes (e.g., size and spatial complexity), and magnitude attributes (e.g., intensity and severity), each of which have ranges of natural variability. Ecosystem stability is threatened when any of the attributes for a given fire regime diverge from its range of natural variability.

There are several historic homestead and historic mining areas that could be potentially loss to wildfire.

Critical recreational assets are defined in the CWPP. Those that could be impacted include the Monarch Mountain ski area, USFS recreation opportunities, trails, Browns Canyon National Monument, and focused and dispersed camping areas. Losses to these assets could affect the local economy also.

#### 4.12.5 Development Trends

Chaffee County has a Chaffee County Community Wildfire Protection Plan. The plan was established to assist the county with wildfire preparation and provide effective techniques to combat wildfires while protecting property and persons. The plan was initially developed in 2007-2009 and included the subdivision-level risk ratings for 54 subdivisions. According the 2020 CWPP, 135 subdivision filings have been added to the county, including 12 with more than 10 lots. In addition, 227 filings are in the CWPP’s top two Treatment Priority Areas. Given the degree of change it is evident that WUI growth is occurring and the CWPP strongly recommends an update of subdivision-level wildfire risk ratings.

The expansion of the WUI can be managed with strong land use and building codes; based on the CWPP there are not provisions that exist within the County building codes that specifically address structural ignitability. Based on a public survey associated with the CWPP there was strong support for additional building codes to make new developments more wildfire resistant.



#### 4.12.6 Risk Summary

The major issues for wildfire are the following:

- Overall significance of the hazard is considered high for all jurisdictions except Salida which considers it to be medium.
- A total of 2,058 homes are located in areas exposed to risk wildfire in unincorporated Chaffee County, with a total value of over \$912 million. An additional 1,019 parcels and 1,045 buildings in the incorporated jurisdictions are exposed to wildfire risk areas.
- Critical facilities potentially at risk include communication infrastructure, power line infrastructure, and a variety of lifeline facilities.
- Wildfires within and in adjacent counties can deter tourism and affect the local economy and air quality.
- Wildfires could cause floods and debris flows as secondary natural hazards.
- Climate change could affect the frequency and intensity of the wildfire hazard.
- Both the natural and human-caused conditions that contribute to the wildland fire hazard are tending to exacerbate through time.
- Extensive beetle kill has resulted in additional fuel loading.
- The WUI is expanding in the County as evidenced by an increase in subdivision filings.
- The continued migration of inhabitants to remote areas of the county increases the probability of human-caused ignitions from vehicles, grills, campfires, and electrical devices.

## 4.13 Winter Storm

WINTER STORM HAZARD RANKING	
Chaffee County	High
City of Salida	Medium
Town of Buena Vista	High
Town of Poncha Springs	High

### 4.13.1 Hazard Profile

Winter storms can include heavy snow, ice, and blizzard conditions. Heavy snow can immobilize a region, stranding commuters, stopping the flow of supplies, and disrupting emergency and medical services. Accumulations of snow can collapse roofs and knock down trees and power lines. In rural areas, homes and farms may be isolated for days, and unprotected livestock may be lost. The cost of snow removal, damage repair, and business losses can have a tremendous impact on cities and towns.

Heavy accumulations of ice can bring down trees, electrical wires, telephone poles and lines, and communication towers. Communications and power can be disrupted for days until damage can be repaired. Even small accumulations of ice may cause extreme hazards to motorists and pedestrians.

Some winter storms are accompanied by strong winds, creating blizzard conditions with blinding wind-driven snow, severe drifting, and dangerous wind chills. Strong winds with these intense storms and cold fronts can knock down trees, utility poles, and power lines. Blowing snow can reduce visibilities to only a few feet in areas where there are no trees or buildings. Serious vehicle accidents can result in injuries and deaths.

Winter storms in Chaffee County, including strong winds and blizzard conditions, can result in property damage, localized power and phone outages and closures of streets, highways, schools, businesses, and non-essential government operations. People can also become isolated from essential services in their homes and vehicles. A winter storm can escalate, creating life threatening situations when emergency response is limited by severe winter conditions. Other issues associated with severe winter weather include hypothermia and the threat of physical overexertion that may lead to heart attacks or strokes. Snow removal costs can also impact budgets significantly. Heavy snowfall during winter can also lead to flooding or landslides during the spring if the area snowpack melts too quickly.

### **Extreme Cold**

Extreme cold often accompanies a winter storm or is left in its wake. It is most likely to occur in the winter months of December, January, and February. Prolonged exposure to the cold can cause frostbite or hypothermia and can become life-threatening. Infants and the elderly are most susceptible. Pipes may freeze and burst in homes or buildings that are poorly insulated or without heat. Extreme cold can disrupt or impair communications facilities.

### **DEFINITIONS**

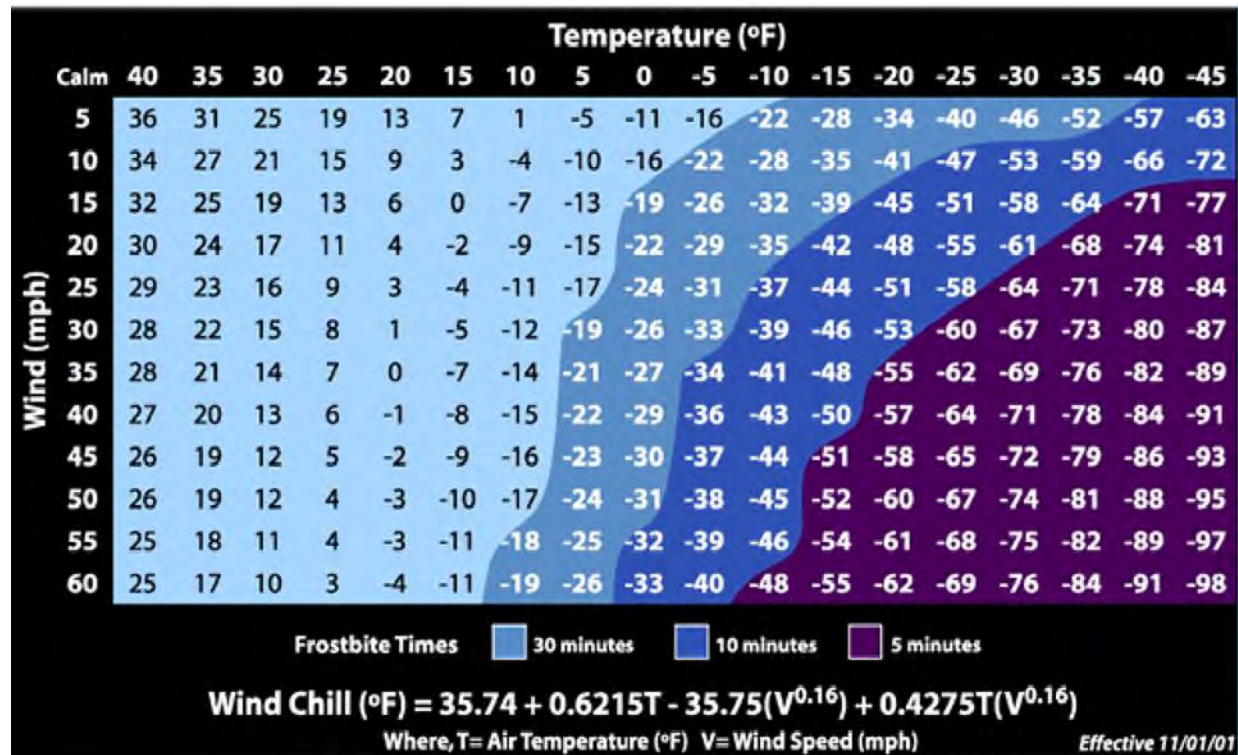
**Winter Storm**—A storm having significant snowfall, ice, or freezing rain; the quantity of precipitation varies by elevation.

**Blizzard**—Sustained wind or frequent gusts to 35 miles an hour or greater; and considerable falling and/or blowing snow.

**Freezing Rain**—The result of rain occurring when the temperature is below the freezing point. The rain freezes on impact, resulting in a layer of glaze ice up to an inch thick. In a severe ice storm, an evergreen tree 60 feet high and 30 feet wide can be burdened with up to 6 tons of ice, creating a threat to power and telephone lines and transportation routes.

In 2001, the NWS implemented an updated wind chill temperature index (see Figure 4-42). This index describes the relative discomfort or danger resulting from the combination of wind and temperature. Wind chill is based on the rate of heat loss from exposed skin caused by wind and cold. As the wind increases, it draws heat from the body, driving down skin temperature and eventually the internal body temperature.

**Figure 4-42 National Weather Service Wind Chill Chart**



Source: National Weather Service, [www.nws.noaa.gov/om/windchill/index.shtml](http://www.nws.noaa.gov/om/windchill/index.shtml)

A wind chill watch is issued by the NWS when wind chill warning criteria are possible in the next 12 to 36 hours. A wind chill warning is issued for wind chills of at least -25°F on the plains and -35°F in the mountains and foothills.

The Western Regional Climate Center reports data summaries from a station in the City of Salida. Table 4-52 contains temperature summaries related to extreme cold for the station.

**Table 4-52 Temperature Data from Salida (1897-2016)**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>Temperature (degrees Fahrenheit)</b>												
Average Maximum Temperature	43.1	45.9	52.2	60.3	69.5	79.4	84.3	82.1	75.7	65.5	52.9	43.5
Average Minimum Temperature	12.5	15.3	20.9	27.9	35.3	42.0	47.6	46.1	38.1	28.5	19.7	12.7
Average Temperature	27.8	30.6	36.5	44.1	52.4	60.7	66.0	64.1	56.9	47.0	36.3	28.1
<b>Extreme Temperatures (degrees Fahrenheit)</b>												

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Extreme Minimum Temperature	-35	-33	-21	-12	13	23	30	31	14	-4	-20	-26
<b>Average Number of Days</b>												
Minimum Temperature below 32 degrees Fahrenheit	29.8	26.8	28.4	22.2	9.7	1.2	0.0	0.1	5.9	22.3	27.0	29.6
Minimum Temperature below 0 degrees Fahrenheit	4.1	2.6	0.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.9	4.4
<b>Snowfall (inches)<sup>1</sup></b>												
Total Snowfall (Normal)	5.5	5.3	8.4	6.9	2.3	0.0	0.0	0.0	0.1	4.1	5.6	4.9

Sources: Western Regional Climate Center <sup>1</sup>National Weather Service, Pueblo Office

Chaffee County receives varying amounts of snow throughout the area. The City of Salida and Towns of Poncha Springs and Buena Vista experience similar winter weather and snowfall. The City of Salida experiences an average annual of 43.1 inches of snowfall. Poncha Springs experience an annual average snowfall of approximately 50 inches, while Buena Vista experiences approximately 43 inches. The higher elevation areas of the county can experience much greater snowfall, around 400 or more inches. Average snow depth in Salida is less than two inches between November and April. February and March are typically the months with the most snow in the county.

### Past Events

According to the NCEI Storm Events Database there has been a total of 102 winter weather events in Chaffee County between 1996 and 2020. The event types include a combination of "Blizzard," "Heavy Snow," "Winter Weather," and "Winter Storm."

**Table 4-53 Summary Table of Chaffee County Winter Weather Events (1996-2020)**

Event Type	Number of Events
Blizzard	2
Heavy Snow	35
Winter Storm	56
Winter Weather	9
<b>Total</b>	<b>102</b>

Source: NCEI

Locations for the records are limited to one of ten National Center for Environmental Information's - defined zones. Table 4-54 shows the distribution of weather events throughout the county. None of the winter weather events recorded in Chaffee County resulted in property damage.

**Table 4-54 Chaffee County Winter Weather Events (1996-2020)**

Location	Event Type	Number of Events
Central Chaffee County	Heavy Snow	7
	Winter Storm	20
	Winter Weather	4
	<b>Total</b>	<b>31</b>
Eastern Chaffee County	Heavy Snow	3
	Winter Storm	23
	Winter Weather	2
	<b>Total</b>	<b>28</b>
Western Chaffee County	Blizzard	1
	Heavy Snow	25
	Winter Storm	47
	Winter Weather	7
	<b>Total</b>	<b>80</b>
Source: National Centers for Environmental Information		

### Location

The entire county is susceptible to severe winter storms, although severe winter weather is primarily found in the higher elevations of the county and in the Sawatch Mountains in the western portion of the county. State Highway 50 runs through the Sawatch Mountains in the southwest and could cause hazardous conditions to motorists if blizzard or severe winter weather conditions occur. State Highway 50 is the major highway that runs through the Town of Poncha Springs and is the main access road to Monarch Ski Area. Many portions of this road are narrow and curved and an accident on State Highway 50 can cause a major disruption in the flow of goods and services in and out of the county.

### Frequency and Severity (Extent)

Severe winter storms happen nearly every year in Chaffee County and are thus considered highly likely, with nearly 100% chance of occurrence in any given year. Severe winter weather occurs most frequently in December, January, and February.

Winter weather in Chaffee County, including strong winds and blizzard conditions, can result in property damage, localized power and phone outages, and closures of streets, highways, schools, businesses, and nonessential government operations. People can also become isolated from essential services in their homes and vehicles. A winter storm can escalate, creating life threatening situations when emergency response is limited by severe winter conditions. Other issues associated with severe winter weather include hypothermia and the threat of physical overexertion that may lead to heart attacks or strokes. Snow removal costs can impact budgets significantly. Heavy snowfall during winter can also lead to flooding or landslides during the spring if the area snowpack melts too quickly. High snow loads also cause damage to buildings and roofs.

The magnitude and severity of severe winter weather is considered moderate in Chaffee County. The annual rate of occurrence for the county is 4.3 events per year. Due to the lack of records of property damages in Chaffee County due to winter weather average loss expectancy is unable to be calculated at this time.



## **Warning Time**

Meteorologists can often predict the likelihood of a severe winter storm; and forecasts usually come from the City of Salida. When forecasts are available, they can give several days of warning time. However, meteorologists cannot predict the exact time of onset or severity of the storm. Some storms may come on more quickly and have only a few hours of warning time.

### **4.13.2 Related Hazards**

The most significant secondary hazards associated with severe winter storms are avalanches.

### **4.13.3 Climate Change Considerations**

Climate change has the potential to exacerbate the severity and intensity of winter storms, including potential heavy amounts of snow. A warming climate may also result in warmer winters, the benefits of which may include lower winter heating demand, less cold stress on humans and animals, and a longer growing season. However, these benefits are expected to be offset by the negative consequences of warmer summer temperatures.

The effects of climate change in Colorado have already been observed. The following climate change observations are noted in the 2018 Colorado State Hazard Mitigation Plan:

- Snowpack, as measured by April 1, 2018 snow-water equivalent (SWE), has been mainly below average since 2000 in all of Colorado's river basins, but long-term (30-year, 50-year) declining trends have been detected.
- The timing of snowmelt and peak runoff has shifted earlier in the spring by 1 to 4 weeks across the state's river basins over the past 30 years, due to the combination of lower SWE since 2000, the warming trend in spring temperatures, and enhanced solar absorption from dust-on-snow.

### **4.13.4 Vulnerability**

#### **Population**

It can be assumed that the entire planning area is exposed to some extent to severe winter weather events. Certain areas are more exposed due to geographic location and local weather patterns.

Vulnerable populations are the elderly, low income or linguistically isolated populations, people with life-threatening illnesses, and residents living in areas that are isolated from major roads. Power outages can be life threatening to those dependent on electricity for life support. Isolation of these populations is a significant concern. These populations face isolation and exposure during severe winter weather events and could suffer more secondary effects of the hazard. Commuters who are caught in storms may be particularly vulnerable. Stranded commuters may be vulnerable to carbon monoxide poisoning or hypothermia. Additionally, individuals engaged in outdoor recreation during a severe winter event may be difficult to locate and rescue.

#### **Property**

According to the Chaffee County Assessor, there are more than 11,000 buildings within the planning area. Most of these buildings are residential. All of these buildings are considered to be exposed to severe winter weather, but structures in poor condition may risk the most damage.

Vulnerability is influenced both by architecture and type of construction material and should be assessed on a building-by-building basis. "Roof avalanches" are a possibility after heavy snowfall events although it is uncommon, it has occurred in other mountain communities in Colorado. Properties in poor condition or in particularly vulnerable locations may risk the most damage. Those that are located under or near

overhead lines or near large trees may be vulnerable to falling ice or may be damaged in the event of a collapse.

The annual rate of occurrence for a severe winter weather event in Chaffee County is approximately 4.3 severe winter weather events per year. Due to the lack of records of property damages from winter weather in Chaffee county, the average loss expectancy for each winter weather event is not available at this time.

### **Critical Facilities and Infrastructure**

All critical facilities and infrastructure are likely exposed to severe winter weather. The most common problems associated with this hazard are utility losses. Downed power lines can cause blackouts, leaving large areas isolated. Phone, water, and sewer systems may not function. Roads may become impassable due to ice or snow. Ice accumulation on roadways can create dangerous driving conditions. There are limited county roads that are available to move people and supplies throughout the region. Many of these roads are narrow and curved, particularly State Highway 50 that runs through the Sawatch Mountains, Monarch Pass, in the southwestern portion of the county. Snowstorms can significantly impact the transportation system and the availability of public safety services. Of particular concern are roads providing access to isolated areas and to the elderly. Prolonged obstruction of major routes can disrupt the shipment of goods and other commerce. Large, prolonged storms can have negative economic impacts for an entire region.

Severe windstorms, downed trees, and ice can create serious impacts on power and above-ground communication lines. Freezing of power and communication lines can cause them to break, disrupting electricity and communication. Loss of electricity and phone connection would leave certain populations isolated because residents would be unable to call for assistance.

### **Economy**

Closure of Highway 50 during winter storms could temporarily isolate portions of the County and preventing the movement of goods and services into and out of the County. Depending on the length of the closure it could also hinder the local economy which is dependent on tourism and out of county visitors.

### **Historic, Cultural and Natural Resources**

The natural environment is not typically directly damaged by winter storms, with the exception of the secondary hazard of avalanche. As noted previously, older, historic buildings could potentially be more vulnerable to roof and structural damage from heavy snow.

#### **4.13.5 Development Trends**

All future development will be exposed to winter storms. The vulnerability of community assets to severe winter storms is increasing through time as more people enter the planning area. The ability to withstand impacts lies in sound land use practices and consistent enforcement of codes and regulations for new construction. The planning partners have adopted the International Building Code. This code is equipped to deal with the impacts of severe weather events. Land use policies identified in the Comprehensive Plan within the planning area also address many of the secondary impacts (flood and landslide) of the severe weather hazard. With these tools, the planning partnership is well equipped to deal with future growth and the associated impacts of severe weather.

#### **4.13.6 Risk Summary**

- There is high vulnerability to severe winter weather along highways and mountain passes

- Increased population exposed to hazards and emergencies during high tourist seasons
- Severe winter weather can isolate residents and travelers by closing roads into and out of the County.
- The County has experienced 102 severe winter weather events in the past 24 years.
- Climate change projections show decreased levels of snowpack, resulting in impacts to the local economy and lifestyle.
- Related Hazards: Avalanche, windstorm, hazardous material incidents
- Older building stock in the planning area is built to low code standards or none at all. These structures could be highly vulnerable to severe weather events such as heavy snow or windstorms.

## 4.14 Pandemic/Epidemic

PANDEMIC/EPIDEMIC HAZARD RANKING	
Chaffee County	Medium
City of Salida	Medium
Town of Buena Vista	Medium
Town of Poncha Springs	Medium

### 4.14.1 Hazard Profile

A pandemic can be defined as a disease that attacks a large population across great geographic distances. Pandemics are larger than epidemics in terms of geographic area and number of people affected. Epidemics tend to occur seasonally and affect much smaller areas. Pandemics, on the other hand, are most often caused by new subtypes of viruses or bacteria for which humans have little or no natural resistance. Consequently, pandemics typically result in more deaths, social disruption, and economic loss than epidemics.

There are three conditions that trigger a pandemic declaration:

1. A new virus subtype must emerge that has not previously circulated in humans (and therefore there is no pre-existing immunity),
2. This new subtype must be able to cause disease in humans, and
3. The virus must be easily transmissible from human to human.

Since March 2020, Chaffee County, the nation, and the world are dealing with the COVID-19 pandemic (caused by the SARS-CoV-2 virus), confirming that pandemic is a key public health hazard in the planning area. This hazard risk assessment includes an analysis of pandemic risk across Chaffee County and an analysis of the impacts of the hazards profiled in this plan on public health.

Unlike seasonal flu, a pandemic has much greater potential for loss of life and significant social disruption due to higher rates of transmission and more severe health impacts. The SARS-CoV-2 virus has a much higher rate of transmission than the seasonal flu, primarily by airborne transmission of droplets/bodily fluid. Common symptoms include fever, cough, fatigue, shortness of breath or breathing difficulties, and loss of smell and taste. While most people have mild symptoms, some people develop acute respiratory distress syndrome with roughly one in five requiring hospitalization in the United States and a fatality rate between 1-2%. Because the virus can be transmitted by people who are asymptomatic, containing the spread has been a significant challenge across the globe.

### Past Events

The Colorado Department of Public Health and Environment releases an annual reportable disease summary for each county. The diagnoses with the highest incidences in Chaffee County for 2016 through 2018 are summarized in Table 4-55.

**Table 4-55 Reportable Disease Diagnosis, Chaffee County 2016-2018**

Diagnosis	Incidents in 2016	Incidents in 2017	Incidents in 2018
Hepatitis C, Chronic	25	15	34
Influenza - Hospitalized	1	12	17
Campylobacter	9	N/A	N/A

Diagnosis	Incidents in 2016	Incidents in 2017	Incidents in 2018
Animal Bites	10	7	14
Giardiasis	2	2	5
Carbapenem-Resistant Enterobacteriaceae (CRE)	N/A	N/A	4
STEC (Shiga Toxin Producing E. coli)	N/A	N/A	4
Salmonellosis	N/A	5	3
Varicella (Chicken Pox)	N/A	N/A	3

Source: <https://www.colorado.gov/pacific/cdphe/colorado-reportable-disease-data>

Since the early 1900s, five lethal pandemics have swept the globe:

- 1918-1919 Spanish Flu:** The Spanish Flu was the most severe pandemic in recent history. The number of deaths was estimated to be 50-100 million worldwide and 675,000 in the United States. Its primary victims were mostly young, healthy adults. At one point, more than 10 percent of the American workforce was bedridden.
- 1957-1958 Asian Flu:** The 1957 Asian Flu pandemic killed 1-2 million people worldwide, including about 70,000 people in the United States, mostly the elderly and chronically ill. Fortunately, the virus was quickly identified, and vaccine production began in May 1957.
- 1968-1969 H3N2 Hong Kong Flu:** The 1968 Hong Kong Flu pandemic killed 34,000 Americans. Again, the elderly were more severely affected. This pandemic peaked during school holidays in December, limiting student-related infections, which may have kept the number of infections down. Also, people infected by the Asian Flu ten years earlier may have gained some resistance to the new virus.
- 2009-2010 H1N1 Swine Flu:** This influenza pandemic emerged from Mexico in early 2009 and was declared a public health emergency in the U.S. on April 26. By June, approximately 18,000 cases had been reported in the U.S. and the virus had spread to 74 countries. Most cases were fairly mild, with symptoms similar to the seasonal flu, but there were cases of severe disease requiring hospitalization and a number of deaths. The CDC estimates that 43-89 million people were infected worldwide, with an estimated 8,870 to 18,300 H1N1 related deaths, including 12,469 deaths in the United States.
- 2020-Ongoing COVID-19:** The COVID-19 or novel coronavirus outbreak began in December 2019 and was declared a pandemic in March of 2020. As of October 30<sup>th</sup>, 2020, 45 million cases have been reported around the world with over 1 million deaths, including 9 million cases and 229,000 deaths in the U.S. As of February 16, 2021, over 108 million cases and approximately 2.4 million deaths have been reported globally, according to the World Health Organization (WHO). Within the U.S. as of February 16, 2021, over 27 million cases and approximately 487,000 deaths have been reported, which is more than double since October 2020. Chaffee County has reported 953 cases so far resulting in 16 deaths. Although several COVID-19 vaccines have been approved by the FDA, it may take months for the entire population to receive a vaccine and achieve herd immunity; thus, the pandemic is expected to continue in 2021.



## **Location**

Pandemics occur not only on a county or state level, but on a national and global scale. It is likely that most communities in Chaffee County would be affected, either directly or by secondary impacts. Some indirect consequences may be the diversion of resources that may be otherwise available.

Chaffee County has reported 953 cases and 16 deaths as of February 16, 2021 and is currently seeing an overall decreasing trend in cases. According to the Chaffee County Public Health COVID-19 dashboard, the North end of the county (including Buena Vista and Nathrop areas) accounted for 48.5% of community cases in the past month, and the South end of the county (including Salida and Poncha Springs) accounted for 51.5% of cases in the past month. In general, it is likely that the more-populated areas municipal areas may be affected sooner and may experience higher infection rates.

## **Frequency and Severity (Extent)**

The magnitude of a public health emergency will range significantly depending on the transmissivity and mortality rate of the virus. For example, pandemic influenza is easily transmitted from person-to-person, however advances in medical technologies have greatly reduced the number of deaths caused by influenza over time.

Today, a much larger percentage of the world's population is clustered in cities, making them ideal breeding grounds for epidemics. Additionally, the explosive growth in air travel means the virus could spread around the globe within hours. Under such conditions, there may be very little time for counties, states, and countries to prepare. Most experts believe we will have just one to six months between the time that a dangerous new influenza strain is identified and the time that outbreaks begin to occur in the United States. Outbreaks are expected to occur simultaneously throughout much of the nation, preventing shifts in human and material resources that normally occur with other natural disasters. These and many other aspects make pandemics unlike any other public health emergency or community disaster. Pandemics typically last for several months to 1-2 years and have even longer lasting effects on the economy and communities.

As described by the WHO, the Pandemic Intervals Framework (PIF) is a six-phased approach to defining the progression of a pandemic. This framework is used to guide pandemic planning and provides recommendations for risk assessment, decision-making, and action. These intervals provide a common method to describe pandemic activity which can inform public health actions. The duration of each pandemic interval might vary depending on the characteristics of the virus and the public health response.

The six-phase approach was designed for the easy incorporation of recommendations into existing national and local preparedness and response plans. Phases 1 through 3 correlate with preparedness in the pre-pandemic interval, including capacity development and response planning activities, while Phases 4 through 6 signal the need for response and mitigation efforts during the pandemic interval. Phase 6 was reached in the County during the 2020 COVID outbreak.

### ***Pre-Pandemic Interval***

Phase 1 is the natural state in which influenza viruses circulate continuously among animals but do not affect humans.

Phase 2 involves cases of animal influenza that have circulated among domesticated or wild animals and have caused specific cases of infection among humans.

Phase 3 represents the mutation of the animal influenza virus in humans so that it can be transmitted to other humans under certain circumstances (usually very close contact between individuals). At this point, small clusters of infection have occurred.

### ***Pandemic Interval***

Phase 4 involves community-wide outbreaks as the virus continues to mutate and become more easily transmitted between people (for example, transmission through the air).

Phase 5 represents human-to-human transmission of the virus in at least two countries.

Phase 6 is the pandemic phase, characterized by community-level influenza outbreaks.

### **Warning Time**

Even before the COVID-19 pandemic began, most public health experts considered another major pandemic to be inevitable. However, there is no definite way to predict when the next pandemic might occur. Some indicators will be present, but not every new virus turns into a pandemic. Based on the five pandemics that have affected the United States in roughly the last 100 years, a pandemic occurs on average roughly every 20 years.

#### **4.14.2 Related Hazards**

There are no related hazards to pandemics/epidemics.

#### **4.14.3 Climate Change Considerations**

Additional research is needed to determine the effects of climate change on the frequency and duration of epidemics and pandemics. Climate change may influence vector-borne disease transmission, although the direction of the effects (increased or decreased incidence) will be location- and disease-specific. The intensity and extent of certain diseases is projected to increase.

Ongoing efforts to reduce greenhouse gas emissions, building climate resiliency, and creating robust public health campaigns to prevent or prepare for possible increased vector-borne diseases may help to reduce the impacts of climate change on pandemics.

#### **4.14.4 Vulnerability**

Preparing for, responding to, and recovering from a pandemic requires a strategy that includes a holistic suite of public health activities designed to lessen the impact on morbidity and mortality. These activities include education, vaccination, prophylaxis, isolation/quarantine, a robust contact tracing program, and the closure of public facilities. In addition, clear, concise communication with the public and with other agencies remains a critical component, as does the ability of the involved agencies to achieve collaboration and coordination. By their very nature, most pandemics, once started, will not be stopped until they have run their course. This course can be shortened and weakened by a number of factors, with vaccination being the most effective method for protecting the population. Pandemic plans describe strategies of preparedness, response, and recovery to attempt to decrease illnesses and deaths during the pandemic period to manageable levels (i.e., that do not overwhelm the critical infrastructures of the State), and to promote community resiliency and rapid recovery.

### **Population**

Pandemics have the ability to affect large segments of the population for long periods of time. The number of hospitalizations and deaths will depend on the virulence of the virus. Risk groups cannot be predicted with certainty; the elderly, people with underlying medical conditions, and young children are usually at higher risk, but as discussed above this is not always true for all influenza strains. People without health coverage or access to good medical care are also likely to be more adversely affected. Mental health of the public could also be impacted depending on the length of the event and public health guidance on prevention.

As previously described in the Past Events section above, the COVID-19 pandemic has resulted in over 108 million cases and approximately 2.4 million deaths globally. The U.S. has reported over 27 million cases and approximately 487,000 deaths. Chaffee County has reported 953 cases and 16 deaths as of February 16, 2021. In addition to the direct impacts, the pandemic has completely disrupted life for many people. Most large gatherings have had to be cancelled, and many schools have closed. Sheltering in place and social distancing have been highly encouraged and, in some places, mandated, leaving some individuals isolated for months.

## **Property**

For the most part, property itself is not generally impacted by a human disease epidemic or pandemic. However, as concerns about contamination increase, property may be quarantined or destroyed as a precaution against spreading illness. Additionally, traditional sheltering facilities including homeless shelters or facilities stood up to support displaced persons due to an evacuation or other reason due to a simultaneous disaster occurring cannot be done in a congregate setting. This requires additional planning considerations or use of facilities that allow for non-congregate shelter settings which may require an approval of a request to FEMA for non-congregate sheltering, and may have an increased cost (such as the use of individual hotel rooms) as opposed to traditional congregate sheltering facilities.

## **Critical Facilities and Infrastructure**

In the event of a pandemic, especially one with high transmission rates and mortality rates such as COVID-19, hospitals and morgues will be heavily affected and may be overwhelmed. Outbreaks in small cities and counties may cause medical facilities to reach capacity very quickly. Other critical facilities and infrastructure are not directly affected by a pandemic but may have difficulty maintaining operations and maintenance activities due to a significantly decreased workforce. Schools may be forced to close.

## **Economy**

Pandemics can have extensive economic impacts, as evidenced by the COVID-19 pandemic and associated restrictions on social gatherings. Social distancing requirements have affected nearly every segment of the local and national economy, most notably the restaurant and hospitality industries.

## **Historic, Cultural and Natural Resources**

Impacts to these resources are typically minimal. However, reduced tourism during outbreaks could lead to additional economic impacts.

### **4.14.5 Development Trends**

Population growth and development contribute to pandemic exposure. Future development in and around Bernalillo County has the potential to change how infectious diseases spread through the community and impact human health in both the short and long term. New development may increase the number of people and facilities exposed to public health hazards and greater population concentrations (often found in special needs facilities and businesses) put more people at risk. During a disease outbreak those in the immediate isolation area would have little to no warning, whereas, the population further away in the dispersion path may have some time to prepare and mitigate against disease depending on the hazard, its transmission, and public notification.

### **4.14.6 Risk Summary**

- Pandemics affecting the U.S. occur roughly once every 20 years but cannot be reliably predicted.
- Effects on people will vary, but as much as 30% of the population could become ill, and 10% may need to be hospitalized

- Effects on property are typically minimal, although quarantines could result in short-term closures. Critical facilities may have difficulty maintaining operations due to staffing shortages.
- Lost productivity due to illness and potential business closures could potentially have severe economic impacts. Social distancing requirements and fear of public gatherings could significantly reduce in-person commerce.
- The hazard is considered medium significance across all participating jurisdictions.
- Ongoing mitigation activities should focus on disease prevention, especially during flu season. This includes, but is not limited to, pre-season community outreach campaigns to educate the public about risks and available support; establishing convenient vaccination centers; reaching out to vulnerable populations and care givers; and issuing advisories and warnings.

## 4.15 Cyber Threats

CYBER THREAT HAZARD RANKING	
Chaffee County	Low
City of Salida	Low
Town of Buena Vista	Low
Town of Poncha Springs	Low

### 4.15.1 Hazard Profile

The 2018 Colorado State Hazard Mitigation Plan defines cyber attacks as “deliberate exploitation of computer systems, technology-dependent enterprises, and networks.” Cyber-attacks use malicious code to alter computer operations or data. The vulnerability of computer systems to attacks is a growing concern as people and institutions become more dependent upon networked technologies. The Federal Bureau of Investigation (FBI) reports that, “cyber intrusions are becoming more commonplace, more dangerous, and more sophisticated,” with implications for private- and public-sector networks.

The 2018 Colorado State Hazard Mitigation Plan concludes: “This is a newly developing threat, so as more resources are devoted to countering the hazard, the risk of a disruption would hopefully decrease. Mitigation opportunities for this hazard include continued diligence of the state’s Office of Information Technology (OIT), as well as for other government and private sector entities to continue to monitor, block, and report cyber-attacks, and continually assess the vulnerability of systems.”

### Past Events

The cybersecurity firm Symantec reports there were a total of 1,209 data breaches worldwide in 2016 (the most recent year for which data has been analyzed). While the number of breaches has remained relatively steady, the average number of identities stolen has increased to almost one million per incident. The report also found that one in every 131 emails contained malware, and the company’s software blocked an average of 229,000 web attacks every day.

The Privacy Rights Clearinghouse, a nonprofit organization based in San Diego, maintains a timeline of 9,741 data breaches resulting from computer hacking incidents in the United States from 2005-2019. The database lists 47 data breaches against systems located in Colorado, totaling over 400,000 impacted records; it is difficult to know how many of those affected Chaffee County residents. Attacks happening outside of the state can also impact local businesses, personal identifiable information, and credit card information. Table 4-56 shows several of the more significant cyber attacks in Colorado in recent years.

### DEFINITIONS

**Phishing Attack**—Emails or texts that appear to come from legitimate sources to trick employees into paying fake invoices, providing passwords, or sending sensitive information.

**Malware**—Malicious code that infects a computer system.

**Ransomware**—A type of malware that encrypts a target’s data and demands a ransom to decrypt the data.

**Distributed Denial of Service (DDoS)**—A common type of attack that seeks to overwhelm a network and causes it to either be inaccessible or shut down.

**Data Breach**—Hackers gain access to large amounts of personal, sensitive, or confidential information.

**SCADA System**—Supervisory Control and Data Acquisition (SCADA) systems controlling critical infrastructure such as power plants and wastewater facilities. Sophisticated attacks on SCADA systems are rare but can potentially have significant impacts.



**Table 4-56 Major Cyber Attacks Impacting Colorado, 2005-2020**

Date Reported	Target	Total Records	Description
July 21, 2005	University of Colorado, Boulder	49,000	Data exposure/ personal identifiable information
August 2, 2005	University of Colorado, Denver	36,000	Data exposure/ personal identifiable information
July 17, 2007	Western Union, Greenwood Village	20,000	Credit card breach
April 22, 2014	Centura Health, Englewood	12,286	Health information breach
July 3, 2017	PVHS-ICM Employee Health and Wellness, Fort Collins	10,143	Data exposure/health information
February, 2018	Colorado Department of Transportation (CDOT)	N/A	Data encryption/ ransomware
August, 2019	Regis University	N/A	DDoS
December, 2019	Southeast Metro Storm Water Authority (SEMSWA)	N/A	Ransomware
June, 2020	Colorado Information Analysis Center (CIAC)	Unknown	Data Breach

Source: Privacy Rights Clearinghouse

A 2017 study found ransomware payments over a two-year period totaled more than \$16 million. Even if a victim is perfectly prepared with full offline data backups, recovery from a sophisticated ransomware attack typically costs far more than the demanded ransom. However, according to a 2016 study by Kaspersky Lab, roughly one in five ransomware victims who pay their attackers never recover their data.

Recent years have seen an increase in ransomware attacks, particularly against local government systems. The City of Atlanta was hit by a major ransomware attack in 2018, recovery from which wound up costing a reported \$2.6 million, significantly more than the \$52,000 ransom demand. A similar attack against the City of Baltimore in 2019 affected the city government's email, voicemail, property tax portal, water bill, and parking ticket payment systems, and delayed more than 1,000 pending home sales. In March 2019, Orange County, North Carolina was attacked with a ransomware virus, causing slowdowns and service problems at key public offices such as the Register of Deeds, the Sheriff's Office, and county libraries. The attack impacted a variety of county services, including disrupting the county's capability to process real estate closings, issue marriage licenses, process fees or permits, process housing vouchers, and verify tax bills.

A large, sophisticated malware attack, known as Olympic Destroyer, was launched against the 2018 Winter Olympics in PyeongChang, South Korea. The attack initially took down servers, email, Wi-Fi, and ticketing systems, which could have severely disrupted the games. Fortunately, the organizing committee had a robust cybersecurity group that was able to quickly restore most functions.

## Location

Cyber-attacks can and have occurred in every location regardless of geography, demographics, and security posture. Incidents may involve a single location or multiple geographic areas. A disruption can have far-reaching effects beyond the location of the targeted system; disruptions that occur far outside the state can still impact people, businesses, and institutions within the county. All the internet-connected computer systems in Chaffee County is susceptible to cyber-attacks. The IT systems of the participating local governments including the County, Buena Vista, Poncha Springs and Salida are the areas of focus.

## **Frequency and Severity (Extent)**

Small-scale cyber attacks such as DDoS attacks occur daily, but most have negligible impacts at the local or regional level. Data breaches are also extremely common, but again most have only minor impacts on government services.

Perhaps of greatest concern to Chaffee County are ransomware attacks, which are becoming increasingly common. It is difficult to calculate the odds of Chaffee County or one of its municipal governments being hit with a successful ransomware attack in any given year, but it is safe to say it is likely to be attacked in the coming years.

The possibility of a larger disruption affecting systems within the county is a constant threat, but it is difficult to quantify the exact probability due to such highly variable factors as the type of attack and intent of the attacker. Major attacks specifically targeting systems or infrastructure in the county cannot be ruled out. There is no universally accepted scale to explain the severity of cyber attacks. The strength of a DDoS attack is often explained in terms of a data transmission rate. One of the largest DDoS disruptions ever, the October 21, 2016 Dyn attack, peaked at 1.2 terabytes per second and impacted some of the internet's most popular sites to include Amazon, Netflix, PayPal, Twitter, and several news organizations.

Data breaches are often described in terms of the number of records or identities exposed. The largest data breach ever reported occurred in August 2013, when hackers gained access to all three billion Yahoo accounts. The hacking incidents associated with Colorado in the Privacy Rights Clearinghouse database are of a smaller scale, ranging from just 32 records to approximately 60,000, along with several cases in which an indeterminate number of records may have been stolen.

Ransomware attacks are typically described in terms of the amount of ransom requested, or by the amount of time and money spent to recover from the attack. One report from cybersecurity firm Emsisoft estimates the average successful ransomware attack costs \$81 million and can take 287 days to recover from.

## **Warning Time**

Cyber attacks can occur with little to no warning, although good cyber security practices can increase the odds of early detection.

### **4.15.2 Related Hazards**

Cyber attacks are not typically tied to other natural hazards. A successful SCADA system attack on dam, power or water control infrastructure could in theory cause or exacerbate a dam incident or hazardous materials release and could potentially lead to utility outages that could amplify the impacts of extreme heat or winter storms.

### **4.15.3 Climate Change Considerations**

There are no known impacts of climate change on cyber threats.

### **4.15.4 Vulnerability**

The impact of a cyber-attack can vary depending on the type of attack and the intent of the malicious actor. Though a cyber disruption can have limited impacts within a system's own operations, it may cause cascading impacts.

## **Population**

Injuries or fatalities from cyber attacks would generally only be possible from a major cyber terrorist attack against critical infrastructure. More likely impacts to the public are financial losses and an inability

to access systems such as public websites and permitting sites. Indirect impacts could include interruptions to traffic control systems or other infrastructure.

Data breaches and subsequent identity thefts can have huge impacts on the public. The Internet Crime Complaint Center (IC3) estimates that identity theft alone resulted in \$2.7 billion in losses to businesses and \$149 million in losses to individuals.

## **Property**

The vast majority of cyber attacks affect only data and computer systems and have no impacts on general property.

## **Critical Facilities and Infrastructure**

The vast majority of cyber attacks affect only data and computer systems. However, sophisticated attacks have occurred against the SCADA systems of critical infrastructure, which could potentially result in system failures on a scale equal with natural disasters. Facilities and infrastructure such as the electrical grid could become unusable. A cyber attack affected the power grid in Ukraine in 2015, leaving over 230,000 people without power. The 2003 Northeast Blackout, while not the result of a cyber attack, caused 11 deaths and an estimated \$6 billion in economic loss. More recently in February 2021, a cyber attack on a water treatment system in Oldsmar Florida put thousands at risk of being poisoned. A hacker accessed the system remotely and adjusted the level of sodium hydroxide to more than 100 times its normal levels. Fortunately, an operator noticed the intrusion immediately and was able to reduce the levels back before any significant effects on the city's water supply.

Cyber-attacks can interfere with emergency response communications, access to mobile data terminals, and access to critical preplans and response documents.

According to the Cyber & Infrastructure Security Agency, cyber risks to 9-1-1 systems can have "severe impacts, including loss of life or property; job disruption for affected network users; and financial costs for the misuse of data and subsequent resolution." CISA also compiled a recent list of attacks on 9-1-1 systems including a DDoS in Arizona, unauthorized access with stolen credentials in Canada, a network outage in New York, and a ransomware attack in Baltimore.

The delivery of services can be impacted since governments rely to a great extent upon electronic delivery of services. Most agencies rely on server backups, electronic backups, and remote options for Continuity of Operations/Continuity of Government. Many departments in Chaffee County have the option to move to a paper method including permitting, DMV services, payments to and from the county, and payroll. However, access to documents on the network, OneDrive access, and other operations that require collaboration across the county will be significantly impacted.

## **Historic, Cultural and Natural Resources**

The vast majority of cyber incidents have little to no impact on historic, cultural or natural resources. A major cyber terrorism attack could potentially impact the environment by triggering a release of a hazardous materials, or by causing an accident involving hazardous materials by disrupting traffic-control devices.

### **4.15.5 Development Trends**

Changes in development have no impact to the threat, vulnerability, and consequences of a cyber attack. Cyber attacks can and have targeted small and large jurisdictions, multi-billion-dollar companies, small mom-and-pop shops, and individual citizens.

The decentralized nature of the internet and data centers means that the cyber threat is shared by all, regardless of new construction and changes in development.

#### **4.15.6 Risk Summary**

- Most data breaches and hacking incidents only impact a few individuals or businesses at a time and have minimal broader impact.
- Ransomware attacks, particularly against state and local governments, have increased significantly in recent years and could have major impacts on services.
- Major cyber attacks against infrastructure and systems are less common but are also happening with more frequency worldwide.
- Effects on people: Cyber attacks can impact personal data and accounts. Injuries or fatalities could potentially result from a major cyber terrorist attacks against critical infrastructure.
- Effects on property: Short of a major cyber terrorist attacks against critical infrastructure, property damage from cyber attacks is typically limited to computer systems.
- Effects on economy: Could greatly affect the economy. In an electronic-based commerce society, any disruption to daily activities can have disastrous impacts to the economy. It is difficult to measure the true extent of the impact.
- Effects on critical facilities and infrastructure: Sabotage of utilities and infrastructure from a major cyber terrorist attacks could potentially result in system failures that damage property on a scale equal with natural disasters. Facilities and infrastructure could become unusable as a result of a major cyber-attack.

## 4.16 Hazardous Materials Incident

WINTER STORM HAZARD RANKING	
Chaffee County	Low
City of Salida	Low
Town of Buena Vista	Low
Town of Poncha Springs	Medium

### DEFINITIONS

**Hazardous Material**—Any material or group of materials of a specific quantity that individually or when combined cause harm to people, property, or the environment.

**Tier II Facility**—A facility that stores, uses, or transports certain quantities of hazardous materials as defined by the U.S. EPA, and are required to report on those materials to Local Emergency Planning Committees (LEPC).

### 4.16.1 Hazard Profile

Hazardous Materials are any material or group of materials of a specific quantity that individually or when combined, cause harm to people, property, or the environment. Chaffee County recognizes the Environmental Protection Agency's (EPA) list of hazardous materials as required by the Emergency Planning and Community Right to Know Act (EPCRA) as the authoritative list of regulated substances. Hazardous Materials may be stored in fixed locations or transported on road or railways.

The U.S. Department of Transportation (DOT), U.S. Environmental Protection Agency (EPA) and the Occupational Safety and Health Administration (OSHA) all have responsibilities relating to the transportation, storage, and use of hazardous materials and waste. The Right to Know Network maintained by the U.S. Coast Guard's National Response Center (NRC) is a primary source of information on the use and storage of hazardous materials, as well as data regarding spills and releases. In Colorado, the manufacture, use, storage, and transportation of hazardous materials is regulated by the Colorado Department of Public Health and the Environment (CDPHE). Hazardous materials carriers are subject to Colorado Public Utility Commission (PUC) registration and insurance requirements. Colorado statutes require that any person transporting hazardous materials that require placarding to obtain a Hazardous Materials Permit from the Public Utilities Commission. Safety oversight is the jurisdiction of the Colorado State Patrol.

The U.S. Department of Transportation divides Hazardous materials into the following classes:

- Explosives
- Compressed gases: flammable, non-flammable compressed, poisonous
- Flammable & combustible liquids
- Flammable solids: spontaneously combustible, dangerous when wet
- Oxidizers and organic peroxides
- Toxic materials: poisonous material, infectious agents
- Radioactive material
- Corrosive material: destruction of human skin, corrodes steel

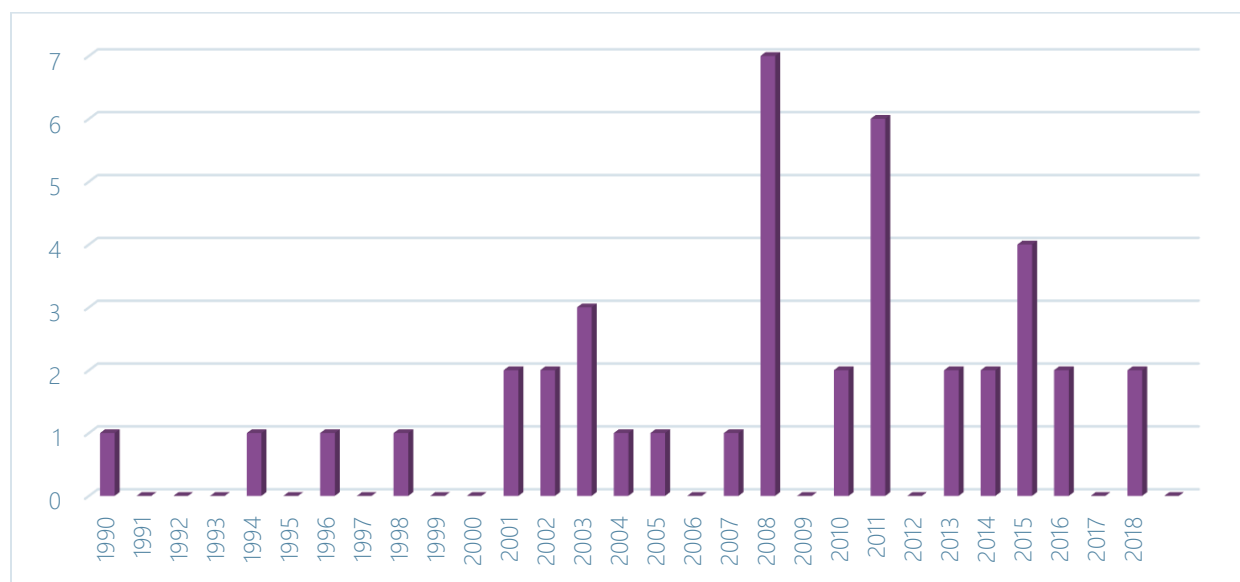
### Past Events

Minor hazardous materials incidents happen regularly in Chaffee County. Statistics from the National Response Center (NRC), which serves as the primary national point of contact for reporting all oil, chemical, radiological, biological, and etiological discharges into the environment anywhere in the United States and its territories, indicate that between 1990 and the end of 2019, 41 hazardous materials incidents were reported in Chaffee County. This number almost certainly excludes a number of very small spills that were not reported to the NRC. As shown in Figure 4-43, during the 1990s Chaffee County



reported an average of 0.4 incidents per year; that increased sharply to 1.7/year during the 2000s and to 2.0/year during the 2010s.

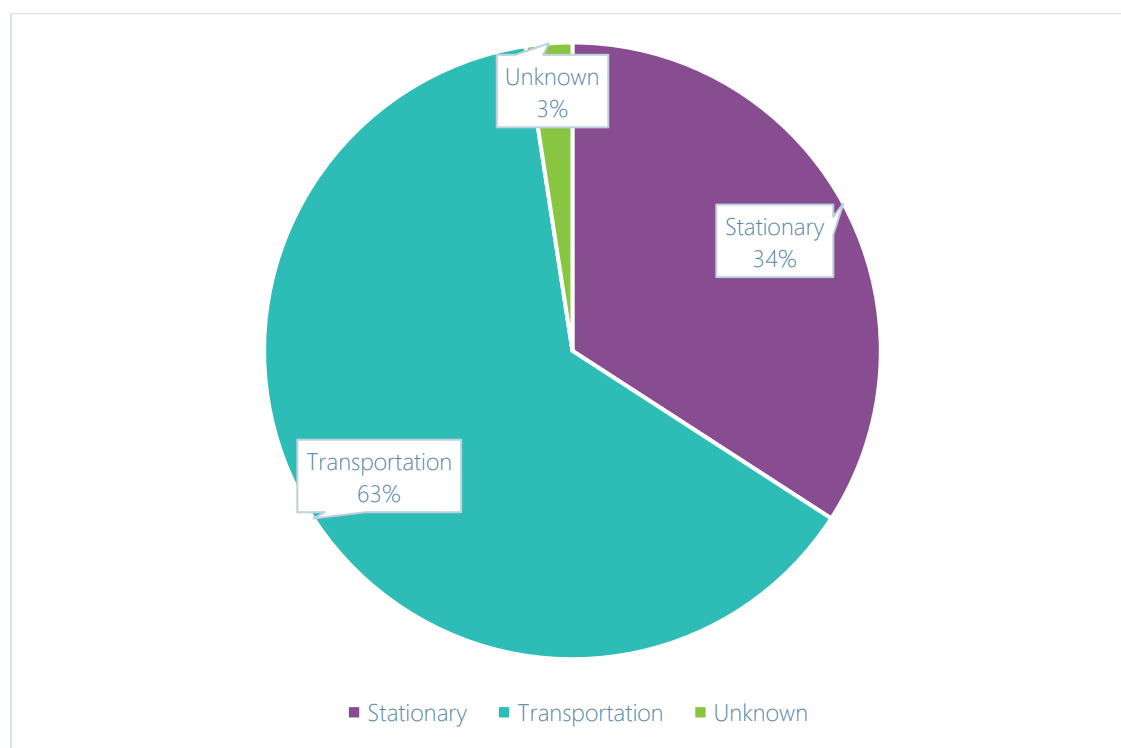
**Figure 4-43 Hazardous Materials Incidents Reported in Chaffee County by Year, 1990-2019**



Source: National Response Center

As shown in Figure 4-44, 63% of hazardous material incidents in Chaffee County occur during transportation, with 34% taking place at fixed facilities or storage tanks.

**Figure 4-44 Hazardous Materials Incidents Reported in Chaffee County by Type, 1990-2019**



Source: National Response Center

The NRC reports 5 deaths and 2 injuries associated with these incidents. However, the NRC counts all injuries or damages resulting from an accident where hazardous materials were involved (e.g. vehicle crashes), whether or not the injuries or damages were caused by exposure to the hazardous substance. Closer analysis shows no record of injuries or fatalities from exposure to hazardous materials in Chaffee County during this time period. There is also no record of property damage from hazardous materials incidents, and only 1 recorded evacuation. Of the 41 recorded incidents, 11 (27%) resulted in road closures.

Table 4-57 shows the most common types of materials reported as released. Diesel fuel, gasoline and various oils account for 66% of hazardous materials incidents in the County.

**Table 4-57 Hazardous Materials Released in Chaffee County, 1990-2019**

Material	#
Diesel	15
Oil, Various	8
Gasoline	4
Natural Gas	3
Propane	2
Ammonium Thiosulfate	1
Asbestos	1
Butane	1
Ethylene Glycol	1
Grease	1
Film Material & Reagent	1
Refrigerant Gases	1
Transmission Fluid	1
Unknown Chemical	1

Source: National Response Center

## Location

As discussed above, hazmat incidents can occur at fixed facilities or during transportation. Transportation accidents primarily happen along highways, railways, or pipelines. Fixed facilities are typically concentrated in urban areas but can also be found in more rural locations.

The Colorado Department of Transportation indicates Highways 24, 50 and 285 are all designated hazardous materials routes. Highway 50 passes through Salida and Poncha Springs and intersects Highway 285 in Poncha Springs. Highway 24 passes through Buena Vista. Highway 50 over Monarch Pass is more prone to vehicle accidents to the nature of the mountainous roads combined with likelihood for adverse weather in the winter.

There are railroad tracks that parallel the Arkansas River through Browns Canyon and over Tennessee Pass in Lake County, but the tracks have been out of service since the 1996. As of early 2021, the Colorado Midland & Pacific Railway Company was looking at potentially operating the line again, but it is not clear if the line would reopen and if it would be passenger service, freight, or both.

Generally, with a fixed facility, the hazards are pre-identified. The U.S. Emergency Planning and Community Right-to-Know Act (EPCRA) requires industries to report on the storage, use, and releases of hazardous substances to federal, state, and local governments. Facilities in Colorado must submit an emergency and hazardous chemical inventory form (Tier II form) to the Colorado Department of Public Health and Environment (CDPHE) and, if required by local reporting regulations, the Local Emergency Planning Committee (LEPC) and local fire departments annually. Tier II forms provide state and local officials and the public with information on the general hazard types and locations of hazardous chemicals present at facilities during the previous calendar year. The inventory forms require basic facility identification information, employee contact information for both emergencies and non-emergencies, and information about chemicals stored or used at the facility. As of January 1, 2021, there are 12 Tier II facilities reported in Chaffee County.

The EPA also requires facilities containing certain extremely hazardous substances to generate Risk Management Plans (RMPs) and resubmit these plans every five years. As of January 1, 2021, there are no RMP facilities in Chaffee County.

Overall, the geographic coverage of this hazard in Chaffee County is limited – less than 10% of the planning area affected based on historical experience – but depending on the type and quantity of spills and the medium affected, the geographic coverage could become large, particularly if a material was released into a stream or waterway.

### **Frequency and Severity (Extent)**

Chaffee County experiences a hazardous materials incident on average twice a year, although incidents that cause major impacts are uncommon.

Hazardous materials come in the form of explosives, flammable and combustible substances, poisons, and radioactive materials. Hazards can occur during production, manufacturing, storage, transportation, use, or disposal. Impacts from hazardous materials releases can include:

- Fatalities
- Injury
- Evacuations
- Property damage
- Animal fatalities (livestock, fish & wildlife)
- Air pollution
- Surface or ground water pollution/contamination
- Interruption of commerce and transportation

Numerous factors influence the impacts of a hazardous materials release, including the type and quantity of material, location of release, method of release, weather conditions, and time of day. This makes it difficult to predict precise impacts. The impact to life and property from any given release depends primarily on:

- The type and quantity of material released.
- The human act(s) or unintended event(s) necessary to cause the hazard to occur.
- The length of time the hazard is present in the area.
- The tendency of a hazard, or that of its effects, to either expand, contract, or remain confined in time, magnitude, and space.
- Characteristics of the location and its physical environment that can either magnify or reduce the effects of a hazard.

The release or spill of hazardous materials can also require different emergency responses depending on the amount, type, and location of the spill incident.

The impacts of major hazardous materials incidents are potentially catastrophic, causing multiple deaths, property damage, and/or interruption of essential facilities and service for more than 72 hours. However, historically the impact of hazardous materials incidents in Chaffee County have been extremely limited. As noted previously, no deaths, injuries, or property damage have been reported from exposure to hazardous materials in Chaffee County from 1990-2019. The most common impact in Chaffee County is road closures, which can have significant transportation impacts.

### **Warning Time**

Hazardous Materials incidents typically occur with little to no warning.

#### **4.16.2 Related Hazards**

All of the 41 incidents in the NRC records were the result of accidents, equipment failure, operator error, or intentional dumping. Severe weather can make such accidents more likely. Additionally, hazardous materials releases can occur as a result of other natural hazards; this is often seen after flooding or dam incidents, but could also occur as a result of earthquake, landslide, severe weather, or a wildfire. The odds of a cyber attack on control systems of a hazardous materials site resulting in a release is remote but cannot be ruled out.

#### **4.16.3 Climate Change Considerations**

There are no known effects of climate change on hazardous material incidents.

#### **4.16.4 Vulnerability**

##### **Population**

Hazardous materials incidents impact on people is highly dependent on the location of the incident, but can cause injuries, hospitalizations, and even fatalities to people nearby. The most likely routes are inhalation, absorption, and ingestion. A toxic spill or a release of an airborne chemical near a populated area can lead to significant evacuations and have a high potential for loss of life. People living near hazardous facilities and along transportation routes may be at a higher risk of exposure, particularly those living or working downstream and downwind from such facilities.

Vulnerable populations can be more severely impacted by hazardous materials incidents. People with existing health risks or compromised immune systems could be severely affected by releases of even relatively low-impact materials. Low income families may be more likely to live in industrial areas or near hazardous materials routes. Individuals with disabilities may need more time to evacuate, so evacuation notices will need to be issued as soon as feasible, and communicated by multiple, inclusive methods.

##### **Property**

The impact of most fixed facility incidents is typically localized to the property where the incident occurs. The impact of small spills during transportation may also be limited to the extent of the spill and remediated if needed. Cleanup from major spills can be lengthy and expensive.

##### **Critical Facilities and Infrastructure**

Impacts on critical facilities are similarly most often limited to the area or facility where they occurred, such as at a transit station, airport, fire station, hospital, or railroad. However, they can cause long-term traffic delays and road closures resulting in major delays in the movement of goods and services. These

impacts can spread beyond the planning area to affect neighboring counties, or vice-versa. While cleanup costs from major spills can be significant, they do not typically cause significant long-term impacts to critical facilities.

The critical facilities tables under the other hazard sections list include Tier II facilities located in mapped hazard areas, to include one in a dam inundation zone, and five in wildfire risk areas. All of these are located in the unincorporated with the exception of one in Poncha Springs.

The vast majority of hazardous materials incidents have minimal impacts on continuity of operations beyond short-term road closures. However, a large spill or a particularly hazardous substance can take weeks or even months to clean up.

### **Historic, Cultural and Natural Resources**

In many instances of hazardous materials releases, the environment is the most significantly affected component of the system consisting of people, property, and the environment. Environmental impact often includes water quality, air quality, and soil contamination. Again, the impact to the environment is scale dependent and ranges from minimal and temporary such as a small chemical spill on a roadway to catastrophic and permanent. Widespread effects can occur when materials contaminate the groundwater and eventually the municipal water supply, or they migrate to a major waterway or aquifer. Impacts on wildlife and natural resources can also be significant but would likely be isolated to the area of spill or release.

#### **4.16.5 Development Trends**

Increased development in the planning area increases not only the number of people potentially exposed to hazardous materials incidents, but also increases the number of shipments which can translate into more releases. Development along major transportation routes and near known fixed facilities should be closely monitored. The possible re-activation of the rail line through the county could increase the potential for spills, if the line is used for freight service.

#### **4.16.6 Risk Summary**

- Chaffee County averages 2 hazardous materials incidents per year; this has increased in recent decades.
- The three major highways in the county are all designated hazardous materials routes and US 50 over Monarch Pass has higher potential for accidents due to weather and terrain.
- Poncha Springs has potentially higher exposure to a transportation incident due to the intersection of Highways 50 and 285, and one facility located in a wildfire risk area.
- There are 12 Tier II hazardous materials facilities in Chaffee County, and no RMP facilities.
- There are no reported deaths, injuries, or property damage resulting from exposure to hazardous materials in Chaffee County.
- The most common impact of incidents in the County is road closures. However, a major spill of a highly toxic chemical could potentially have short- and long-term impacts to public health and the environment.



## 5 Mitigation Strategy

### DMA Requirement §201.6(c)(3):

*[The plan shall include] a mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.*

This section describes the mitigation strategy process and mitigation action plan for the Chaffee County Multi-Hazard Mitigation Plan. It explains how the County and participating jurisdictions accomplished Phase 3 of FEMA's 4-phase guidance—Develop the Mitigation Plan—and includes the following from the 10-step planning process:

- Planning Step 6: Set Goals
- Planning Step 7: Review Possible Activities
- Planning Step 8: Draft an Action Plan

### 5.1 Mitigation Strategy: Overview

The results of the planning process, the risk assessment, the goal setting, the identification of mitigation actions, and the hard work of the Hazard Mitigation Planning Committee (HMPC) led to the mitigation strategy and mitigation action plan for this HMP update. As part of the plan update process, a comprehensive review and update of the mitigation strategy portion of the plan was conducted by the HMPC. As part of this process the original goals and objectives from the 2016 Plan were reviewed and reaffirmed. The HMPC thought the goals and objectives are still valid and were kept as originally written. The mitigation actions from 2016 Plan were reviewed and assessed for progress and evaluated for their inclusion in this plan update. Section 5.1.1 below identifies the updated goals and objectives of this plan and Section 5.3.1 details the progress on 2016 mitigation actions and summarizes the updated mitigation action plan.

#### 5.1.1 Goals and Objectives

### DMA Requirement §201.6(c)(3)(i):

*[The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards*

Up to this point in the planning process, the HMPC has organized resources, assessed natural hazards and risks, and documented mitigation capabilities. A profile of the County's vulnerability to natural hazards resulted from this effort, which is documented in the preceding chapter. The resulting goals, objectives, and mitigation actions were developed based on this profile. The HMPC developed the new updated mitigation strategy based on a series of meetings and worksheets designed to achieve a collaborative mitigation planning effort, as described further in this section. The goals for this plan were developed by the HMPC based on the plan's risk assessment. This analysis of the risk assessment identified areas where improvements could be made and provided the framework for the HMPC to formulate planning goals and objectives and the mitigation strategy for Chaffee County.

Goals were defined for the purpose of this mitigation plan as broad-based public policy statements that:

- Represent basic desires of the community;
- Encompass all aspects of community, public and private;
- Are nonspecific, in that they refer to the quality (not the quantity) of the outcome;
- Are future-oriented, in that they are achievable in the future; and
- Are time-independent, in that they are not scheduled events.

Goals are stated without regard for implementation, that is, implementation cost, schedule, and means are not considered. Goals are defined before considering how to accomplish them so that the goals are not dependent on the means of achievement. Goal statements form the basis for objectives and actions that will be used as means to achieve the goals. Objectives define strategies to attain the goals and are more specific and measurable.

Based upon the risk assessment review and goal setting process, the HMPC re-assessed the following goals and associated objectives developed from the 2016 Plan. These were revisited during the second and third planning meetings. During the meetings, and through a post-meeting online form, the HMPC decided to make changes to each goal and several of the objectives, in some cases adding new objectives in the 2021 HMP update process (Objective 4.5 was added to specifically address risk from high hazard dams in the planning area). Additional input on goals revision was provided by Chaffee County Emergency Management.

- **Goal 1:** Reduce the risk to the people, property, and environment from impacts of hazards identified in the risk assessment process.
  - **Objective 1.1:** Assess and improve hazard-specific mapping and warning systems associated with high risk hazards to provide accurate and accessible information for public officials, residents, visitors, and responders.
  - **Objective 1.2:** Protect existing property and future property development to the extent possible through regulations, codes, education, cooperative agreements, hazard reduction projects and other means.
  - **Objective 1.3:** Protect and reduce vulnerability of critical facilities, infrastructure, and other key community lifelines and assets from hazards.
  - **Objective 1.4:** Create incentives for the public to mitigate hazards on their own property.
  - **Objective 1.5:** Continue programs to further identify hazards. Provide timely notifications and direction to the public of imminent and potential hazards.
- **Goal 2:** Improve public awareness and preparedness regarding hazard vulnerability and mitigation.
  - **Objective 2.1:** Assess and improve emergency notification systems to ensure reliable, diverse, and redundant public communication of potential hazards.
  - **Objective 2.2:** Provide community education programs to increase awareness of hazards and mitigation opportunities to reduce personal risk.
  - **Objective 2.3:** Continually assess ongoing disaster preparedness programs and activities to implement changes that improve disaster preparedness.
- **Goal 3:** Minimize economic losses due to disasters caused by hazards while increasing economic resiliency.
  - **Objective 3.1:** Minimize economic impact of hazard events and reduce private property losses.
  - **Objective 3.2:** Reduce financial exposure of county and municipal governments.
- **Goal 4:** Improve community resilience to hazards

- **Objective 4.1:** Establish and maintain relationships with public agencies, nongovernmental organizations, businesses, and citizens to strengthen hazard communication and coordination, both within and outside of Chaffee County.
- **Objective 4.2:** Build resilience through integrated planning including incorporating hazard analysis, hazard mitigation, and emergency preparedness considerations into county and local future development planning.
- **Objective 4.3:** Continually assess ongoing programs and activities to improve disaster resilience.
- **Objective 4.4:** Assess opportunities to incorporate mitigation during recovery from hazard events to reduce repeated damages.
- **Objective 4.5:** Continue to promote programs, projects and planning to reduce long-term vulnerabilities from high hazard potential dams that pose an unacceptable risk to the public.
- **Goal 5:** Strengthen intergovernmental coordination, communication, and capabilities regarding mitigation of hazard impacts.
  - **Objective 5.1:** Promote planning efforts that foster cooperation and coordination among jurisdictions, agencies, and organizations involved in hazard mitigation.
  - **Objective 5.2:** Enhance training for hazard prevention, Lifeline impacts and mitigation options.
  - **Objective 5.3:** Continue to collaborate with area partners through mutual aid agreements and long-term planning efforts.
  - **Objective 5.4:** Reduce the vulnerability of local assets and Lifeline services to the impacts of hazards.

## 5.2 Identification and Analysis of Mitigation Actions

### DMA Requirement §201.6(c)(3)(ii):

*[The mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.*

In order to identify and select mitigation measures to support the mitigation goals, each hazard identified in Chapter 4: Hazard Identification Risk Assessment was evaluated. The HMPC analyzed a comprehensive set of viable mitigation alternatives for both new and existing buildings and infrastructure that would support identified goals and objectives. Each HMPC member was provided with the following list of categories of mitigation measures, which originate from the NFIP Community Rating System:

- **Prevention:** Administrative or regulatory actions or processes that influence the way land and buildings are developed and built.
- **Property protection:** Actions that involve the modification of existing buildings or structures to protect them from a hazard or remove them from the hazard area.
- **Structural:** Actions that involve the construction of structures to reduce the impact of a hazard.
- **Natural resource protection:** Actions that, in addition to minimizing hazard losses, also preserve or restore the functions of natural systems.
- **Emergency services:** Actions that protect people and property during and immediately after a disaster or hazard event.
- **Public information/education and awareness:** Actions to inform and educate citizens, elected officials, and property owners about the hazards and potential ways to mitigate them.

The HMPC members were also provided with several lists of alternative multi-hazard mitigation actions for each of the above categories via email and at a mitigation strategy webinar in March 2021. Other reference handouts were shared with the HMPC including a document titled “Mitigation Ideas” developed by FEMA in 2013 and FEMA’s 2020 “Mitigation Action Portfolio”, both were distributed to the HMPC via an online link after the meeting. This reference provides four categories of mitigation actions that were discussed at the HMPC meeting in addition to the NFIP/CRS categories. These include:

- Plans and Regulations
- Structure and Infrastructure Projects
- Education and Awareness
- Natural systems protection

Other alternatives discussed on the webinar include the four ‘A’s’ of mitigation:

- Alter the physical nature of the hazard
  - Such as wildfire defensible space and fuels treatments, snow fences etc.
- Avert the hazard away from people, buildings, and infrastructure
  - Can include engineered solutions, drainage, and channel improvements, floodproofing, fuel breaks
- Adapt to the hazard
  - Through land use planning, building codes and design standards, warning systems etc.
- Avoid the hazard
  - Natural systems protection, open space, acquisition, or relocation of properties out of hazardous areas

To facilitate the brainstorming process, the HMPC referred to a matrix of typical mitigation alternatives organized by CRS category for the hazards identified in the plan, in addition to a handout that explains the categories and provided examples. These materials are included in Appendix D. HMPC members were encouraged to develop mitigation alternatives that would protect future, as well as existing, development from hazards per the DMA 2000 regulations. A facilitated discussion then took place to examine the existing actions in the 2016 plan and analyze the other possible mitigation alternatives. With an understanding of the alternatives, a brainstorming session was conducted to generate a list of preferred mitigation actions. The result was new and updated project ideas with the intent of meeting the identified goals and mitigating identified hazards.

### **5.2.1 Prioritization Process**

Once the mitigation actions were identified, the HMPC was provided with several decision-making tools, including FEMA’s recommended prioritization criteria STAPLEE, sustainable disaster recovery criteria, and others, to assist in deciding why one recommended action might be more important, more effective, or more likely to be implemented than another. STAPLEE stands for the following:

- 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?

In accordance with the DMA requirements, an emphasis was placed on the importance of a benefit-cost analysis in determining project priority (the 'economic' factor of STAPLEE). Other criteria used to recommend what actions might be more important, more effective, or more likely to be implemented than another included:

- Does action protect lives?
- Does action address hazards or areas with the highest risk?
- Does action protect critical facilities, infrastructure, or community assets?
- Does action meet multiple objectives (Multiple Objective Management)?

At the mitigation strategy webinar, the HMPC reviewed and discussed the STAPLEE considerations to determine which of the identified actions were most likely to be implemented and effective. Prioritization of previous mitigation actions identified in the 2016 HMP that are continuing in the updated plan were revisited during a HMPC meeting. New actions identified in 2020 also were prioritized based on the group discussion with the STAPLEE considerations in mind.

### 5.3 Mitigation Action Plan

#### DMA Requirement §201.6(c)(3)(iii):

*[The mitigation strategy section shall include] an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.*

This section outlines the development of the updated mitigation action plan. The action plan consists of the specific projects, or actions, designed to meet the plan's goals. Over time the implementation of these projects will be tracked as a measure of demonstrated progress on meeting the plan's goals.

#### 5.3.1 Progress on Previous Mitigation Actions

A review of 2016 mitigation actions progress reports indicates that Chaffee County and the participating jurisdictions have been successful in implementing actions identified in the 2016 HMP Mitigation Strategy, thus, working diligently towards meeting the 2016 plan goals. The 2016 mitigation strategy contained 38 separate mitigation actions. As of July 2021, 4 of these actions have been completed, 4 deleted and 30 are continuing. The table below summarizes progress implementing mitigation actions by jurisdiction. The Total Continuing Actions column summarizes the actions from 2016 that are either still in progress, have annual implementation, or are continuing but not completed. The New Actions in 2021 summarizes the number of actions that were identified during the 2021 plan update process.



**Table 5-1 Mitigation Action Progress Summary by Jurisdiction**

Jurisdiction	Completed	Action Ongoing Toward Completion	Continue-Not Completed	Deleted	Total Continuing Actions	New Actions in 2021
Chaffee County	1	9	4	3	13	6
Buena Vista	1	3	3	1	6	5
Poncha Springs	1	4	2	0	6	2
Salida	1	4	1	0	5	1
<b>Grand Total</b>	<b>4</b>	<b>20</b>	<b>10</b>	<b>4</b>	<b>30</b>	<b>14</b>

Table 5-2 indicates the details for each of the 2016 mitigation action items that have been completed or deleted. Each of the 2016 action were connected to the five mitigation goals discussed above. Based on the table below all five goals have had progress made towards them.

**Table 5-2 Completed and Deleted Mitigation Actions**

Jurisdiction	2016 Action ID	Related Goal(s)	Hazard(s) Mitigated	Mitigation Action Title	Priority	Comments
Chaffee County	1	1,2,4	Avalanche; Dam/Levee Failure; Earthquake; Flood; Hail; Landslide, Mud/Debris Flow, and Rockfall; Lightning; Severe Wind; Tornado; Wildfire; Winter Storm	Code Red ENS Enhancements	Medium	Completed in 2020. Switched to Everbridge and Obtained IPAWS Messaging Authorization.
	7	2	Lightning	Lightning Danger Warning Signage	High	Deleted; signage not considered to be effective as other methods.
	8	2,4	Avalanche; Flood; Wildfire; Winter Storm	Publicize Locations of Public Shelters	Medium	Deleted as no shelters designated for these hazards.
	17	1,3	Wildfire	Wildfire Fuels Reduction Program	High	Deleted. Duplication of Action #9.
Salida	6	4,5	Dam/Levee Failure; Drought; Erosion and Deposition; Extreme Heat; Flood; Hail; Lightning; Severe	Update Building Codes.	Low	Completed. The City updated to the 2015 Code Set in March of 2018.

Jurisdiction	2016 Action ID	Related Goal(s)	Hazard(s) Mitigated	Mitigation Action Title	Priority	Comments
			Wind; Subsidence; Tornado; Winter Storm			
Buena Vista	3	3,4,5	Extreme Heat; Flood; Lightning; Severe Wind; Tornado; Wildfire; Winter Storm	Require Underground Electric Lines.	Medium	Completed.
	8	4,5	Avalanche; Dam/Levee Failure; Drought; Earthquake; Extreme Heat; Flood; Hail; Landslide, Mud/Debris Flow, and Rockfall; Lightning; Severe Wind; Tornado; Wildfire; Winter Storm	Update Building Codes.	Low	Deleted. Town is not pursuing new codes. We will engage in public discussions once the County Building Department brings new codes forward for consideration.
Poncha Springs	1	4,5	Avalanche; Dam/Levee Failure; Drought; Earthquake; Erosion and Deposition; Expansive Soils; Extreme Heat; Flood; Hail; Landslide, Mud/Debris Flow, and Rockfall; Lightning; Severe Wind; Subsidence; Tornado; Wildfire; Winter Storm	Update Building Codes.	Medium	Completed.

### 5.3.2 Continued Compliance with the National Flood Insurance Program

The NFIP makes federally backed flood insurance available to homeowners, renters, and business owners in participating communities. For most participating communities, FEMA has prepared a detailed Flood Insurance Study (FIS). The study presents water surface elevations for floods of various magnitudes, including the 1% annual chance flood (or 100-year flood) and the 0.2% annual chance flood (or 500-year

flood). Base flood elevations and the boundaries of the 100- and 500-year floodplains are shown on Flood Insurance Rate Maps (FIRM), which are the principle tool for identifying the extent and location of the riverine flood hazard. FIRMs are the most detailed and consistent data source available, and for many communities they represent the minimum area of oversight under their floodplain management program.

Participants in the NFIP must, at a minimum, regulate development in floodplain areas in accordance with NFIP criteria. Before issuing a permit to build in a floodplain, participating jurisdictions must ensure that three criteria are met:

- New buildings and those undergoing substantial improvements must, at a minimum, be elevated to protect against damage by the 100-year flood.
- New floodplain development must not aggravate existing flood problems or increase damage to other properties.
- New floodplain development must exercise a reasonable and prudent effort to reduce its adverse impacts on threatened salmonid species.

Chaffee County, the City of Salida, Town of Buena Vista and Town of Poncha Springs participate in the NFIP program. Structures permitted or built in the county before 1987 when the county and Poncha Springs joined the NFIP (1982 for Buena Vista and Salida) are called “pre-FIRM” structures, and structures built afterwards are called “post-FIRM.” Post-FIRM structures built in compliance with the floodplain regulations are mitigated to withstand floods up through the 100-year event. The insurance rate is different for the two types of structures, as pre-FIRM are at higher risk of flooding. The effective date for the current countywide FIRM is December 7, 2017. The county and participating communities are currently in good standing with the provisions of the NFIP. Compliance is monitored by FEMA regional staff. Maintaining compliance with the NFIP is an important component of flood mitigation and risk reduction.

Given the flood hazard and risk in the planning area and recognizing the importance of the NFIP in mitigating flood losses, an emphasis is placed on continued compliance with the NFIP by Chaffee County and all NFIP participating jurisdictions including Buena Vista, Poncha Springs, and Salida. As NFIP participants, these communities have and will continue to make every effort to remain in good standing with NFIP. This includes continuing to comply with the NFIP’s standards for updating and adopting floodplain maps and maintaining and updating the floodplain zoning ordinance.

### **5.3.3 Updated Action Plan**

The results of the project identification and prioritization exercise are summarized in Table 5-3. These projects detail specific actions for reducing future hazard-related losses within Chaffee County. The projects are organized by jurisdictions and included notes about the department and partners necessary to implement the project. Table 5-3 provides more details on the mitigation actions, including the mitigation action description estimated cost, potential funding sources, timeline, indication of the goal(s) that the projects primarily align with and are marked with their relative level of priority high, medium, and low. All county and jurisdictional actions are included in the table below and are organized by a mitigation identification number. The following table also provides status/implementation notes that describe progress made on the actions so far, using the following categories, and, where applicable, notes if there were changes in the priority level from the previous plan:

- Action ongoing toward completion: work has begun on the project and is ongoing.
- Continue - Not completed: little or no work has been done on the project to date and the HMPC agreed to carry over the action into the updated plan.
- New in 2021: The action is new to this plan update; little to no work has been completed.

Many of these mitigation actions are intended to reduce impacts to existing development. Those that protect future development from hazards, as required per the DMA 2000 regulations, are indicated by an asterisk '\*' in the action identification number. These actions include those that promote wise development and hazard avoidance, such as building code, mapping, and zoning improvements, and continued enforcement of floodplain development regulations.

**Table 5-3 2021 Mitigation Action Plan**

ID	Related Goal(s)*	Hazard(s) Mitigated	Action Title and Description	Lead Agency and Partners	Cost Estimate	Potential Funding	FEMA Lifeline	Priority	Timeline*	Status/Implementation Notes
<b>Chaffee County</b>										
CC-1	Goal: 2 Obj: 2.2	Drought	Encourage Water Saving Measures. Educate citizens to implement water- saving measures including but not limited to: installing low-flow showerheads, toilets, etc; checking for leaking in plumping; installing graywater systems in homes to encourage water reuse.	OEM	< \$10,000	County Budget	Food, Water, Shelter	Medium	Ongoing	Continue- Not Completed.
CC-2	Goal: 2 Obj: 2.2	Drought	Promote Xeriscape Landscaping and Drought-tolerant Plants. Promote through education xeriscape landscaping and planting of drought-tolerant plants around homes and businesses to minimize water consumption.	OEM	< \$10,000	County Budget	Food, Water, Shelter	High	Ongoing	Continue- Not Completed.
CC-3	Goal: 1,4 Obj: 1.3, 4.2,	Flood	Build New Drains and Increase Culverts Around County. Chaffee County has suffered minor flooding over the past several years affecting road and bridge infrastructure. The need for better drainage has been identified in several locations around the county. New infrastructure like drainages and culverts are needed to reduce the risks of continued flooding in these areas.	Road and Bridge	\$10,000 - \$100,000	County and State improvement budgets	Transportation	Medium	Ongoing	Action ongoing toward completion. HMPC noted some progress has been made in past 5-years.
CC-4	Goal: 2 Obj: 2.1	Avalanche	Avalanche Danger Warning Signage. The Chaffee County OEM publishes avalanche dangers on the social media sites in conjunction with the National Weather Service. Chaffee County in coordination with BLM and the U.S. Forest Service can place avalanche danger signage throughout the county in areas that the public regularly visits.	OEM	< \$10,000	County and State budgets	N/A	Low	Short Term	Continue- Not Completed.
CC-5	Goal: 1, 3 Obj: 3.2,	Severe Wind; Winter Storm	Build Living Snow Fences. Build living snow fences to block the wind and blowing snow from main roads, long driveways, and homeowner association areas.	Road and Bridge	< \$10,000	State and HMA grants; CDOT	Transportation	High	Long Term	Continue- Not Completed.
CC-6*	Goal: 1,3,5 Obj: 1.2,5.3	Wildfire	Continue Wildfire Mitigation Measures as outlined in the identified in the 2020 County Community Wildfire Protection Plan and	OEM, USFS and Envision Forest Health Council	> \$100,000	FEMA HMGP, BRIC; State Forest Service;	Food, Water, Shelter	High	Ongoing	Action ongoing toward



ID	Related Goal(s)*	Hazard(s) Mitigated	Action Title and Description	Lead Agency and Partners	Cost Estimate	Potential Funding	FEMA Lifeline	Priority	Timeline*	Status/ Implementation Notes
			updates through annual community reports including: Chaffee Chips program Chaffee Treats program Wildfire evacuation route thinning along Route 162 Homeowners Association projects Fuels reduction below power lines Develop Antero Subdivision CWPP element	Chaffee County OEM will work closely with State and U.S. Forest Services to educate the public, conduct risk and mitigation inspections and conduct mitigation efforts.		Envision Chaffee County				completion. Numerous projects occurring and planned. Numerous projects being handled by Envision Forest Health Council. Annual progress reporting.
CC-7	Goal: 2 Obj: 2.2	Avalanche; Dam Failure or Incident; Drought; Earthquake; Erosion and Deposition; Expansive Soils; Extreme Heat; Flood; Hail; Landslide, Mud/Debris Flow, and Rockfall; Lightning; Severe Wind; Subsidence; Tornado; Wildfire; Winter Storm	Strengthen Public Education Programs. The Chaffee County OEM will use the county website, publications, and social media to education citizens of the natural hazards they are exposed to and educate homeowners how to mitigate damages.	OEM	< \$10,000	County Budget	N/A	High	Ongoing	Action ongoing toward completion. Large increase in public outreach in 2020 with new CWPP.
CC-8*	Goal: 1,2,4,5 Obj: 1.2, 2.2, 4.1, 5.3	Wildfire	Strengthen Partnership Between Code-enforcing Firefighters, Planners, and Law Enforcement Authorities. The Chaffee County OEM will continue to strengthen partnership	OEM	< \$10,000	County Budget	N/A	Medium	Ongoing	Action ongoing toward completion.

ID	Related Goal(s)*	Hazard(s) Mitigated	Action Title and Description	Lead Agency and Partners	Cost Estimate	Potential Funding	FEMA Lifeline	Priority	Timeline*	Status/ Implementation Notes
			between code-enforcing firefighters, planners, and law enforcement authorities concerning wildfires in the county.							
CC-9*	Goal: 1,3,5 Obj: 1.3, 3.2, 5.1	Flood	Partner with FEMA to Update and Improve Accuracy of Flood Hazard Area Boundaries. The Chaffee County Planning and Zoning is working with CWCB and FEMA Region VIII to get a finalized DFIRM. The county is also participating in the Colorado Risk MAP process for additional flood risk mapping products.	Planning and Zoning	\$10,000 - \$100,000	County Budget, CWCB, FEMA Risk MAP, BRIC	N/A	High	Ongoing	Action ongoing toward completion. New effective flood maps adopted in 2017. Base Level Engineering being completed in 2021 to map flood hazards on drainages beyond the FEMA FIRMs.
CC-10	Goal: 1 Obj: 1.1	Dam Failure or Incident; Flood; Winter Storm	Incorporate GIS Layer for Land- Ownership Parcels into Emergency- Response Procedures. The Chaffee County Communication Center will incorporate a GIS layer for Land-Ownership Parcels into emergency-response procedures.	OEM, Planning and Zoning	< \$10,000	County Budget	N/A	High	Ongoing	Action ongoing toward completion. GIS Planning Collaborative Project in progress.
CC-11	Goal: 1,2, 3, 4, 5 Obj: 1.2, 2.2, 3.1, 3.2, 4.1, 5.1	Erosion and Deposition; Flood; Severe Wind; Wildfire; Winter Storm	Western Area Power Administration Powerline ROW Fuels Reduction Project. In a cooperative effort with the landowners (private, state, and federal) projects will be identified that will reduce the potential of wildfire by using equipment to do fuels reduction in priority areas that have the highest risk.	Western Area Power Admin, Transmission Lines ROW Construction and Maintenance	> \$100,000	Western, state and federal agencies, grant support for private land projects.	Energy	Medium	Long Term	Action ongoing toward completion.

ID	Related Goal(s)*	Hazard(s) Mitigated	Action Title and Description	Lead Agency and Partners	Cost Estimate	Potential Funding	FEMA Lifeline	Priority	Timeline*	Status/ Implementation Notes
CC-12	Goal: 1,2, 3, 4, 5 Obj: 1.2, 2.2, 3.1, 3.2, 4.1, 5.2	Erosion and Deposition; Flood; Severe Wind; Wildfire; Winter Storm	Tri-State Generation & Transmission Powerline ROW Fuels Reduction Project. In a cooperative effort with the landowners (private, state, and federal) projects will be identified that will reduce the potential of wildfire by using equipment to do fuels reduction in priority areas that have the highest risk.	Tri-State Generation and Transmission Association, Construction and Maintenance	> \$100,000	Tri-State Generation, state and federal agencies, grant support for private land projects	Energy	Medium	Long Term	Action ongoing toward completion.
CC-13	Goal: 1,2,3,4 Obj: 1.2, 2.2, 3.2, 4.1	Wildfire	Wildfire Risk Assessment and Mapping Program. A CSFS Forester with wildland fire experience will evaluate WUI property; share results with homeowner; perform a site visit consultation; and create a digital, printable map showing the associated risk ratings.	Envision Forest Health and Colorado State Forest Service, Chaffee County	\$10,000 - \$100,000	Title 3 Secure Rural Schools Grant, BLM Grant for CWPP, DNR Resources Fuels Reduction Grant Program, CSFS Forest Restoration Grant Program	N/A	Medium	Ongoing	Action ongoing toward completion.
CC-14	Goal: 1,3,5	Landslides, Mud/ Debris flows, Rockfalls; Flood;	Implement a Flood Warning System for the Decker Burn Scar. Placement and installation of rain gauge(s) and/or weather station(s) to monitor real time conditions and provide timely situational awareness information to provide warning to residents in area and those below the drainages.	OEM, Road & Bridge, South Arkansas Fire District, Fremont County OEM	\$10,000 - \$100,000	County Budget, HMA Grant(s)	Safety & Security; Comms; Transportation; Food, Water, Shelter;	High	Short Term	New in 2021.
CC-15	Goal: 1,2,3,4,5	Avalanche; Flood; Wildfire; Hazardous Materials Incident; Dam Failure or Incident;	Develop a Multi-hazard County-Wide Evacuation Plan. The research and development of an evacuation plan including notifications, routes, defensible spaces, and emergency evacuation helispots for all areas of the county.	OEM, Road & Bridge, Planning, Assessor, Sheriff, Town of Buena Vista, Town of Poncha Springs, City of Salida, Chaffee County Fire, South Arkansas Fire	< \$10,000	County / Jurisdictions Budgets	Safety & Security; Hazardous Material; Transportation; Communications; Food, Water, Shelter;	High	Short-Term	New in 2021.

ID	Related Goal(s)*	Hazard(s) Mitigated	Action Title and Description	Lead Agency and Partners	Cost Estimate	Potential Funding	FEMA Lifeline	Priority	Timeline*	Status/ Implementation Notes
				District, CDPS, CDOT			Health & Medical;			
CC-16	Goal: 1,2,3,4,5	Avalanche; Dam Failure or Incident; Flood; Wildfire; Hazardous Materials Incident;	County-Wide Evacuation Zones Development. The research and development of an evacuation zone plan for all areas of the county with inclusion into the County's EOP Evacuation Plan, Shelter Plan, Re-Entry Plan, and Alert & Warning Plan.	OEM, County Depts. City of Salida, Town of Buena Vista, Town of Poncha Springs, Chaffee County Fire District, South Arkansas Fire District, Chaffee County Forest Health Council, County Planning Commission	\$10,000 - \$100,000	County / Jurisdictional Budgets, HMA Grant(s)	Safety & Security; Food, Water, Shelter; Health & Medical; Communications; Transportation; Hazardous Material;	High	Short-Term	New in 2021.
CC-17	Goal: 1,2,3,4,5	Wildfire	Increase Wildfire Risk Awareness. Develop and present education and outreach programs to target citizens, businesses, developers, landscapers, and insurers among others to increase awareness of wildfire risk and strategies for protecting homes and infrastructure.	Chaffee County Fire District, CSFS	\$10,000 - \$100,000	County / Jurisdictional / Dept. Budgets, HMA Grant(s)	Safety & Security; Food, Water, Shelter; Energy; Communications; Transportation;	High	Ongoing	New in 2021.
CC-18	Goals: 1,2,3,4,5	Avalanche; Dam Failure or Incident; Drought; Earthquake; Erosion and Deposition; Expansive Soils; Extreme Heat; Flood; Hail; Landslides, Mud/Debris flows, Rockfalls;	Increase Hazard Education and Risk Awareness. Develop and implement multi-hazard public awareness programs using multiple methods and media platforms.	OEM, County Depts, City of Salida, Town of Buena Vista, Town of Poncha Springs, Envision Chaffee County Forest Health Council, Chaffee County Fire District, South Arkansas Fire District, Colorado DFPC, Colorado DHSEM	< \$10,000	Chaffee County / Jurisdictional / Department Budgets, HMA Grant(s)	Safety & Security; Food, Water, Shelter; Health & Medical; Energy; Communications; Transportation; Hazardous Material;	High	Ongoing	New in 2021.

ID	Related Goal(s)*	Hazard(s) Mitigated	Action Title and Description	Lead Agency and Partners	Cost Estimate	Potential Funding	FEMA Lifeline	Priority	Timeline*	Status/ Implementation Notes
		Lightning; Severe Wind; Subsidence; Tornado; Wildfire; Winter Storm; Pandemic/Epidemic; Cyber Attack; Hazardous Materials Incident;								
CC-19	Goals: 1,2,3,4,5	Avalanche; Erosion and Deposition; Flood; Hail; Landslides; Mud/Debris Flows; Rockfalls; Lightning; Severe Wind; Tornado; Winter Storm	StormReady Certification. Become StormReady certified communities (County, City of Salida, Town of Buena Vista, Town of Poncha Springs)	OEM, City of Salida, Town of Buena Vista, Town of Poncha Springs, NWS	Little to no cost	Departmental Budget	Safety and Security; Food, Water, Shelter, Communications	High	Short Term	New in 2021.
CC-20	Goals: 1,2,4,5	Avalanche; Erosion and Deposition; Flood; Hail; Landslides; Mud/Debris Flows; Rockfalls; Lightning; Severe Wind; Tornado; Winter Storm	Procure and install a generator for the fairgrounds which functions as a shelter for both humans and animals	OEM, Poncha Springs	\$10,000 for installation - \$30,000 for purchase	Homeland Security grant and County general funds	Safety and Security; Food, Water, Shelter,	High	Short Term	New in 2021.
CC-21	Goals: 1,3,4,5	Lightning	Implement lightning protection measures for the County Fairgrounds building to reduce direct damages and maintain continuity of essential services	OEM	\$10,000 - \$100,000	Homeland Security grant and County general funds	Safety and Security; Food, Water, Shelter,	High	Short Term	New in 2021.



ID	Related Goal(s)*	Hazard(s) Mitigated	Action Title and Description	Lead Agency and Partners	Cost Estimate	Potential Funding	FEMA Lifeline	Priority	Timeline*	Status/ Implementation Notes
CC-22	Goals: 1,2,3,4,5	Avalanche, Flood, Drought, Landslides; Mud/Debris Flows; Rockfalls; Wildfire	Update the Land Use Code to reference the updated Hazard Mitigation Plan and include hazard mitigation when reviewing land slated for development	Planning	> \$100,000	County general funds, Envision Chaffee County	Safety and Security; Food, Water, Shelter, Communications	Medium	Short Term	New in 2021.
CC-23	Goals: 1, 3, 4	Flood, Mud/Debris Flow	Support the USFS and CDOT efforts to mitigate debris flows on public lands in the Poncha Pass area to reduce impacts on the watershed and Highway 285 as well as downstream.	USFS, CDOT, Road and Bridge	> \$100,000	USFS	Food, Water, Shelter, Transportation	High	Short Term	New in 2021; Hwy 285 was impacted by debris flows 3 times in 2021
<b>City of Salida</b>										
S-1	Goal: 1,4 Obj: 1.2, 4.1	Wildfire	Wildfire Risk Reduction Public Education. Increase wildfire risk awareness by providing education and outreach programs. Educate the public on the importance of "defensible space" around the home.	Fire Dept, CSFS	< \$10,000	State Forest Service	N/A	Medium	Short Term	Action ongoing toward completion. Ongoing through social media, web pages and local publications.
S-2	Goal: 1,2,5 Obj: 1.2, 2.2, 5.3	Wildfire	Encourage HOA's to Join Firewise Communities/USA. There are many benefits of becoming a Firewise community such as: getting organized for wildfire safety efforts, connecting with experts, peace of mind, community building, access to financial assistance, etc.	Fire Dept, CSFS, Envision Chaffee County	< \$10,000	State Forest Service	N/A	Medium	Short Term	Continue not completed. Support from Envision Chaffee County.
S-3	Goal: 2,3 Obj: 2.2, 3.2	Dam Failure or Incident; Earthquake; Extreme Heat; Flood; Hail; Lightning;	Educate Public About Natural Hazards. Inform the public about natural hazards. Provide information about specific weather hazards and how to be prepared. Educate the citizens about the importance of carbon monoxide detectors in	Fire Department and Police Department	< \$10,000	General funds, local business partnerships	N/A	Medium	Ongoing	Action ongoing toward completion.

ID	Related Goal(s)*	Hazard(s) Mitigated	Action Title and Description	Lead Agency and Partners	Cost Estimate	Potential Funding	FEMA Lifeline	Priority	Timeline*	Status/ Implementation Notes
		Severe Wind; Tornado; Wildfire; Winter Storm	the home and proper installation of fuel burning equipment in particular.							
S-4	Goal: 2,3,4 Obj: 2.1, 2.2, 4.1	Dam Failure or Incident; Earthquake; Extreme Heat; Flood; Hail; Lightning; Severe Wind; Tornado; Wildfire; Winter Storm	Identifying Access and Functional Needs Population. Identify the functional and access needs population that may need assistance during weather events with items such as medication, oxygen, hydration, etc.	Fire Dept and Police Dept	< \$10,000	General funds, local business partnerships	N/A	High	Ongoing	Action ongoing toward completion. Ongoing as the populations and demographics are continually changing.
S-5	Goal: 1,2 Obj: 1.3, 2.2	Dam Failure or Incident; Flood	Securing propane tanks. Educate the public about securing debris, items around the home, and propane tanks that could be a hazard if picked up and washed away.	Public Works and Planning	< \$10,000	General funds	Hazardous Materials	Low	Ongoing	Action ongoing toward completion. Ongoing through social media, web pages and local publications
S-6	Goal: 1,3,4,5 Obj: 1.3, 3.2, 4.1, 4.3, 5.1	Dam Failure or Incident; Flood	Flood Response Plan. Identify flood prone areas and have a plan in place to respond to high water. Acquire a large cache of sandbags and have them strategically stored in critical areas in the county.	Public Works and Planning	< \$10,000	General funds	N/A	High	Short Term	Action ongoing toward completion. Sandbag cache was acquired. Flood prone areas were identified and will be ongoing with new subdivisions

ID	Related Goal(s)*	Hazard(s) Mitigated	Action Title and Description	Lead Agency and Partners	Cost Estimate	Potential Funding	FEMA Lifeline	Priority	Timeline*	Status/ Implementation Notes
										and commercial development.
S-7	Goal: 2,3 Objective: 2.2, 3.2	Dam/Levee Failure; Drought; Erosion and Deposition; Extreme Heat; Flood; Hail; Lightning; Severe Wind; Subsidence; Tornado; Wildfire; Winter Storm	Inform the public about natural hazards. Provide information about specific weather hazards and how to be prepared. Educate the citizens about the importance of carbon monoxide detectors in the home and proper installation of fuel burning equipment in particular.	Fire Department and Police Department	<\$10,000	Staff time	NA	Low	Annual implementation	Action ongoing toward completion.
S-8	Goals: 1,2,3,4,5	Dam Failure or Incident; Flood	Salida Low Head Dams Retrofitting or Replacement. Retrofit or replace existing diversion structure, boat chute and fish ladder to minimize public safety risks.	Public Works/Colorado Parks & Wildlife, OEM, Salida Fire Dept., CWCB, DNR-SEO	\$100,000-\$1,000,000	Grants, State Funding	Safety & Security; Food, Water, Shelter, Health & Medical	Medium	Short Term	New in 2021.
S-9	Goals: 1, 3	Flood, Drought, Wildfire, Hazardous Materials	Implement the Best Management Practices related to wildland fires, flooding and stormwater runoff identified in the 2018 City of Salida Source Water Protection Plan	Public Works, Water Department, Colorado Rural Water Association	\$10,000 - \$100,000	General funds	Food, Water, Shelter, Transportation	Medium	Short Term	New in 2021
S-10	Goals: 1, 3, 4	Flood, Mud/Debris Flow	Support the USFS efforts to mitigate debris flows on public lands in the Poncha Pass area to reduce impacts on the City's watershed and City water Treatment Plant; See action CC-23	USFS, Public Works and Planning	>\$100,000	USFS	Food, Water, Shelter, Transportation	High	Short Term	New in 2021
S-11	Goals: 1, 3	Flood	Implement a planned stormwater improvement project to reduce street flooding	Public Works	\$100,000-\$1,000,000	General funds	Food, Water, Shelter, Transportation	Medium	Long term	New in 2021

ID	Related Goal(s)*	Hazard(s) Mitigated	Action Title and Description	Lead Agency and Partners	Cost Estimate	Potential Funding	FEMA Lifeline	Priority	Timeline*	Status/ Implementation Notes
Town of Buena Vista										
BV-1	Goal: 2,3 Obj: 2.2, 3.1	Dam Failure or Incident; Drought	Back-up Water Supply. Create MOUs for other town wells to be used as backup water supply. Cottonwood Lake contains the only dam/levee system. It is a low risk dam. If it were breached the biggest threat would be to the town's source water.	Public Works	> \$100,000	General funds	Food, Water, Shelter	High	Long Term	Action ongoing toward completion. Purchased Arkansas water right. Town will continue looking for additional water rights and storage. Backup well installed. Town will continue to look at wells, water rights and storage to diversify the supply. This is a top priority.
BV-2	Goal: 2,4 Obj: 2.2, 4.3	Drought	Develop Residential and Commercial Watering Restrictions. Designate drought stage conditions and associated watering restrictions for public and private properties within town limits.	Public Works	< \$10,000	General funds	Food, Water, Shelter	Medium	Short Term	Continue not completed. Public education through local media and social media about best practices. Looking at

ID	Related Goal(s)*	Hazard(s) Mitigated	Action Title and Description	Lead Agency and Partners	Cost Estimate	Potential Funding	FEMA Lifeline	Priority	Timeline*	Status/ Implementation Notes
										including some water conservation detail in the 2021 Water Master Plan update. No progress at this time.
BV-3	Goal: 1,2,3,4 Obj: 1.2, 2.2, 3.2, 4.3	Wildfire	Encourage Wildfire Fuel Reductions. Encouraging wildfire fuel reductions with posting information on town website, newspaper, the town posting boards, and insert with water bills.	Chaffee County Fire; Police Department, Public Works	\$10,000 - \$100,000	General funds; FEMA	Food, Water, Shelter	Medium	Ongoing	Action ongoing toward completion. Looking to expand program to help with mitigation for in-town situations, especially on private property. Support through Chaffee County Common Ground to prioritize Cottonwood Creek and Town's Source Water Protection area.
BV-4	Goal: 3 Obj: 3.1, 3.2	Wildfire	Wildfire Evacuation Plan. Create an evacuation plan that can use implemented in areas where threat is occurring.	Chaffee County Fire; Police	< \$10,000	General funds	N/A	Medium	Long Term	Continue not completed. Intend to



ID	Related Goal(s)*	Hazard(s) Mitigated	Action Title and Description	Lead Agency and Partners	Cost Estimate	Potential Funding	FEMA Lifeline	Priority	Timeline*	Status/Implementation Notes
				Department, Public Works						discuss with School and County OEM. Support through Chaffee County. We should refresh our plans between Town, School and County to inventory our resources, capacities and response.
BV-5	Goal: 2 Obj: 2.2	Avalanche; Landslide, Mud/Debris Flow, and Rockfall; Lightning; Severe Wind	Danger Warning Signage. Place hazard warning signs in public places and give information as to where to find the latest weather information.	Public Works	< \$10,000	General funds	Food, Water, Shelter	Medium	Short Term	Action ongoing toward completion. Public Works is working on adding 3 new signs around source water protection area. Signage installed around source water areas and around

ID	Related Goal(s)*	Hazard(s) Mitigated	Action Title and Description	Lead Agency and Partners	Cost Estimate	Potential Funding	FEMA Lifeline	Priority	Timeline*	Status/ Implementation Notes
										McPhelemy pond.
BV-6	Goal: 2 Obj: 2.3	Avalanche; Dam Failure or Incident; Drought; Earthquake; Extreme Heat; Flood; Hail; Landslide, Mud/ Debris Flow, and Rockfall; Lightning; Severe Wind; Tornado; Wildfire; Winter Storm	Public Education of Natural Hazards. Educate homeowners with information on how to mitigate homes from natural hazards by posting information on town website, editorials in newspaper, use town posting boards, Facebook, and insert in water bills.	Fire Dept	\$10,000	General funds, FEMA HMA	Food, Water, Shelter	Medium	Ongoing	Continue not completed. Support through Chaffee County and Chaffee County Fire.
BV-7	Goals: 4,5	Cyber Attack; Hazardous Materials Incident;	Security for municipal water infiltration treatment plant. As Town expands the water infiltration gallery and rehabs the surface water treatment plan, we will add security fencing, signage and cameras.	Public Works	\$100,000 - \$1,000,000	Capital Improvement Program (CIP), CDPHE SRF Loan, Grants	Food, Water, Shelter; Safety and Security; Hazardous Materials	High	Short Term	New in 2021.
BV-8*	Goals 1, 5	Flood	Stormwater Management Standards for New Development. Address code updates to provide stormwater specifications and standards to ensure positive drainage and minimize runoff.	Public Works	\$100,000 - \$1,000,000	CIP, grants	Safety & Security	High	Ongoing	New in 2021.
BV-9	Goals: 1, 5	Flood	Stormwater Hazard Mitigation. This project will mitigate flooding based on 2014 Stormwater and Drainage Master Plan Implementation.	Public Works	\$100,000 - \$1,000,000	CIP, grants	Safety & Security	High	Ongoing	New in 2021.
BV-10	Goal: 5	Hazardous Materials Incident	Highway 24 Intersection Improvements to mitigate hazardous materials spills. Work with CDOT to prioritize and fund improvements at Baylor/DePaul and HWY 24 to address safety issues and improve pedestrian transportation.	Public Works, CDOT	>\$1,000,000	CIP, CDOT grants	Hazardous Materials; Safety & Security; Transportation;	High	Long Term	New in 2021.
BV-11	Goals: 1,3,5	Flood; Erosion and Deposition;	Replace older bridges/culverts in Town over Cottonwood Creek at James St, N Pleasant Ave, Cottonwood Ave, West Main (at McPhelemy) to	Town	\$100,000 - \$1,000,000	CIP, EPA/DOLA grants	Transportation; Safety & Security	Medium	Long Term	New in 2021.

ID	Related Goal(s)*	Hazard(s) Mitigated	Action Title and Description	Lead Agency and Partners	Cost Estimate	Potential Funding	FEMA Lifeline	Priority	Timeline*	Status/ Implementation Notes
			reduce flood risk. Some of these bridges and culverts have been identified as older and undersized - specifically at James St and Cottonwood Ave.							
<b>Town of Poncha Springs</b>										
PS - 1	Goal: 2 Obj: 2.2	Erosion and Deposition; Flood; Landslide, Mud/ Debris Flow	Public Awareness Campaigns with Erosion, Flood, Landslide, Mud, Debris Flow, Rockfall. Public awareness campaigns and preparedness. Post warning signs in dangerous areas and write articles in The Mountain Mail newspaper in Salida.	Public Works and Town Admin., OEM	< \$10,000	FEMA HMA, In-Kind, Local Agency funding	N/A	High	Long Term	Continue- Not Completed.
PS-2	Goal: 2,3,4 Obj: 2.2, 3.1, 4.1	Severe Wind; Winter Storm	Encourage Living Fences. Encourage living snow fences made of rows of trees or other vegetation to limit blowing wind and snow drifting over roadways.	Town Admin.	< \$10,000	Private sector, Grants, In-kind, local agency funding, NRCS	Transportation	Low	Ongoing	Action ongoing toward completion. Encouraged during Land Use Applications including site plan review and approval
PS-3	Goal: 2 Obj: 2.2	Avalanche; Dam Failure or Incident; Drought; Earthquake; Erosion and Deposition; Expansive Soils; Extreme Heat; Flood; Hail; Landslide, Mud/Debris Flow, and Rockfall; Lightning; Severe Wind;	Educate Homeowners on Natural Hazards. Public awareness campaigns and preparedness for homeowners to mitigate their homes from natural hazards.	Public Works and Town Admin	< \$10,000	FEMA HMA, General Budget, USDA	Food, Water, Shelter	High	Long Term	Continue- Not Completed.

ID	Related Goal(s)*	Hazard(s) Mitigated	Action Title and Description	Lead Agency and Partners	Cost Estimate	Potential Funding	FEMA Lifeline	Priority	Timeline*	Status/ Implementation Notes
		Subsidence; Tornado; Wildfire; Winter Storm								
PS-4	Goal: 1,3,4 Obj: 1.3, 3.1, 4.1, 4.2	Dam Failure or Incident; Flood	Identify Future Flood Protection Measures. Identify and budget for future flood protection measures such as larger culverts, retention dams, water infrastructure.	Public Works and Town Admin	\$100,000 - \$1,000,000	USCOE, BRIC, USDA, General Budget	Food, Water, Shelter; transportation	Medium	Long Term	Action ongoing toward progress. Reduced loads by removal of beaver dams and associated ponds up Poncha Creek above Town.
PS-5	Goal: 1,2,3 Obj: 1.2, 2.2, 3.1	Wildfire	Reduction of Wildfire Fuels. Performing fuel management techniques such as pruning and clearing dead vegetation and overgrowth, selective logging, cutting high grass, and planting fire-resistant vegetation.	Public Works and Town Admin	\$100,000 - \$1,000,000	BRIC State Forestry Dept., USDA-EWPP	Food, Water, Shelter	High	Short Term/ Ongoing	Action ongoing toward progress. South park, willow park, contribution to Methodist project.
PS-6	Goal: 2,3 Obj: 2.3, 3.3	Winter Storm	Winter Storm Preparedness. Modern snowplowing equipment procurement, maintenance, and continual staff training. Keeping main roads accessible during winter storms is critical for EMS and firefighters to respond in a timely manner.	Public Works and Town Admin	\$100,000 - \$1,000,000	General Budget	Transportation; Safety and Security	Low	Short Term/ Ongoing	Action ongoing toward progress. Purchased a new snowplow.
PS-7	Goals: 4,5	Hazardous Materials Incidents	Hazardous Material Preparedness. Create a multi-jurisdictional call down list, update regularly, and ensure all agencies know where to find the list and have readily available.	Poncha Springs Admin, OEM	<\$10,000	In-Kind, General Budget Line Items	Hazardous Materials	Medium	Short Term/ Ongoing	New in 2021.

ID	Related Goal(s)*	Hazard(s) Mitigated	Action Title and Description	Lead Agency and Partners	Cost Estimate	Potential Funding	FEMA Lifeline	Priority	Timeline*	Status/Implementation Notes
PS-8	Goals: 1,3,4,5	Dam Failure or Incident; Flood	Establish a 50-ft Building Setback Standard. Establish a 50-foot building setback from the edge of the South Arkansas River.	Planning and Zoning	<\$10,000	Dept. Budget	Safety & Security; Food, Water, Shelter, Health & Medical	Medium	Short Term/Ongoing	New in 2021.
PS-9	Goal: 1,2,3	Wildfire	Develop a CWPP for the Town to identify specific risks and wildfire mitigation projects to reduce future losses	Poncha Springs Admin, OEM, Envision Forest Health Council	\$10,000 - \$100,000	Dept. Budget, BRIC State Forestry Dept.,	Food, Water, Shelter	Medium	Short Term	New in 2021
PS-10	Goals: 1,2,4,5	Avalanche; Erosion and Deposition; Flood; Hail; Landslides; Mud/Debris Flows; Rockfalls; Lightning; Severe Wind; Tornado; Winter Storm	Support County action CC-20: Procure and install a generator for the fairgrounds which functions as a shelter for both humans and animals; The fairgrounds are located in Poncha Springs and would boost sheltering capabilities for the Town in the event of long term power outages from various hazards.	County OEM, Poncha Springs	\$10,000 - \$100,000	Homeland Security grant	Safety and Security; Food, Water, Shelter,	High	Short Term	New in 2021.
PS-11	Goals: 1, 3, 4	Flood, Mud/Debris Flow	Support the USFS efforts to mitigate debris flows on public lands in the Poncha Pass area to reduce impacts on the Town's watershed and reduce flood risk; See action CC-23	USFS, Public Works and Planning	>\$100,000	USFS	Food, Water, Shelter, Transportation	High	Short Term	New in 2021

\* Goal 1: Reduce the risk to the people, property, and environment from impacts of hazards identified in the risk assessment process.

- Goal 2: Improve public awareness and preparedness regarding hazard vulnerability and mitigation.
- Goal 3: Minimize economic losses due to disasters caused by hazards while increasing economic resiliency.

• Goal 4: Improve community resilience to hazards

• Goal 5: Strengthen intergovernmental coordination, communication, and capabilities regarding mitigation of hazard impacts.

\*\*Timeline: Short Term – To be completed in 1 to 5 years, Long Term – To be completed in greater than 5 years, Ongoing – Currently being funded and implemented under existing programs

## 6 Plan Adoption and Maintenance

### 6.1 Plan Adoption

#### **DMA Requirements §201.6(c)(3):**

*[The local hazard mitigation plan shall include] documentation that the plan has been formally approved by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, county commissioner, Tribal Council).*

The purpose of formally adopting this plan is to secure buy-in from Chaffee County and the participating jurisdictions, raise awareness of the plan, and formalize the plan's implementation. The adoption of this plan completes Planning Step 9 of the 10-step planning process: Adopt the Plan. The governing board for each participating jurisdiction has adopted this local hazard mitigation plan by passing a resolution. A copy of the generic resolution and the executed copies are included in Appendix F: Plan Adoptions and Approval.

### 6.2 Plan Implementation

#### **DMA Requirement §201.6(c)(4)(ii):**

*[The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.*

Once re-adopted, the plan faces the truest test of its worth: implementation. While this plan contains many worthwhile actions, the participating jurisdictions will need to decide which action(s) to undertake. Two factors will help with making that decision: the priority assigned the actions in the planning process and funding availability. Low or no-cost actions most easily demonstrate progress toward successful plan implementation.

Implementation will be accomplished by adhering to the schedules identified for each mitigation action in Table 5-3 in Chapter 5 Mitigation Strategy, and through pervasive efforts to network and highlight the multi-objective, win-win benefits of each project to the Chaffee County community and its stakeholders. These efforts include the routine actions of monitoring agendas, attending meetings, and promoting a safe, sustainable community.

Mitigation is most successful when it is incorporated into the day-to-day functions and priorities of government and development. Implementation will be accomplished by adhering to the schedules identified for each action and through constant, pervasive, and energetic efforts to network and highlight the multi-objective, win-win benefits to each program and the Chaffee County community and its stakeholders. This effort is achieved through the routine actions of monitoring agendas, attending meetings, and promoting a safe, sustainable community. Additional mitigation strategies could include consistent and ongoing enforcement of existing policies and vigilant review of programs for coordination and multi-objective opportunities.

Simultaneous to these efforts, it is important to maintain a constant monitoring of funding opportunities that can be leveraged to implement some of the more costly recommended actions. This will include creating and maintaining a bank of ideas on how to meet local match or participation requirements, should grants be pursued. When funding becomes available, the participating jurisdiction's will be in a position to capitalize on the opportunity. Funding opportunities to be monitored include special pre- and post-disaster funds, special district budgeted funds, state and federal earmarked funds, and other grant



programs, including those that can serve or support multi-objective applications. The Chaffee County Office of Emergency Management will have lead responsibility for overseeing the plan implementation and maintenance strategy. Plan implementation and evaluation will be a shared responsibility among all planning partnership members and agencies identified as lead agencies in the mitigation action plans.

### 6.2.1 Role of the Hazard Mitigation Committee in Implementation and Maintenance

With adoption of this plan the Hazard Mitigation Planning Committee comprised of Chaffee County, Town of Buena Vista, Town of Poncha Springs and City of Salida, will be tasked with plan implementation and maintenance. The HMPC membership as defined in Section 2.2 and Appendix C, led by the Chaffee County Emergency Manager, agree to:

- Act as a forum for hazard mitigation issues;
- Disseminate hazard mitigation ideas and activities to all participants;
- Pursue the implementation of high-priority, low/no-cost recommended actions;
- Keep the concept of mitigation in the forefront of community decision making by identifying plan recommendations when other community goals, plans, and activities overlap, influence, or directly affect increased community vulnerability to disasters;
- Maintain a monitoring of multi-objective cost-share opportunities to help the community implement the plan's recommended actions for which no current funding exists;
- Monitor and assist in implementation and update of this plan;
- Report on plan progress and recommended changes to the Board of County Commissioners, municipal councils, and other partners; and
- Inform and solicit input from the public.

Other duties include reviewing and promoting mitigation proposals, considering stakeholder concerns about hazard mitigation, passing concerns on to appropriate entities, and posting relevant information on the County, City and Towns' website and in the local newspaper.

## 6.3 Plan Maintenance/Monitoring Strategy

### DMA Requirement §201.6(c)(4)(i):

*[The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.*

Plan maintenance implies an ongoing effort to monitor and evaluate plan implementation and to update the plan as required or as progress, roadblocks, or changing circumstances are recognized. This chapter also describes how public participation will be integrated throughout the plan maintenance and implementation process. It also explains how the mitigation strategies outlined in this plan will be incorporated into existing planning mechanisms and programs, such as comprehensive land-use planning processes, capital improvement planning, and building code enforcement and implementation. The plan's format allows sections to be reviewed and updated when new data become available, resulting in a plan that will remain current and relevant.

### 6.3.1 Maintenance/Monitoring Schedule

In order to track progress and update the mitigation strategies identified in the action plan, the HMPC will revisit this plan at the following times or occurrences:

- Annually, to assess if mitigation actions/projects have been completed;
- Following a significant hazard event;
- Following a disaster declaration;
- Any other time the HMPC sees it is prudent or necessary.

County emergency management will facilitate these reviews with the HMPC.

This plan will be updated, approved, and adopted within a five-year cycle as per Requirement §201.6(c)(4)(i) of the Disaster Mitigation Act of 2000. Efforts to begin the update should begin no later than June 2025. The County will monitor planning grant opportunities from the Colorado Division of Homeland Security and Emergency Management (DHSEM) and FEMA for funds to assist with the update. This may include submitting a planning grant application under the FEMA BRIC or other grant programs. This grant should be submitted in 2024, as there is a three-year performance period to expend the funds, and there is no guarantee that the grant will be awarded when initially submitted. This allows time to resubmit the grant in subsequent years, if needed. Updates to this plan will follow the most current FEMA and DHSEM planning guidance. The next plan update should be completed and reapproved by DHSEM and FEMA Region VIII by September 2026. The HMPC members and those entities identified in Appendix C, will be reconvened for this process by Chaffee County Emergency Management.

Updates to this plan will:

- Consider changes in vulnerability due to project implementation,
- A comprehensive review of plan goals and objectives
- Document success stories where mitigation efforts have proven effective,
- Document areas where mitigation actions were not effective,
- Document any new hazards that may arise or were previously overlooked,
- Document hazard events and impacts that occurred within the five-year period,
- Incorporate new data or studies on hazards and risks,
- Incorporate new capabilities or changes in capabilities,
- Document continued public involvement
- Document changes to the planning process, which may include new or additional stakeholder involvement
- Incorporate growth and development-related changes to building inventories,
- Incorporate new project recommendations or changes in project prioritization,
- Include a public involvement process to receive public comment on the updated plan prior to submitting the updated plan to DHSEM/FEMA, and
- Include re-adoption by all participating entities following DHSEM/FEMA approval.

### **6.3.2 Hazard Mitigation Planning Committee**

The HMPC is a total volunteer body that oversaw the development of the plan and made recommendations on key elements of the plan, including the maintenance strategy. The HMPC will have an active role in the plan maintenance strategy. Therefore, it is recommended that the HMPC remain a viable body involved in key elements of the plan maintenance strategy. The HMPC should strive to include representation from the planning partners, as well as other stakeholders in the planning area.

The principal role of the HMPC in this plan maintenance strategy will be to review annually progress on mitigation actions and provide input to the Chaffee County Emergency Manager on possible enhancements to be considered at the next update. Future plan updates will be overseen by a HMPC similar to the one that participated in this plan development process, so keeping an interim HMPC intact will provide a head start on future updates.

### **6.3.3 Maintenance Evaluation Process – Annual Meeting and Progress Reporting**

The minimum task of each planning partner will be the evaluation of the progress of its individual action plan during a 12-month performance period. Completion of the annual progress report is the responsibility of each planning partner, not solely the responsibility of County Emergency Management.

The HMPC will review the annual progress reports in an effort to identify issues needing to be addressed by future plan updates. This review will include the following:

- Summary of any hazard events that occurred during the performance period and the impact these events had on the planning area
- Review of mitigation success stories
- Review of continuing public involvement
- Brief discussion about why targeted strategies were not completed
- Re-evaluation of the action plan to evaluate whether the timeline for identified projects needs to be amended (such as changing a long-term project to a short-term one because of new funding)
- Recommendations for new projects
- Changes in or potential for new funding options (grant opportunities)
- Impact of any other planning programs or initiatives that involve hazard mitigation

The annual meeting will be held in the 1<sup>st</sup> quarter of each year, prior to the spring runoff and wildfire season and align with the quarterly CWPP progress meetings where possible. This also would position the planning partners for any potential FEMA Hazard Mitigation Assistance grants with annual allocations, which are typically require notices of interest and applications due to CO DHSEM in the 4<sup>th</sup> quarter of each year. It is recommended to invite a CO DHSEM representative to the annual meeting to discuss current grant opportunities and provide guidance on implementation, changing legislation, incorporation into other planning mechanisms etc.

The planning team has created a template to guide the planning partners in preparing a progress report (see Appendix G). The HMPC will provide feedback to the planning team on items included in the template. The planning team will then prepare a formal annual report on the progress of the plan. This report should be used as follows:

- Posted on the Chaffee County OEM website page dedicated to the hazard mitigation plan
- Provided to the local media through a press release
- Presented to planning partner governing bodies to inform them of the progress of initiatives implemented during the reporting period

The 2016 maintenance evaluation process was not followed during the annual review but during the 2021 Plan Update the templates for mitigation action status created in 2016 were useful in gaining information on the status of 2016 actions.

#### **6.3.4 Continuing Public Involvement**

The public will continue to be apprised of the plan's progress through the Chaffee County OEM's website and by providing copies of annual progress reports to the media. The Chaffee County OEM will maintain the hazard mitigation plan website. This site will not only house the final plan, but it will also become the one-stop shop for information regarding the plan, the partnership and plan implementation. Upon initiation of future update processes, a new public involvement strategy will be initiated based on guidance and input from the HMPC. This strategy will be based on the needs and capabilities of the planning partnership at the time of the update. At a minimum, this strategy will include the use of local media outlets within the planning area.

#### **6.3.5 Incorporation into Other Planning Mechanisms**

The information on hazard, risk, vulnerability, and mitigation contained in this plan is based on the best science and technology available at the time this plan was prepared. The comprehensive plans, zoning and subdivision regulations, and ordinances of Chaffee County and the partner cities/towns are considered to be integral parts of this plan. The county and partner municipalities, through adoption of

comprehensive plans and zoning ordinances, have planned for the impact of natural hazards. The plan development process provided the county and the cities/towns with the opportunity to review and expand on policies contained within these planning mechanisms. The planning partners used their comprehensive plans and the hazard mitigation plan as complementary documents that work together to achieve the goal of reducing risk exposure to the citizens of the planning area. An update to a comprehensive plan may trigger an update to the hazard mitigation plan.

All municipal planning partners are committed to creating a linkage between the hazard mitigation plan and their individual comprehensive plans. Other planning processes and programs to be coordinated with the recommendations of the hazard mitigation plan include the following:

- Municipal codes
- Community design guidelines
- Water-efficient landscape design guidelines
- Stormwater management programs
- Water system vulnerability assessments
- Community wildfire protection plans

### **Process for Incorporation/Integration**

HMPC members involved in the updates to the planning mechanisms listed above will be responsible for integrating the findings and recommendations of this LHMP with these other plans, programs, and mechanisms as appropriate. As an action step to ensure integration with other planning mechanisms, the Lead Hazard Mitigation Manager will discuss this topic at the annual meeting (refer to Section 6.3.1, Maintenance Schedule) with the HMPC. The HMPC will discuss if there are opportunities to incorporate the plan into other planning mechanisms and who will be responsible for leveraging those opportunities. HMPC members representing local jurisdictions will work with their jurisdictional planning teams to integrate their identified mitigation actions into their own local plans, programs, and mechanisms. Efforts to integrate the hazard mitigation plan into local plans, programs, and policies will be reported during the annual HMPC plan review meeting. Successful integration efforts will be recorded during the meeting.

Specific examples of incorporation of the HMP into existing planning mechanisms include:

- County: Update of Land Use Code (see County mitigation action CC-22); update of Emergency Operations Plan; update of Capital Improvement Plan; update of Comprehensive Plan
- County: Cooperative/collaborative progress reporting during CWPP progress meetings and annual HMP meetings.
- Buena Vista: Stormwater Management Standards for New Development (see mitigation action BV-8). Integration with updated water and street standards manual.
- Poncha Springs: Incorporation of risk information and relevant mitigation projects in the next update of the Town Comprehensive Plan
- Salida: Cross reference and integrate relevant mitigation projects in the next update of the Capital Improvement Plan and Source Water Protection Plan
- Should the county planning area be affected by a disaster, integrate mitigation into the Chaffee County Recovery Annex and any other post-disaster recovery planning and process as applicable.

Some action items do not need to be implemented through regulation. Instead, these items can be implemented through the creation of new educational programs, continued interagency coordination, or improved public participation. As information becomes available from other planning mechanisms the HMPC will be responsible for integrating the findings and recommendations of this plan with these other plans, as appropriate. The mitigation plan can be considered as a “hub on the wheel” with spokes radiating out to other related planning mechanisms that will build from the information and

recommendations contained herein. that can enhance this plan, that information will be incorporated via the update process.

---

## **APPENDIX A: ACRONYMS AND DEFINITIONS**



# Acronyms

§	Section
°F	Degrees Fahrenheit
°C	Degrees Celsius
%g	Percentage of gravity
ACS	American Community Survey
44 CFR	Title 44 of the Code of Federal Regulations
BLM	Bureau of Land Management
BOCC	Board of County Commissioners
BRIC	Building Resilient Infrastructure and Communities
CAIC	Colorado Avalanche Information Center
CCR	Code of Colorado Regulations
CCEMS	Chaffee County Emergency Medical Services
CDOT	Colorado Department of Transportation
Covid-19	Coronavirus Disease 2019
CO-WRAP	Colorado Wildfire Risk Assessment Program
CRS	Community Rating System
CSAS	Center for Snow and Avalanche Studies
CWA	Clean Water Act
CWCB	Colorado Water Conservation Board
CWPP	Community Wildfire Protection Plan
DEM	Digital Elevation Model
DFIRM	Digital Flood Insurance Rate Map
DHSEM	Department of Homeland Security and Emergency Management
DMA	Disaster Mitigation Act
EF	Enhanced Fujita
EMS	Emergency Medical Services
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FIRM	Flood Insurance Rate Map

FIS	Flood Insurance Study
FMA	Flood Mitigation Assistance
FoCAIC	Friends of the Colorado Avalanche Information Center
GIS	Geographic Information System
HAZMAT	Hazardous Materials
HAZUS-MH	Hazards, United States-Multi Hazard
HMA	Hazard Mitigation Assistance
HMPC	Hazard Mitigation Planning Committee
HMGP	Hazard Mitigation Grant Program
HIRA	Hazard Identification and Risk Assessment
HOA	Homeowners Association
LEOP	Local Emergency Operations Plan
ML	Local Magnitude Scale
MM	Modified Mercalli Scale
mph	Miles per Hour
MW	Moment Magnitude
NASA	National Aeronautics and Space Administration
NCEI	National Centers for Environmental Information
NEHRP	National Earthquake Hazards Reduction Program
NFIP	National Flood Insurance Program
NOAA	National Oceanic and Atmospheric Administration
NREL	National Renewable Energy Laboratory
NRP	Natural Resource Protection
NSSA	National Storm Shelter Association
NSP	Natural Systems Protection
NWS	National Weather Service
OTA	Congressional Office of Technology Assessment
PDM	Pre-Disaster Mitigation
PDI	Palmer Drought Index
PGA	Peak Ground Acceleration
PHDI	Palmer Hydrological Drought Index
SIP	Structure and Infrastructure Project
SFHA	Special Flood Hazard Area

SPI	Standardized Precipitation Index
UAACOG	Upper Arkansas Area Council of Governments
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USGS	U.S. Geological Survey
WUI	Wildland Urban Interface

## Definitions

**100- Year Flood:** The term “100-year flood” can be misleading. The 100-year flood does not necessarily occur once every 100 years. Rather, it is the flood that has a 1% chance of being equaled or exceeded in any given year. Thus, the 100-year flood could occur more than once in a relatively short period of time. The Federal Emergency Management Agency (FEMA) defines it as the 1% annual chance flood, which is now the standard definition used by most federal and state agencies and by the National Flood Insurance Program (NFIP).

**Acre-Foot:** An acre-foot is the amount of water it takes to cover 1 acre to a depth of 1 foot. This measure is used to describe the quantity of storage in a water reservoir. An acre-foot is a unit of volume. One-acre foot equals 7,758 barrels; 325,829 gallons; or 43,560 cubic feet. An average household of four will use approximately 1 acre-foot of water per year.

**Asset:** An asset is any man-made or natural feature that has value, including, but not limited to, people; buildings; infrastructure, such as bridges, roads, sewers, and water systems; lifelines, such as electricity and communication resources; and environmental, cultural, or recreational features such as parks, wetlands, and landmarks.

**Base Flood:** The flood having a 1% chance of being equaled or exceeded in any given year, also known as the “100-year” or “1% chance” flood. The base flood is a statistical concept used to ensure that all properties subject to the NFIP are protected to the same degree against flooding.

**Basin:** A basin is the area within which all surface water—whether from rainfall, snowmelt, springs, or other sources—flows to a single water body or watercourse. The boundary of a river basin is defined by natural topography, such as hills, mountains, and ridges. Basins are also referred to as “watersheds” and “drainage basins.”

**Benefit:** A benefit is a net project outcome and is usually defined in monetary terms. Benefits may include direct and indirect effects. For the purposes of benefit/cost analysis of proposed mitigation measures, benefits are limited to specific, measurable risk reduction factors, including reduction in expected property losses (buildings, contents, and functions) and protection of human life.

**Benefit/Cost Analysis:** A benefit/cost analysis is a systematic, quantitative method of comparing projected benefits to projected costs of a project or policy. It is used as a measure of cost effectiveness.

**Building:** A building is defined as a structure that is walled and roofed, principally aboveground, and permanently fixed to a site. The term includes manufactured homes on permanent foundations on which the wheels and axles carry no weight.

**Capability Assessment:** A capability assessment provides a description and analysis of a community’s current capacity to address threats associated with hazards. The assessment includes two components: an

inventory of an agency's mission, programs, and policies, and an analysis of its capacity to carry them out. A capability assessment is an integral part of the planning process in which a community's actions to reduce losses are identified, reviewed, and analyzed, and the framework for implementation is identified. The following capabilities were reviewed under this assessment:

- Legal and regulatory capability
- Administrative and technical capability
- Fiscal capability

**Community Rating System (CRS):** The CRS is a voluntary program under the NFIP that rewards participating communities (provides incentives) for exceeding the minimum requirements of the NFIP and completing activities that reduce flood hazard risk by providing flood insurance premium discounts.

**Critical Area:** An area defined by state or local regulations as deserving special protection because of unique natural features or its value as habitat for a wide range of species of flora and fauna. A sensitive/critical area is usually subject to more restrictive development regulations.

**Critical Facility:** Facilities and infrastructure that are critical to the health and welfare of the population. These become especially important after any hazard event occurs. For the purposes of this plan, critical facilities include:

- Structures or facilities that produce, use, or store highly volatile, flammable, explosive, toxic or water reactive materials.
- Hospitals, nursing homes, and housing likely to contain occupants who may not be sufficiently mobile to avoid death or injury during a hazard event.
- Police stations, fire stations, vehicle and equipment storage facilities, and emergency operations centers that are needed for disaster response before, during, and after hazard events.
- Public and private utilities, facilities and infrastructure that are vital to maintaining or restoring normal services to areas damaged by hazard events.
- Government facilities.

**Dam:** Any artificial barrier or controlling mechanism that can or does impound 10 acre-feet or more of water.

**Dam Failure:** Dam failure refers to a partial or complete breach in a dam (or levee) that impacts its integrity. Dam failures occur for a number of reasons, such as flash flooding, inadequate spillway size, mechanical failure of valves or other equipment, freezing and thawing cycles, earthquakes, and intentional destruction.

**Debris Flow:** Dense mixtures of water-saturated debris that move down-valley; looking and behaving much like flowing concrete. They form when loose masses of unconsolidated material are saturated, become unstable, and move down slope. The source of water varies but includes rainfall, melting snow or ice, and glacial outburst floods.

**Debris Slide:** Debris slides consist of unconsolidated rock or soil that has moved rapidly down slope. They occur on slopes greater than 65%.

**Disaster Mitigation Act of 2000 (DMA):** The DMA is Public Law 106-390 and is the latest federal legislation enacted to encourage and promote proactive, pre-disaster planning as a condition of receiving financial assistance under the Robert T. Stafford Act. The DMA emphasizes planning for disasters before they occur. Under the DMA, a pre-disaster hazard mitigation program and new requirements for the national post-disaster Hazard Mitigation Grant Program (HMGP) were established.

**Drainage Basin:** A basin is the area within which all surface water—whether from rainfall, snowmelt, springs or other sources—flows to a single water body or watercourse. The boundary of a river basin is defined by natural topography, such as hills, mountains and ridges. Drainage basins are also referred to as watersheds or basins.

**Drought:** Drought is a period of time without substantial rainfall or snowfall from one year to the next. Drought can also be defined as the cumulative impacts of several dry years or a deficiency of precipitation over an extended period of time, which in turn results in water shortages for some activity, group, or environmental function. A hydrological drought is caused by deficiencies in surface and subsurface water supplies. A socioeconomic drought impacts the health, well-being, and quality of life or starts to have an adverse impact on a region. Drought is a normal, recurrent feature of climate and occurs almost everywhere.

**Earthquake:** An earthquake is defined as a sudden slip on a fault, volcanic or magmatic activity, and sudden stress changes in the earth that result in ground shaking and radiated seismic energy. Earthquakes can last from a few seconds to over 5 minutes and have been known to occur as a series of tremors over a period of several days. The actual movement of the ground in an earthquake is seldom the direct cause of injury or death. Casualties may result from falling objects and debris as shocks shake, damage, or demolish buildings and other structures.

**Enhanced Fujita Scale (EF-Scale):** Became operational on February 1, 2007, is used to assign a tornado a 'rating' based on estimated wind speeds and related damage. When tornado-related damage is surveyed, it is compared to a list of Damage Indicators (DIs) and Degrees of Damage (DoD) which help estimate better the range of wind speeds the tornado likely produced. From that, a rating (from EF0 to EF5) is assigned. The EF Scale was revised from the original Fujita Scale to reflect better examinations of tornado damage surveys so as to align wind speeds more closely with associated storm damage. The new scale has to do with how most structures are designed.

**Exposure:** Exposure is defined as the number and dollar value of assets considered to be at risk during the occurrence of a specific hazard.

**Extent:** The extent is the size of an area affected by a hazard.

**Fire Behavior:** Fire behavior refers to the physical characteristics of a fire and is a function of the interaction between the fuel characteristics (such as type of vegetation and structures that could burn), topography, and weather. Variables that affect fire behavior include the rate of spread, intensity, fuel consumption, and fire type (such as underbrush versus crown fire).

**Fire Frequency:** Fire frequency is the broad measure of the rate of fire occurrence in a particular area. An estimate of the areas most likely to burn is based on past fire history or fire rotation in the area, fuel conditions, weather, ignition sources (such as human or lightning), fire suppression response, and other factors.

**Flash Flood:** A flash flood occurs with little or no warning when water levels rise at an extremely fast rate

**Flood Insurance Rate Map (FIRM):** FIRMs are the official maps on which the Federal Emergency Management Agency (FEMA) has delineated the Special Flood Hazard Area (SFHA).

**Flood Insurance Study:** A report published by the Federal Insurance and Mitigation Administration for a community in conjunction with the community's FIRM. The study contains such background data as the base flood discharges and water surface elevations that were used to prepare the FIRM. In most cases, a community FIRM with detailed mapping will have a corresponding flood insurance study.

**Floodplain:** Any land area susceptible to being inundated by flood waters from any source. A FIRM identifies most, but not necessarily all, of a community's floodplain as the SFHA.

**Floodway:** Floodways are areas within a floodplain that are reserved for the purpose of conveying flood discharge without increasing the base flood elevation more than 1 foot. Generally speaking, no development is allowed in floodways, as any structures located there would block the flow of floodwaters.

**Floodway Fringe:** Floodway fringe areas are located in the floodplain but outside of the floodway. Some development is generally allowed in these areas, with a variety of restrictions. On maps that have identified and delineated a floodway, this would be the area beyond the floodway boundary that can be subject to different regulations.

**Fog:** Fog refers to a cloud (or condensed water droplets) near the ground. Fog forms when air close to the ground can no longer hold all the moisture it contains. Fog occurs either when air is cooled to its dew point or the amount of moisture in the air increases. Heavy fog is particularly hazardous because it can restrict surface visibility. Severe fog incidents can close roads, cause vehicle accidents, cause airport delays, and impair the effectiveness of emergency response. Financial losses associated with transportation delays caused by fog have not been calculated in the United States but are known to be substantial.

**Freeboard:** Freeboard is the margin of safety added to the base flood elevation.

**Frequency:** For the purposes of this plan, frequency refers to how often a hazard of specific magnitude, duration, or extent is expected to occur on average. Statistically, a hazard with a 100-year frequency is expected to occur about once every 100 years on average and has a 1% chance of occurring any given year. Frequency reliability varies depending on the type of hazard considered.

**Fujita Scale of Tornado Intensity:** Tornado wind speeds are sometimes estimated on the basis of wind speed and damage sustained using the Fujita Scale. The scale rates the intensity or severity of tornado events using numeric values from F0 to F5 based on tornado wind speed and damage. An F0 tornado (wind speed less than 73 miles per hour [mph]) indicates minimal damage (such as broken tree limbs), and an F5 tornado (wind speeds of 261 to 318 mph) indicates severe damage. The scale was revised and updated in 2007 to the Enhanced Fujita Scale.

**Goal:** A goal is a general guideline that explains what is to be achieved. Goals are usually broad-based, long-term, policy-type statements and represent global visions. Goals help define the benefits that a plan is trying to achieve. The success of a hazard mitigation plan is measured by the degree to which its goals have been met (that is, by the actual benefits in terms of actual hazard mitigation).

**Geographic Information System (GIS):** GIS is a computer software application that relates data regarding physical and other features on the earth to a database for mapping and analysis.

**Hazard:** A hazard is a source of potential danger or adverse condition that could harm people or cause property damage.

**Hazard Mitigation Grant Program (HMGP):** Authorized under Section 202 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, the HMGP is administered by FEMA and provides grants to states, tribes, and local governments to implement hazard mitigation actions after a major disaster declaration. The purpose of the program is to reduce the loss of life and property due to disasters and to enable mitigation activities to be implemented as a community recovers from a disaster

**Hazards U.S. Multi-Hazard (HAZUS-MH) Loss Estimation Program:** HAZUS-MH is a GIS-based program used to support the development of risk assessments as required under the DMA. The HAZUS-MH software program assesses risk in a quantitative manner to estimate damages and losses associated



with natural hazards. HAZUS-MH is FEMA's nationally applicable, standardized methodology and software program and contains modules for estimating potential losses from earthquakes, floods, and wind hazards. HAZUS-MH has also been used to assess vulnerability (exposure) for other hazards.

**Hydraulics:** Hydraulics is the branch of science or engineering that addresses fluids (especially water) in motion in rivers or canals, works and machinery for conducting or raising water, the use of water as a prime mover, and other fluid-related areas.

**Hydrology:** Hydrology is the analysis of waters of the earth. For example, a flood discharge estimate is developed by conducting a hydrologic study.

**Intensity:** For the purposes of this plan, intensity refers to the measure of the effects of a hazard.

**Inventory:** The assets identified in a study region comprise an inventory. Inventories include assets that could be lost when a disaster occurs, and community resources are at risk. Assets include people, buildings, transportation, and other valued community resources.

**Landslide:** Landslides can be described as the sliding movement of masses of loosened rock and soil down a hillside or slope. Fundamentally, slope failures occur when the strength of the soils forming the slope exceeds the pressure, such as weight or saturation, acting upon them.

**Lightning:** Lightning is an electrical discharge resulting from the buildup of positive and negative charges within a thunderstorm. When the buildup becomes strong enough, lightning appears as a "bolt," usually within or between clouds and the ground. A bolt of lightning instantaneously reaches temperatures approaching 50,000°F. The rapid heating and cooling of air near lightning causes thunder. Lightning is a major threat during thunderstorms. In the United States, 75 to 100 Americans are struck and killed by lightning each year (see <http://www.fema.gov/hazard/thunderstorms/thunder.shtm>).

**Liquefaction:** Liquefaction is the complete failure of soils, occurring when soils lose shear strength and flow horizontally. It is most likely to occur in fine grain sands and silts, which behave like viscous fluids when liquefaction occurs. This situation is extremely hazardous to development on the soils that liquefy, and generally results in extreme property damage and threats to life and safety.

**Local Government:** Any county, municipality, city, town, township, public authority, school district, special district, intrastate district, council of governments (regardless of whether the council of governments is incorporated as a nonprofit corporation under State law), regional or interstate government entity, or agency or instrumentality of a local government; any Indian tribe or authorized tribal organization, or Alaska Native village or organization; and any rural community, unincorporated town or village, or other public entity.

**Magnitude:** Magnitude is the measure of the strength of an earthquake and is typically measured by the Richter scale. As an estimate of energy, each whole number step in the magnitude scale corresponds to the release of about 31 times more energy than the amount associated with the preceding whole number value.

**Mass movement:** A collective term for landslides, mudflows, debris flows, sinkholes, and lahars.

**Mitigation:** A preventive action that can be taken in advance of an event that will reduce or eliminate the risk to life or property.

**Mitigation Initiatives (or Mitigation Actions):** Mitigation initiatives are specific actions to achieve goals and objectives that minimize the effects from a disaster and reduce the loss of life and property.

**Objective:** For the purposes of this plan, an objective is defined as a short-term aim that, when combined with other objectives, forms a strategy or course of action to meet a goal.

**Peak Ground Acceleration:** Peak Ground Acceleration (PGA) is a measure of the highest amplitude of ground shaking that accompanies an earthquake, based on a percentage of the force of gravity.

**Preparedness:** Preparedness refers to actions that strengthen the capability of government, citizens, and communities to respond to disasters.

**Presidential Disaster Declaration:** These declarations are typically made for events that cause more damage than state and local governments and resources can handle without federal government assistance. Generally, no specific dollar loss threshold has been established for such declarations. A Presidential Disaster Declaration puts into motion long-term federal recovery programs, some of which are matched by state programs, designed to help disaster victims, businesses, and public entities.

**Probability of Occurrence:** The probability of occurrence is a statistical measure or estimate of the likelihood that a hazard will occur. This probability is generally based on past hazard events in the area and a forecast of events that could occur in the future. A probability factor based on yearly values of occurrence is used to estimate probability of occurrence.

**Repetitive Loss Property:** Any NFIP-insured property that, since 1978 and regardless of any changes of ownership during that period, has experienced:

- Four or more paid flood losses in excess of \$1000.00; or
- Two paid flood losses in excess of \$1000.00 within any 10-year period since 1978 or
- Three or more paid losses that equal or exceed the current value of the insured property.

**Return Period (or Mean Return Period):** This term refers to the average period of time in years between occurrences of a particular hazard (equal to the inverse of the annual frequency of occurrence).

**Riverine:** Of or produced by a river. Riverine floodplains have readily identifiable channels. Floodway maps can only be prepared for riverine floodplains.

**Risk:** Risk is the estimated impact that a hazard would have on people, services, facilities, and structures in a community. Risk measures the likelihood of a hazard occurring and resulting in an adverse condition that causes injury or damage. Risk is often expressed in relative terms such as a high, moderate, or low likelihood of sustaining damage above a particular threshold due to occurrence of a specific type of hazard. Risk also can be expressed in terms of potential monetary losses associated with the intensity of the hazard.

**Risk Assessment:** Risk assessment is the process of measuring potential loss of life, personal injury, economic injury, and property damage resulting from hazards. This process assesses the vulnerability of people, buildings, and infrastructure to hazards and focuses on (1) hazard identification; (2) impacts of hazards on physical, social, and economic assets; (3) vulnerability identification; and (4) estimates of the cost of damage or costs that could be avoided through mitigation.

**Risk Ranking:** This ranking serves two purposes, first to describe the probability that a hazard will occur, and second to describe the impact a hazard will have on people, property, and the economy. Risk estimates for the City are based on the methodology that the City used to prepare the risk assessment for this plan. The following equation shows the risk ranking calculation:

Risk Ranking = Probability + Impact (people + property + economy)

**Robert T. Stafford Act:** The Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 100-107, was signed into law on November 23, 1988. This law amended the Disaster Relief Act of 1974, Public Law 93-288. The Stafford Act is the statutory authority for most federal disaster response activities, especially as they pertain to FEMA and its programs.

**Sinkhole:** A collapse depression in the ground with no visible outlet. Its drainage is subterranean. It is commonly vertical-sided or funnel-shaped.

**Special Flood Hazard Area:** The base floodplain delineated on a FIRM. The SFHA is mapped as a Zone A in riverine situations. The SFHA may or may not encompass all of a community's flood problems

**Stakeholder:** Business leaders, civic groups, academia, non-profit organizations, major employers, managers of critical facilities, farmers, developers, special purpose districts, and others whose actions could impact hazard mitigation.

**Stream Bank Erosion:** Stream bank erosion is common along rivers, streams, and drains where banks have been eroded, sloughed, or undercut. However, it is important to remember that a stream is a dynamic and constantly changing system. It is natural for a stream to want to meander, so not all eroding banks are "bad" and in need of repair. Generally, stream bank erosion becomes a problem where development has limited the meandering nature of streams, where streams have been channelized, or where stream bank structures (like bridges, culverts, etc.) are located in places where they can actually cause damage to downstream areas. Stabilizing these areas can help protect watercourses from continued sedimentation, damage to adjacent land uses, control unwanted meander, and improvement of habitat for fish and wildlife.

**Steep Slope:** Different communities and agencies define it differently, depending on what it is being applied to, but generally a steep slope is a slope in which the percent slope equals or exceeds 25%. For this study, steep slope is defined as slopes greater than 33%.

**Sustainable Hazard Mitigation:** This concept includes the sound management of natural resources, local economic and social resiliency, and the recognition that hazards, and mitigation must be understood in the largest possible social and economic context.

**Thunderstorm:** A thunderstorm is a storm with lightning and thunder produced by cumulonimbus clouds. Thunderstorms usually produce gusty winds, heavy rains, and sometimes hail. Thunderstorms are usually short in duration (seldom more than 2 hours). Heavy rains associated with thunderstorms can lead to flash flooding during the wet or dry seasons.

**Tornado:** A tornado is a violently rotating column of air extending between and in contact with a cloud and the surface of the earth. Tornadoes are often (but not always) visible as funnel clouds. On a local scale, tornadoes are the most intense of all atmospheric circulations, and winds can reach destructive speeds of more than 300 mph. A tornado's vortex is typically a few hundred meters in diameter, and damage paths can be up to 1 mile wide and 50 miles long.

**Vulnerability:** Vulnerability describes how exposed or susceptible an asset is to damage. Vulnerability depends on an asset's construction, contents, and the economic value of its functions. Like indirect damages, the vulnerability of one element of the community is often related to the vulnerability of another. For example, many businesses depend on uninterrupted electrical power. Flooding of an electric substation would affect not only the substation itself but businesses as well. Often, indirect effects can be much more widespread and damaging than direct effects.

**Watershed:** A watershed is an area that drains downgradient from areas of higher land to areas of lower land to the lowest point, a common drainage basin.

**Wildfire:** Wildfire refers to any uncontrolled fire occurring on undeveloped land that requires fire suppression. The potential for wildfire is influenced by three factors: the presence of fuel, topography, and air mass. Fuel can include living and dead vegetation on the ground, along the surface as brush and small trees, and in the air such as tree canopies. Topography includes both slope and elevation. Air mass includes temperature, relative humidity, wind speed and direction, cloud cover, precipitation amount,

duration, and the stability of the atmosphere at the time of the fire. Wildfires can be ignited by lightning and, most frequently, by human activity including smoking, campfires, equipment use, and arson.

**Windstorm:** Windstorms are generally short-duration events involving straight-line winds or gusts exceeding 50 mph. These gusts can produce winds of sufficient strength to cause property damage. Windstorms are especially dangerous in areas with significant tree stands, exposed property, poorly constructed buildings, mobile homes (manufactured housing units), major infrastructure, and aboveground utility lines. A windstorm can topple trees and power lines; cause damage to residential, commercial, critical facilities; and leave tons of debris in its wake.

**Zoning Ordinance:** The zoning ordinance designates allowable land use and intensities for a local jurisdiction. Zoning ordinances consist of two components: a zoning text and a zoning map.

---

## **APPENDIX B: REFERENCES**

- Ahrens, Marty. Lighting Fires and Lighting Strikes. 2013. National Fire Prevention Association Fire Analysis and Research Division.
- American Community Survey Statistics for Chaffee County. 2015-2019. U.S. Census Bureau. 2021.
- Atkins, Dale. A History of Colorado Avalanche Accidents, 1859–2006. International Snow Science Workshop 2006 Proceedings. 2006.
- Buena Vista, Colorado Area History. June 5, 2013. <http://www.buenavistacolorado.org/buena-vista-colorado-area-history>
- Bureau of Land Management, Colorado State Office, Statewide Colorado Land Ownership, Land Status. Geosciences team. Published July 24, 2015
- Center for Climate and Energy Solutions. <http://www.c2es.org/science-impacts/basics/faqs/tornadoes>.
- Chaffee County Community Health Assessment & Health Improvement Plan (CHIP) 2017-2021. Chaffee County Public Health.
- Chaffee County Comprehensive Plan Chaffee County, Colorado. Chaffee County Commission. March 2000, <https://www.gigshowcase.com/enduserfiles/421.pdf>
- Colorado Dust-On-Snow Program. Center for Snow and Avalanche Studies (CSAS). 2019.
- Colorado Avalanche Information Center (CAIC). 2020.
- Colorado Department of Labor and Employment. <https://www.colorado.gov/cdle>
- Colorado Department of Environment and Public Health. Colorado Tracking Data, County Profiles. <https://coepht.colorado.gov/county-profiles>
- Colorado Division of Homeland Security and Emergency Management. 2018. State of Colorado Hazard Mitigation Plan.
- Colorado Geological Survey. 2001. Rock Talk Vol 4(4). <http://geosurvey.state.co.us/pubs/Documents/rtv4n4.pdf>.
- Colorado Geological Survey. 2015. Accessed October 2015. <http://coloradogeologicalsurvey.org/>.
- Colorado Water Conservation Board, Department of Natural Resources 2010. Flood Hazard Mitigation
- Colorado Department of Natural Resources. Division of Dam Safety. Colorado's Low Head Dams. 2021. <https://dnr.colorado.gov/initiatives/colorado-low-head-dams>
- Colorado Division of Water Resources, Office of the State Engineer. 2015. 27th Annual Report on Dam Safety. <http://water.state.co.us/DWRIPub/DWR%20Annual%20Reports/>.
- Colorado Division of Water Resources, 2015. <http://water.state.co.us/DIVISIONSOFFICES/DIV2ARKANSASRIVERBASIN/Pages/Div2ArkansasRB.aspx>
- Colorado State Demography Office. Department of Local Affairs. <https://demography.dola.colorado.gov/>
- Colorado Water Conservation Board. 2018. Colorado Drought Mitigation and Response Plan.
- Colorado Water Conservation Board (CWCB) Future Avoided Cost Explorer: Colorado Hazards tool.
- Colorado Wildfire Risk Assessment Portal (CO-WRAP). Colorado State Forest Service. 2020. <https://csfs.colostate.edu/wildfire-mitigation/cowrap/>



- Doerge, Benjamin C., Trent Street, John Chua, Rex Stambaugh, and James McHenry. 2011. Using Geotextiles to Repair Earth Dams. [http://geosyntheticsmagazine.com/articles/0411\\_f5\\_dam\\_repair.html](http://geosyntheticsmagazine.com/articles/0411_f5_dam_repair.html).
- Federal Reserve Bank of St. Louis. FRED Graph. Accessed 2016. <https://research.stlouisfed.org/fred2/graph/fredgraph.png?hires=1&g=3wO3>
- Federal Emergency Management Agency (FEMA). 2001. Understanding Your Risks; Identifying Hazards and Determining Your Risks. FEMA (386-2). August.
- FEMA. 2002. Getting Started; Building Support for Mitigation Planning. FEMA (386-1). September. FEMA. 2003. Developing the Mitigation Plan; Identifying Mitigation Actions and Implementing Strategies. FEMA (386-3). April.
- FEMA. 2004. Using HAZUS-MH for Risk Assessment, How to Guide. FEMA (433). August.
- FEMA. 2007. FEMA, National Flood Insurance Program, Community Rating System; CRS Coordinator's Manual FIA-15/2007 OMB No. 1660-0022.
- FEMA 2015. Website accessed 2015. <http://www.fema.gov>.
- Office of the Governor of the State of Colorado. Accessed 2015. Request for Presidential Major Disaster Declaration. <http://www.colorado.gov/cs/>.
- Homer, C.G., Dewitz, J.A., Yang, L., Jin, S., Danielson, P., Xian, G., Coulston, J., Herold, N.D., Wickham, J.D., and Megown, K. 2015. Completion of the 2011 National Land Cover Database for the conterminous United States: Representing a decade of land cover change information.
- Photogrammetric Engineering and Remote Sensing, v. 81, no. 5, p. 345-354
- International Strategy for Disaster Reduction. 2008. Disaster Risk Reduction Strategies and Risk Management Practices: Critical Elements for Adaptation to Climate Change. November 11.
- Johnson, Leland R. 2011. Situation Desperate: U.S. Army Engineer Disaster Relief Operations, Origins to 1950. EP 870-1-70. [http://www.publications.usace.army.mil/Portals/76/Publications/EngineerPamphlets/EP\\_870-1-70.pdf](http://www.publications.usace.army.mil/Portals/76/Publications/EngineerPamphlets/EP_870-1-70.pdf).
- McKee, Thomas B, Nolan J. Doesken, John Kleist, Catherine J. Shier and William P. Stanton. 2000. A History of Drought in Colorado: Lessons Learned and What Lies Ahead. No. 9 – Second Edition. Colorado State University.
- National Oceanic and Atmospheric Administration (NOAA). Accessed October 2015. NOAA, National Centers for Environmental Information website. <http://www.ncdc.noaa.gov/stormevents/>
- Congressional Office of Technology Assessment (OTA). 1993. Preparing for an Uncertain Climate, Vol. I. OTA-O-567. U.S. Government Printing Office, Washington, D.C.
- Salida.com. Best of Salida - Rocky Mountain Geology and 14er Information. 2008-2015. <http://salida.com/salida-best-of/best-of-salida-mountains.html>
- Soil and Water Conservation Society. 2003. Conservation Implications of Climate Change: Soil Erosion and Runoff from Cropland. Ankeny, IA: Soil and Water Conservation Society. [http://www.swcs.org/en/publications/conservation\\_implications\\_of\\_climate\\_change/](http://www.swcs.org/en/publications/conservation_implications_of_climate_change/).

- Upper Arkansas Area Risk Assessment and Hazard Mitigation Plan 2003. Fremont County Emergency Services Division. Accessed 2015.  
<http://www.dhsem.state.co.us/sites/default/files/Upper%20Arkansas%20Area%201.2004.pdf>
- U.S. Department of Agriculture Soil Conservation Service. Colorado Agricultural Experiment Station. 1975. Soil Survey of the Chaffee-Lake Area, Colorado. October.
- U.S. Census Bureau. 2010. Data from 2010 U.S. Census. <http://factfinder.census.gov/>
- U.S. Environmental Protection Agency (EPA). 2006. Excessive Heat Events Guidebook. EPA 430-B-06-005. [http://www.epa.gov/heatisd/about/pdf/EHEguide\\_final.pdf](http://www.epa.gov/heatisd/about/pdf/EHEguide_final.pdf).
- USDA 2017 Census of Agriculture. County Profile.  
[https://www.nass.usda.gov/Publications/AgCensus/2017/Online\\_Resources/County\\_Profiles/Colorado/cp08015.pdf](https://www.nass.usda.gov/Publications/AgCensus/2017/Online_Resources/County_Profiles/Colorado/cp08015.pdf)
- U.S. Forest Service (USFS) Pike and San Isabel National Forests Cimarron and Comanche National Grasslands. Salida Ranger District. Accessed 2016. [http://www.fs.usda.gov/detail/psicc/about-forest/districts/?cid=fsm9\\_032697](http://www.fs.usda.gov/detail/psicc/about-forest/districts/?cid=fsm9_032697)
- U.S. Geological Survey (USGS). 1989. The Severity of an Earthquake. U.S. Government Printing Office: 1989-288-913. [http://pubs.usgs.gov/gip/earthq4/severity\\_text.html](http://pubs.usgs.gov/gip/earthq4/severity_text.html).
- USGS. 2008. An Atlas of ShakeMaps for Selected Global Earthquakes. U.S. Geological Survey Open-File Report 2008-1236. Prepared by Allen, T.I., Wald, D.J., Hotovec, A.J., Lin, K., Earle, P.S. and Marano, K.D.
- Zimmer, Sarah. Colorado Low Head Dam Inventory Project 2019. October 2019.  
<https://dnr.colorado.gov/initiatives/colorado-low-head-dams>

---

## **APPENDIX C: PLANNING COMMITTEE MEMBERS**

# APPENDIX C: HMPC MEMBERS

Agency/ Jurisdiction	Title	Name	Meetings <sup>1</sup> Attended
<b>Chaffee County</b>			
Office of Emergency Management	Emergency Manager	Rich Atkins	Kick-off, Mtg 2, Mtg 3
Public Health	Director of Public Health	Andrea Carlstrom	Kick-off, Mtg 2, Mtg 3
Housing	Director of Housing	Becky Gray	Kick-off, Mtg 2
Planning	Planner	Christie Barton	Kick-off, Mtg 2
Planning	Manager	Jon Roorda	Kick-off, Mtg 2
Planning	Planning Commissioner	Marjo Curgus	Mtg 2, Mtg 3
Attorney's Office	Assistant County Attorney	Daniel Tom	Kick-off, Mtg 2
Attorney's Office	County Attorney	Jenny Davis	
EMS	Director of EMS	Josh Hadley	Kick-off, Mtg 3
Administration	County Administrator	Robert Christiansen	Kick-off, Mtg 2
Road and Bridge	Superintendent	Mark Stacey	Kick-off, Mtg 2
Public Health and Environment	Environmental Health Manager	Wano Urbonas	Mtg 2
Assessor's Office	Deputy Assessor / GIS	Dean Russell	Kick-off, Mtg 2
Assessor's Office	County Assessor	Brenda Mosby	Kick-off
Board of County Commissioners	County Commissioner	Keith Baker	Mtg 2
Board of County Commissioners	County Commissioner	Greg Felt	Mtg 2
Board of County Commissioners	County Commissioner	Rusty Granzella	
Public Affairs	Public Affairs Officer	Beth Helmke	Mtg 2, Mtg 3
Sheriff's Office	Undersheriff	Andy Rohrich	Mtg 2
Sheriff's Office	County Sheriff	John Spezze	Mtg 2
Finance	Director of Finance	Dan Short	Mtg 2
<b>Town of Buena Vista</b>			
Town Administration	Mayor	Duff Lacy	Kick-off, Mtg 2, Mtg 3
Buena Vista School District	Transportation Director	Tony Stromer	Kick-off, Mtg 2, Mtg 3
Buena Vista School District	School Superintendent	Lisa Yates	Kick-off
Town Administration	Town Administrator	Phillip Puckett	Kick-off, Mtg 2, Mtg 3
Fire Department	Interim Chief	Christopher Greene	Mtg 2, Mtg 3

<sup>1</sup> Those that are not listed as attending a meeting participated in the planning process in other ways such as emails, phone calls and face-to-face meetings with the County Project Manager and consultants.

# APPENDIX C: HMPC MEMBERS

Agency/ Jurisdiction	Title	Name	Meetings <sup>1</sup> Attended
<b>City of Salida</b>			
Fire Department/South Ark Fire	Assistant Fire Chief	Kathy Rohrich	Kick-off, Mtg 2, Mtg 3
Fire Department/ South Ark Fire	Chief	Doug Bess	Mtg 2, Mtg 3
Salida Schools – R-32-J	Facilities & Safety Director	Brendon Hawkins	Kick-off
City Administration	City Mayor	PT Wood	Kick-off
City Administration	City Administrator	Drew Nelson	Kick-off, Mtg 2
Police Department	Police Chief	Russ Johnson	Kick-off, Mtg 2
Police Department	Police Lieutenant	Spencer Blades	Kick-off
<b>Town of Poncha Springs</b>			
Town Administration	Town Manager	Brian Berger	Kick-off
Town Administration	Town Mayor	Ben Scanga	
Chaffee Co. Fire Department & CO Fire Camp	Battalion Chief / Camp Manager	Kent Maxwell	Kick-off, Mtg 3
<b>Partners/Stakeholders</b>			
American Red Cross	External Relations Lead	Jimmy Jenkins	Kick-off
American Red Cross	Senior Disaster Program Manager	Sally Broomfield	Mtg 3
Ark Valley Humane Society	Executive Director	Amber Van Luken	Kick-off
Colorado Dept. of Transportation (CDOT)	Maintenance Superintendent	Kenneth J. Quintana	Kick-off
Colorado Dept. of Transportation (CDOT)	Deputy Maintenance Superintendent	Marc Quintana	Kick-off
Colorado Dam Safety	Chief	Bill McCormick	Mtg 2
Colorado Parks and Wildlife (CPW)	Senior Ranger	Glenn Cottone	Kick-off, Mtg 2
Colorado State Patrol (CSP)	Master Sergeant	Marshall Schwarz	Kick-off
Colorado State Forest Service (CSFS)	Supervisory Forester	Adam Moore	Mtg 2, Mtg 3
Colorado State Forest Service – Salida	Forester	John (JT) Shaver	Mtg 2, Mtg 3
Colorado State Forest Service	Southwest Area Manager	Damon Lange	Mtg 2
Colorado State University Extension	Chaffee Co. Extension Director	Kurt Jones	Kick-off
Colorado Division of Homeland Security and Emergency Management (DHSEM)	Mitigation Specialist	Mark Thompson	Mtg 3
Colorado Division of Homeland Security and Emergency Management (DHSEM)	Mitigation Supervisor	Patricia Gavelda	Kick-off, Mtg 3
Colorado Division of Homeland Security and Emergency Management (DHSEM)	Regional Field Manager	Mike McHargue	Kick-off
Colorado Department of Local Affairs (DOLA)	Regional Field Manager	Christy Doon	Mtg 2
Heart of the Rockies Regional Medical Center (HRRMC)	Emergency Management Coordinator	Mark Rowland	Kick-off, Mtg 3
National Weather Service (NWS)	Warning Coordination Meteorologist	Greg Heavener	Kick-off, Mtg 2, Mtg 3

# APPENDIX C: HMPC MEMBERS

Agency/ Jurisdiction	Title	Name	Meetings <sup>1</sup> Attended
Central Colorado Conservancy	Board President	Cindy Williams	
Southern Colorado Economic Development	Economic Recovery Specialist	Michael Yerman	Mtg 2
Sangre de Cristo Electric Association	Communication Specialist	Chris McGinnis	Kick-off
Xcel Energy	Area Manager South Colorado	Ashely Valdez	Kick-off
Xcel Energy	Operations Manager	Dale Johnson	Mtg 2
United States Forest Service (USFS) – Salida Ranger District	Acting District Ranger	Amy Titterington	Kick-off
Fremont County Emergency Management	Emergency Manager	Mykel Kroll	Kick-off
Lake County Office of Emergency Management	Emergency Manager	Cailee Hamm	Kick-off
Gunnison County Office of Emergency Management	Emergency Manager	Scott Morrill	Kick-off



---

## **APPENDIX D: MENU OF MITIGATION ALTERNATIVES**

# APPENDIX D: MITIGATION ACTION ALTERNATIVES

## Example Mitigation Actions by FEMA categories with Hazards Identified in the Chaffee County Hazard Mitigation Plan Update 2021

Alternative Mitigation Actions	Dam Incidents	Floods	Epidemic/ Pandemic Cyber Threat, HazMat	Avalanches; Landslide, Mud/Debris Flow, Rockfall; Erosion and Deposition, Expansive soils, and subsidence	Weather Extremes: (drought and extreme heat; hail, lightning, and severe wind; tornado)	Earthqua kes	Wildfire	Winter Storm
<b>PLANS and REGULATIONS</b>								
Building codes and enforcement		■		■	■	■	■	■
Comprehensive Watershed Tax		■						
Density controls	■	■		■			■	
Design review standards		■		■		■	■	
Easements		■		■			■	
Environmental review standards		■		■		■	■	
Floodplain development regulations	■	■						
Hazard mapping	■	■		■			■	
Fluvial Hazard Zone mapping and regulations		■		■				
Floodplain zoning	■	■						
Forest fire fuel reduction							■	
Housing/landlord codes					■			
Slide-prone area/grading/hillside development regulations				■			■	
Manufactured home guidelines/regulations		■			■	■		
Multi-Jurisdiction Cooperation within watershed	■	■						
Open burning regulations							■	
Open space preservation	■	■		■			■	
Performance standards	■	■		■	■	■	■	■
Special use permits	■	■		■			■	
Stormwater management regulations		■						

# APPENDIX D: MITIGATION ACTION ALTERNATIVES

Alternative Mitigation Actions	Dam Incidents	Floods	Epidemic/ Pandemic Cyber Threat, HazMat	Avalanches; Landslide, Mud/Debris Flow, Rockfall; Erosion and Deposition, Expansive soils, and subsidence	Weather Extremes: (drought and extreme heat; hail, lightning, and severe wind; tornado)	Earthqua kes	Wildfire	Winter Storm
Subdivision and development regulations	■	■		■		■	■	
Surge protectors and lightning protection					■			
Tree Management					■		■	■
Transfer of development rights		■		■			■	
Utility location		■		■	■		■	■
<b>STRUCTURE AND INFRASTRUCTRE PROJECTS</b>								
Acquisition of hazard prone structures	■	■		■			■	
Facility inspections/reporting	■	■				■		
Construction of barriers around structures	■	■						
Elevation of structures	■	■						
Relocation out of hazard areas	■	■		■			■	
Structural retrofits (e.g., reinforcement, floodproofing, bracing, etc.)		■	■	■	■	■	■	■
Channel maintenance		■		■				
Dams/reservoirs (including maintenance)	■	■						
Levees and floodwalls (including maintenance)		■						
Safe room/shelter					■	■		■
Secondary containment system								
Site reclamation/restoration/revegetation		■		■				
Snow fences					■			■
Water supply augmentation					■			
Debris Control/Debris basins		■		■				
Defensible Space							■	
Stream stabilization		■		■				
<b>EDUCATION AND AWARENESS</b>								

## APPENDIX D: MITIGATION ACTION ALTERNATIVES

Alternative Mitigation Actions	Dam Incidents	Floods	Epidemic/ Pandemic Cyber Threat, HazMat	Avalanches; Landslide, Mud/Debris Flow, Rockfall; Erosion and Deposition, Expansive soils, and subsidence	Weather Extremes: (drought and extreme heat; hail, lightning, and severe wind; tornado)	Earthqua kes	Wildfire	Winter Storm
Flood Insurance	■	■						
Hazard information centers	■	■	■	■	■	■	■	■
Public education and outreach programs	■	■	■	■	■	■	■	■
Real estate disclosure	■	■		■	■	■	■	■
Crop Insurance					■	■		
Lightning detectors in public areas					■			
Disease contact tracing protocols and tools			■					
<b>NATURAL SYSTEMS PROTECTION</b>								
Best Management Practices (BMPs)		■		■	■		■	
Forest and vegetation management	■	■		■	■		■	■
Hydrological Monitoring	■	■		■	■			
Sediment and erosion control regulations	■	■		■				
Stream corridor restoration		■		■				
Stream dumping regulations		■						
Urban forestry and landscape management		■		■	■		■	■
Wetlands development regulations		■		■			■	
<b>EMERGENCY SERVICES</b>								
Critical facilities protection	■	■	■	■	■	■	■	■
Emergency response services	■	■	■	■	■	■	■	■
Facility employee safety training programs	■	■	■	■	■	■	■	■
Hazard threat recognition	■	■	■	■	■	■	■	■
Hazard warning systems (community sirens, NOAA weather radio)	■	■	■	■	■	■	■	■
Health and safety maintenance	■	■	■	■	■	■	■	■
Post-disaster mitigation	■	■		■	■	■	■	■

## APPENDIX D: MITIGATION ACTION ALTERNATIVES

Alternative Mitigation Actions	Dam Incidents	Floods	Epidemic/ Pandemic Cyber Threat, HazMat	Avalanches; Landslide, Mud/Debris Flow, Rockfall; Erosion and Deposition, Expansive soils, and subsidence	Weather Extremes: (drought and extreme heat; hail, lightning, and severe wind; tornado)	Earthqua kes	Wildfire	Winter Storm
Evacuation planning	■	■	■	■			■	

---

## **APPENDIX E: PLANNING PROCESS DOCUMENTATION**



**Subject: Chaffee County Multi-jurisdictional Hazard Mitigation Plan Update Kick-Off Meeting.**

You are invited to the first of three planning meetings to update the Chaffee County Multi-jurisdictional Hazard Mitigation Plan. The existing plan was developed in accordance with the Disaster Mitigation Act of 2000 which requires all local governments to develop a plan to assess their risks to hazards and identify actions that can be taken in advance to reduce future losses. Hazard mitigation plans are to be updated every five years in order to maintain eligibility for FEMA Hazard Mitigation Assistance grants.

***Chaffee County Multi-jurisdictional Hazard Mitigation Plan Update  
Kickoff Meeting/Webinar  
Thursday, November 19, 2020  
1:00 pm – 3:00 pm***

Join Zoom Meeting  
<https://us02web.zoom.us/j/5716103474>  
Meeting ID: 571 610 3474  
+1 346 248 7799

The hazard mitigation planning process is heavily dependent on the participation of representatives from local government agencies and departments, the public, and other stakeholder groups. A Hazard Mitigation Planning Committee will be re-convened to support this project and will include representatives from the County and municipalities as participating jurisdictions. Other interested stakeholders, including local and regional agencies involved in hazard mitigation activities or agencies that regulate development, are also invited. This includes special districts, private-non-profit entities, business partners, academic institutions, and other local, state, and federal agencies in or that serve Chaffee County.

At the kickoff meeting, we will discuss the benefits of updating the hazard mitigation plan, the project schedule, and all of the hazards that affect Chaffee County, such as wildfire, floods, winter storms, landslides, and more. **Chaffee County requests your assistance in forwarding this invitation to others in your jurisdiction. Appropriate persons to be a part of the planning committee include, but are not limited to: county and municipal planners, public works directors, floodplain managers, economic development directors, GIS staff, first responders, local government administration, elected officials, business partners, private-non-profit representatives, and school district representatives.** Each participating jurisdiction must have at least one representative at the meetings to meet participation requirements. There will be 3 total primary planning meetings held during the update process over the next 3-4 months, with submittal of the updated plan for State and FEMA review within 6 months.

As the Chaffee County Emergency Manager, I will be taking the lead in coordinating the update of this plan. The County has hired a consultant, **Wood Environment & Infrastructure Solutions, Inc.**, to manage the planning project. Wood will facilitate the planning process, collect the necessary data, and perform other technical services, including updating the risk assessment and plan document. However, to successfully complete this project and ensure your organization is eligible for FEMA hazard mitigation assistance funding, we need your participation and input.

A Microsoft Outlook meeting invitation/calendar item will be sent out soon; please confirm your attendance or provide contact information for your designated alternate. Looking forward to your input and participation during the process.

For your reference the 2016 Chaffee County Multi-jurisdictional Hazard Mitigation Plan can be accessed here: <https://www.colorado.gov/pacific/mars/south-central-region-1>

# **CHAFFEE COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN UPDATE**

## ***Kickoff Meeting Agenda***

**Thursday, November 19, 2020**

**1:00 pm – 3:00 pm**

Join Zoom Meeting

<https://us02web.zoom.us/j/5716103474>

Meeting ID: 571 610 3474

[+1 346 248 7799](tel:+13462487799)

- 1. Introductions**
- 2. Hazard Mitigation Overview – CO DHSEM**
- 3. Hazard Mitigation Planning Process and Requirements**
- 4. Role of the Hazard Mitigation Planning Committee**
- 5. Plan Update Requirements, Key Elements, and Schedule**
- 6. Review of Identified Hazards and 2016 Mitigation Plan**
- 7. Coordinating with Other Agencies/Related Planning Efforts**
- 8. Initial Information Needs**
- 9. Questions and Answers/Adjourn**

# **Chaffee County Multi-Jurisdictional Hazard Mitigation Plan 2021 Update**

## **Kickoff Webinar Summary 1:00 PM – 3:00 PM**

### **Introductions and Opening Remarks**

This document summarizes the kickoff webinar for the Chaffee County Hazard Mitigation Plan (HMP) update for 2021. The webinar was facilitated by Wood Environment & Infrastructure Solutions, Inc. (Wood), the consulting firm hired to facilitate the planning process and develop the updated multi-jurisdictional plan. This type of meeting is ideally conducted in-person, however in this instance the meeting was done in a webinar format in order to comply with social distancing requirements as a result of the COVID-19 pandemic. Jeff Brislawn, Project Manager at Wood, began the meeting with introductions. Forty-one persons attended the webinar representing a mix of County departments, participating jurisdictions, and stakeholders.

The key discussion is summarized below, and the webinar chat log is attached at the end. Additional details can be found in the meeting PowerPoint presentation and webinar recording.

### **Hazard Mitigation Overview**

Patricia Gavelda (Colorado Division of Homeland Security and Emergency Management) outlined what hazard mitigation is and why it is important. Hazard mitigation should be an ongoing effort integrated into both day-to-day operations and long-term planning. The overall purpose of a local hazard mitigation plan is to prevent knowable hazards from having an impact on the community.

There are two additional benefits a community gains from having a FEMA approved hazard mitigation plan; (1) bringing people together in the community; (2) eligibility for FEMA mitigation grants. Any requests for FEMA mitigation funding need to be based on the hazards and mitigation strategy in the HMP. The information from the hazard mitigation plan, specifically the vulnerability assessment and mitigation strategy, can be used in other hazard related plans such as community wildfire protection plans.

FEMA will only fund mitigation projects that will reduce future demand for and the costs of disaster response and recovery, such as retrofitting a critical facility, enforcing building codes, land use planning, or removing a structure from a hazard area. Mitigation funding cannot be used for response actions such as purchasing vehicles for fire or police departments. The 2019 National Institute of Building Science Report which showed that mitigation grants funded through select federal government agencies, on average, save the nation \$6 in future disaster costs for every \$1 spent on hazard mitigation.

A Hazard Mitigation Plan is not a regulatory document, nor does it create new regulations. It is not a firm commitment of resources. FEMA and the State encourage communities to be both ambitious and practical when developing mitigation actions. There is a mutual understanding that actions are dependent on the

availability of resources. Communities will not be punished if any of the action included in the plan are not completed.

## **Hazard Mitigation Planning Process and Requirements**

The Disaster Mitigation Act (DMA) of 2000 lays out the specific planning requirements the County will have to meet in order to have a FEMA approved plan; the Chaffee County HMP will be updated in accordance with these requirements.

The first step in getting organized is to obtain community commitment to mitigation, determine and assign staff, establish the hazard mitigation planning team, which has already started with those in attendance at the kickoff webinar, and to determine the planning area. Committee members will include those on the committee for the 2016 planning process. Additional recommendations of who could also be invited to be on the committee include, neighboring jurisdictions, local businesses, nonprofits, school districts, watershed coalitions. Special districts can also be considered jurisdictions and be eligible for FEMA funding on their own, or they have the option to participate as stakeholders.

The following jurisdictions and special districts have committed to participating in the 2021 plan update:

- Chaffee County
- Town of Buena Vista
- City of Salida
- City of Poncha Springs

Local input, and participation from the county, municipalities, and special districts is required for full approval from FEMA. Participation includes the following:

- Attend meetings and participate in the planning process
- Provide requested information to update or develop jurisdictional information
- Review drafts and provide comments
- Identify mitigation projects specific to jurisdiction, provide status
- Assist with and participate in the public input process
- Coordinate formal adoption

Stakeholders include other local, state and federal agencies with a stake in hazard mitigation in the County or may include academic institutions and local business and industry. Stakeholders may include the Colorado Department of Homeland Security (DHSEM), Colorado Division of Water Resources, Colorado State Forest Service, CDOT, Colorado State Patrol, Colorado Parks and Wildlife, Colorado Water Conservation Board, USGS, U.S. Forest Service, EPA, FEMA Region VIII, and the National Weather Service, Neighboring counties will also be notified about the update and given an opportunity to provide input into the process.

Stakeholders do not need to adopt the plan and will not be eligible to apply directly to FEMA for grant funding. Stakeholders have various options and levels of participation including:

- Attend HMPC meetings or stay in loop via email list
- Provide data/information
- Partner on mitigation efforts
- Review draft plan

Another requirement of the plan update process is performing a community capability assessment. This is an assessment of the communities existing plans, regulations, fiscal abilities, administrative and technical abilities. Identifying fiscal abilities early on is important because FEMA grants generally require a 25% match of local funds. Early identification will help to understand potential funding sources now that could be used to possibly match the federal funds. Additionally, it is important that participating jurisdictions track any time in which they are engaged in the Hazard Mitigation Process and provide this information to the Project Lead as this time can be used to meet this match requirement.

Conducting a risk assessment is a key aspect of a hazard mitigation plan and involves two components: hazard identification (what can happen here) and the vulnerability assessment (what will be affected). The HMP update will be based on existing documents and studies, with the Chaffee County Hazard Mitigation Plan (2016) providing the baseline for identified hazards and the groundwork for goals, policies and actions for hazard mitigation.

The HMP will be updated over the next six months, with at least two more meetings with the Hazard Mitigation Planning Committee. Wood will be updating the Hazard Identification and Risk Assessment (HIRA) in the next couple of months, with input from the HMPC. Three drafts of the HMP will be created: the first for review by HMPC members, a second for public review, and a third for state and FEMA review. The tentative project schedule is shown below, although these dates may need to be adjusted based on the ongoing pandemic situation.

## **Planning For Public Involvement**

An important requirement of the hazard mitigation planning process is to involve the public in the process. FEMA requires two opportunities for public involvement: once during the drafting stage and once more prior to plan approval. FEMA does not prescribe how to involve the public at either of these steps. There are several advantages to involving the public including developing solutions that fit local needs better, strengthening local support for the plan and ensuring a fair process in the development of the plan. Wood will be creating an online public survey for the County and jurisdictions to advertise via their media and social media accounts. Two public meetings will also be held, one at the beginning of the process and one during the public review draft comment period.

## **Overview of 2016 Hazard Mitigation Plan**

The list of hazards included in the 2016 plan was reviewed for inclusion in the 2021 plan update.

- Avalanche
- Dam/Levee Failure
- Drought
- Earthquake
- Erosion and Deposition
- Expansive Soils
- Extreme Heat
- Flood
- Hailstorm
- Landslides, Debris flows, Rockfalls
- Lightning
- Severe Wind
- Subsidence
- Tornado
- Wildfire
- Winter Storm

The following human-caused hazards may also be considered to add to the 2021 Plan Update.

- Pandemic
- Hazardous Materials Incidents
- Transportation Accident
- Cyber Threats



The Planning Committee is asked to review the list of hazards and comment on how they could be enhanced or updated with:

- Historic incidents
- Incident logs
- Public perception
- Scientific studies
- Other plans and reports (e.g., flood and drainage studies, CWPPs, Internet databases)
- Recent disasters

### **Coordinating with Other Agencies, Related Planning Efforts, and Recent Studies**

A discussion on recent studies of hazards in other documents and reports followed the identified hazards discussion. Opportunities for coordinating and cross-referencing the HMP were discussed. Discussions on the benefits of the Community Rating System (CRS) were also had.

### **Initial Information Needs and Next steps**

The project schedule was reviewed:

<b><u>Project Milestone</u></b>	<b><u>Anticipated Timeline</u></b>
• HMPC Meeting #2 – HIRA Review	January 2021
• Updated HIRA	January 2021
• HMPC Meeting #3 – Mitigation Goals	February 2021
• HMPC Review Draft	March 2021
• Public Review Draft	Mid-March 2021
• CO DHSEM Review	April 2021
• Final Plan for FEMA Review (estimated)	May 2021
• FEMA Review (estimated)	May-June 2021
• Final Approved HMP for local adoption	June 2021

Initial information needs and next steps were discussed. Wood will be sending a Data Collection Guide requesting input on:

- Recent hazard events (since 2016)
- Growth and development trends
- Recent updated plans and policies

Where available online, Wood will try to obtain the updated plans previously noted. The HMPC is encouraged to send other information that might not be readily accessible online.

Wood will begin work in the Hazard Identification and Risk Assessment update and develop a public survey that can be used online, with a hardcopy version for dissemination at local events.

The next HMPC webinar is tentatively planned for January following the update of the Hazard Identification and Risk Assessment section of the plan. Meeting dates and other deadlines will be shared when available.

# Chaffee County Hazard Mitigation Plan Update

## Kickoff Meeting Chat Log

13:00:42 From Brandon Hawkins : Brandon Hawkins-Salida Schools.

13:02:07 From Amy Carr : Hi everyone! I'm Amy Carr, Hazard Mitigation Planner with Wood. We will have a couple poll questions throughout the presentation, please go to [sli.do.com](https://sli.do.com) either on your computer or you phone and enter code#33444

13:03:21 From Chaffee County Public Health : Andrea Carlstrom, Chaffee County Public Health

13:03:24 From smorrill : Scott Morrill Gunnison County OEM

13:03:27 From Phillip Puckett : Phillip Puckett- Buena Vista

13:03:28 From Jim Jenkins : Jimmy Jenkins American Red Cross

13:03:37 From quintanak : Kenneth J. Quintana, CDOT

13:03:38 From Ashley Valdez Xcel Energy : Ashley Valdez Xcel Energy Area Manager Southern Colorado

13:03:40 From quintanam : Marc Quintana CDOT

13:03:43 From Mack Chambers : Hello, Mack Chambers - GIS Specialist with Wood

13:03:44 From JOSH HADLEY : Josh Hadley - Chaffee County EMS

13:03:45 From Amy Titterington - USFS - PSICC Colorado : Amy Titterington - USFS, Acting District Ranger, Salida Ranger District

13:03:45 From Amber : Amber Vanleuken, Ark-Valley Humane Society

13:03:46 From mcginnis : Chris McGinnis Sangre de Cristo Electric Association

13:03:47 From PT Wood : PT Wood City of Salida

13:04:05 From Bob : Mark Stacy, Road and Bridge Superintendent, Chaffee County

13:04:14 From Kent Maxwell : Kent Maxwell, Chaffee County Fire & Colorado Firecamp

13:04:32 From Becky Gray : Becky Gray, Director of Housing, Chaffee County

13:04:39 From Drew Nelson : Drew Nelson, City of Salida

13:04:41 From Russ : Russ & Spencer Salida PD

13:04:58 From Mark Rowland : Unable to make the link/url for the polls to load/work. Usually user error, when that happens to me

13:05:13 From Lisa Yates : Lisa Yates , Buena Vista School District

13:05:22 From Dean Russell, GIS Assessor : Dean Russell, Assessor's Office GIS

13:05:39 From Amy Carr : [sli.do.com](https://sli.do.com) Code#3444

13:05:56 From Marshall : Marshall with CSP

13:06:00 From Mark Rowland : [sli.do.com](https://sli.do.com) won't load for me

13:06:21 From Amy Carr : sorry try [slido.com](https://slido.com) instead

13:06:23 From Kurt Jones : [slido.com](https://slido.com), event 33444

13:06:59 From Chaffee County Public Health : I can't get through either.

13:07:24 From Mark Rowland : No

13:07:34 From quintanam : [sli.do.com](https://sli.do.com) on google

13:07:36 From Mark Rowland : Got in w/ [slido.com](https://slido.com)

13:08:02 From Marshall : Worked fine on chrome

13:09:47 From Brenda : Brenda - Assessor

13:10:50 From Christie Barton : Christie Barton - Chaffee County Planning

13:11:12 From Brian Berger : Brian Berger - Town of Poncha Springs

13:14:25 From Bob : Maybe at a future meeting we could host this and use our OWL system which is much more interactive.

13:14:58 From Rich Atkins - CC OEM : Rich Atkins - Chaffee County Office of Emergency Management - [ChaffeeOEM@gmail.com](mailto:ChaffeeOEM@gmail.com) - 719-207-2730

13:16:44 From Jim Jenkins : Be Right Back,

13:18:09 From Bob : The HMPplan will be part of our 2020 Comprehensive Plan for Chaffee County.

13:19:01 From Rich Atkins - CC OEM : Please enter your name and agency that you are representing as we need to document your presentation. Thank-you, Rich!

13:19:31 From Daniel Tom : Daniel Tom, Chaffee County Attorney's Office

13:25:52 From Mike McHargue - DHSEM \CSAFM : I apologize for the delay. Fire in the Colorado Springs WUI with LTCF evacs

13:35:10 From Rich Atkins - CC OEM : Please enter your name and agency that you are representing as we need to document your presentation. Thank-you, Rich!

13:36:46 From Mike McHargue - DHSEM \CSAFM : Mike McHargue, CSAFM, DHSEM  
13:38:22 From smorrill : 1330 C&G meeting, back in 15 minutes. Scott Morrill, Gunnison OEM

13:44:58 From Jim Jenkins : Jimmy Jenkins, American Red Cross, jimmy.jenkins@redcross.org, 719-337-8508  
13:45:20 From Rich Atkins - CC OEM : Please enter your name and agency that you are representing as we need to document your presentation. Thank-you, Rich!

13:45:46 From Rich Atkins - CC OEM : Please enter your name and agency that you are representing as we need to document your attendance. Thank-you, Rich!

13:46:58 From Cailee Hamm : Cailee Hamm, Lake County OEM - apologies for joining late!  
13:47:11 From Jon Roorda : Jon Roorda, Chaffee County Planning Manager  
13:47:59 From Jon Roorda : jroorda@chaffeecounty.org 719/530-5566

14:01:30 From Rich Atkins - CC OEM : Please enter your name and agency that you are representing as we need to document your attendance. Thank-you, Rich!

14:05:43 From Patricia Gavelda : Thank you Local EM community, for supporting Rich in this effort!

14:05:56 From Rich Atkins - CC OEM : If you didn't receive an invite to this meeting and would like to be included in the distribution list, please list your name and email in the chat or send an email to me at chaffeeoem@gmail.com.

14:13:35 From quintanam : marc.quintana@state.co.us  
14:13:50 From Kent Maxwell : Transportation / hazardous materials?

14:14:31 From Chaffee County Public Health : I would say "pandemic" but I'm hoping we don't have to revisit that for another 100 years. :)

14:14:44 From Kurt Jones : Livestock Diseases?

14:19:06 From Bob : The CMP will become an appendix to the County Comp Plan.

14:23:09 From Amy Carr : <https://cwcb.colorado.gov/FACE>

14:23:47 From DLacy : envision chaffee county fire mitigation?

14:27:51 From Bob : Comp Plan for Chaffee County

14:27:53 From Drew Nelson : Salida's Raw Water Supply Study

14:28:24 From Amy Carr : slido.com Event Code # 3344

14:29:05 From Jon Roorda : The Chaffee County Comprehensive Plan update that we anticipate approval of in December. That plan will adopt this plan as an appendix

14:29:41 From Kent Maxwell : Chaffee Treats is a program gathering assessments for private property wildfire/forest health treatment projects, to support implementation of the CWPP. <https://gametrailassn.org/2020/10/22/chaffee-treats-program>

14:32:33 From DLacy : sangre de cristo electric  
14:33:25 From Patricia Gavelda : Yes, the DoLA funded Comp Plans require Hazard Mitigation Elements, yet they're not the FEMA-required elements needed for an approved HMP.

14:34:46 From Rich Atkins - CC OEM : If you didn't receive an invite to this meeting and would like to be included in the distribution list, please list your name and email in the chat or send an email to me at chaffeeoem@gmail.com.

14:35:10 From Rich Atkins - CC OEM : Please enter your name and agency that you are representing as we need to document your attendance. Thank-you, Rich!

14:35:16 From quintanak : kenneth.quintana@state.co.us  
14:35:37 From DLacy : We have a good turn out with water billing inserts

14:36:08 From Drew Nelson : Salida publishes a monthly digital newsletter, plus a new website and social media channels.

14:36:16 From quintanam : local PIO's

14:41:13 From Ashley Valdez Xcel Energy : Great meeting. Thanks so much!

14:41:18 From Amy Titterington - USFS - PSICC Colorado : amy.j.titterington@usda.gov

14:42:26 From quintanam : Thanks All. good information

14:42:34 From Amy Titterington - USFS - PSICC Colorado : thank you!  
14:42:37 From Jon Roorda : Thank you all  
14:42:45 From Phillip Puckett : thank you!  
14:42:49 From Greg : Happy Thanksgiving all!

**Did you participate in the 2015 Hazard Mitigation Plan?**

Yes



No



No but I have some experience or familiarity with hazard mitigation.



**What plans and/or studies do you think should be linked to the Hazard Mitigation Plan?**

EnergyNow community energy plan??

The consultants for the Comp Plan also included the Envision goals as a basis for the comp plan.

Asbestos

Chaffee County Comprehensive Plan - we should be getting the final draft out to the public in a week, then it goes to hearing December 15th.

Are there any renewable/ green energy plans?

Comprehensive Plan,

any wildfire mitigation plans that utilities might have.

Comp Plan, DOLA requires Haz Planning requirements in the final draft.

Climatology

CWPP

Salida's Raw Water Supply Study

Any Resiliency or Climate Plans?



**Who's Missing? - What other stakeholders should be included in this planning process?**

USGS (debris flow models - Chalk Creek) or CAIC - avalanche awareness/ mitigations

---

Colorado Division of Fire Prevention & Control

---

Front range water suppliers, Colorado Springs / Aurora

---

BLM, Colorado Forest Service

---

BV School District, Salida School District, Conservancy Districts, electric/utility companies

---

# Chaffee County

## Hazard Mitigation Plan Update

### Risk Assessment Webinar Agenda

---

**Date:** Thursday, February 4, 2021  
1:30 – 3:30 pm MST

**Meeting at:** Zoom meeting  
<https://us02web.zoom.us/j/5716103474>  
1 (346) 248 7799 United States, Houston  
Meeting ID: 571 610 3474#

#### **Subject/Purpose**

The purpose of the meeting is to review the highlights of the updated Hazard Identification and Risk Assessment. The meeting will be delivered as a webinar due to the COVID-19 pandemic and social distancing requirements.

**Attendees:** Hazard Mitigation Planning Committee, Stakeholders and Consultant Team

---

1. Introductions
2. Review of the Hazard Mitigation Planning Process
3. Update on public involvement activities
4. Hazard Identification and Risk Assessment (HIRA) update
5. Review of mitigation goals
6. Next steps
7. Questions and answers

**Summary of the Chaffee County  
Multi-Jurisdictional Hazard Mitigation Plan Update  
Risk Assessment and Goals Meeting**

**February 4, 2021  
1:30-3:30pm  
Virtual Webinar via Zoom**

**Introductions and Opening Remarks**

Richard Atkins with Chaffee County OEM gave some brief pre-meeting instructions, reminding participants to keep track of their time spent on this project and to send their name, title, and affiliation in the meeting chat. Jeff Brislawn of Wood, the consulting firm hired to facilitate the plan development process, began the meeting with welcoming remarks. Thirty-three persons were present including the Wood team.

**Review of Mitigation, Disaster Mitigation Act (DMA) Requirements, and the Planning Process**

Following introductions, a PowerPoint presentation was led by Jeff Brislawn. Jeff reviewed the planning process being followed and discussed the project status.

**Risk Assessment Presentation and Discussion**

Jeff outlined the general risk assessment requirements before beginning a detailed discussion of each hazard. He presented highlights on each hazard included in the updated risk assessment chapter of the plan. Refer to the Chaffee County HMP Risk Assessment PowerPoint presentation for specific details on each hazard and a summary of hazard significance.

Additional insight and details were learned during the risk assessment conversation among participants. Highlights of the discussion are noted by hazard in the table below.

<b>Hazard or Topic</b>	<b>Meeting Discussion</b>
Avalanche	<ul style="list-style-type: none"><li>• Jeff mentioned his own experience seeing avalanche damage off CR 306 below Cottonwood Pass area that appeared to be from the March 2019 cycle that created a lot of debris down to the valley floor, and asked if anyone on the HMPC had any more input on that event.</li><li>• No comment from HMPC</li></ul>
Dam Failure/Incident	<ul style="list-style-type: none"><li>• 3 upstream dams in Lake County are high hazard</li><li>• Greg Felt asked about a dam on Chalk Creek near St. Elmo and inquired why it was not included on the map</li><li>• Bill McCormick with Colorado Dam Safety added that it might not be a jurisdictional dam on the state list</li><li>• Boss Lake was increased to high hazard due to structures on the States list</li><li>• Twin Lakes and Trout Creek dams will have impacts</li></ul>

Hazard or Topic	Meeting Discussion
	<ul style="list-style-type: none"> <li>• CO DNR -inventory of low head dams, there are a couple in the county above Salida that has had some fatalities. - <a href="https://dnr.colorado.gov/initiatives/colorado-low-head-dams">https://dnr.colorado.gov/initiatives/colorado-low-head-dams</a></li> <li>• Bill asked if low head dams might be added and Jeff said it would be appropriate because they are a public safety hazard; Bill noted there are mitigation options for them also.</li> <li>• Phillip Puckett – should we consider the small dam at McPhelemy pond in BV?</li> <li>• Rich's personal experience (not just with this county) said the smaller dams have big impacts</li> <li>• Rich wants to take inventory of all potential dams even if classified as lower hazard</li> </ul>
Flood	<ul style="list-style-type: none"> <li>• Jeff highlighted hazard, updated mapping, new FIRM for the County, and that there have been no repetitive loss properties in the County</li> <li>• No Comment from HMPC</li> </ul>
Earthquake	<ul style="list-style-type: none"> <li>• No Comment from HMPC</li> </ul>
Landslide, Debris Flow, Rockfall	<ul style="list-style-type: none"> <li>• Adam Moore -does this take into account post fire debris flow potential? <ul style="list-style-type: none"> <li>◦ Jeff -no. Doesn't reflect impacts from Decker Fire</li> <li>◦ Rich -how could we get that into the plan? Or does it fall into more recovery planning</li> <li>◦ Jeff-we could include information from study that Rich sent on erosion from Decker Fire and could be referenced under the "other related hazards" section of the plan in the wildfire section.</li> <li>◦ Rich -long term post fire mitigation project and wants it documented in the plan</li> </ul> </li> <li>• Jon Roorda -There have been significant debris flow events along CR 306 in the area of Cottonwood Hot Springs</li> <li>• Rich -will send info from Road and Bridge related to this</li> </ul>
Other Geologic Hazards	<ul style="list-style-type: none"> <li>• Jeff inquired about a home lost to subsidence, Jon Roorda - (2017 event) based on incident near Methodist Mountain south of Highway 50. Rough and rocky terrain. Might have been leakage from well. Entire slope collapsed after construction. House broke apart and started to impact other homes.</li> <li>• Bill McCormick -Collapsible soils -alluvial fan deposits during debris flow events with lots of water. Back in 2000 Bill worked on project between Poncha Springs and Salida that did the same thing. Salida has similar issues as well as Glenwood Springs.</li> <li>• Jon -Will look into more and send to Rich</li> </ul>
Drought and Extreme Heat	<ul style="list-style-type: none"> <li>• Marjo Curgus -Are you looking for economic or ecological past impacts? <ul style="list-style-type: none"> <li>◦ Jeff -Both</li> <li>◦ Rich -do we have the ability to look at past small business impacts? <ul style="list-style-type: none"> <li>▪ Jeff – RMA data and livestock data</li> </ul> </li> </ul> </li> <li>• No comments on Extreme Heat</li> </ul>
Hail, Lightning, and Severe Wind	<ul style="list-style-type: none"> <li>• No Comments from HMPC</li> </ul>
Tornado	<ul style="list-style-type: none"> <li>• No Comments from HMPC</li> </ul>
Winter Storm	<ul style="list-style-type: none"> <li>• Greg NWS -noted avg snowfall doesn't seem accurate <ul style="list-style-type: none"> <li>◦ Amy Sent link to SCENIC with numbers (meeting followup showed that WRCC numbers were not accurate and have been corrected in the PPT)</li> </ul> </li> </ul>

<b>Hazard or Topic</b>	<b>Meeting Discussion</b>
Wildfire	<ul style="list-style-type: none"> <li>• Damon Lange SFS -Modeling in CWPP is pretty good, lots of data. CWPP better data using in forest council</li> <li>• Contact Dean Russell <ul style="list-style-type: none"> <li>◦ Marjo Curgus added -Should also be included platted lots, not just buildings. A lot of entitled land not built yet.</li> </ul> </li> <li>• Damon Lange -working with county wildfire risk assessment project 5-6 years, have 1,000s of structures that have been assessed. Work with JT Shaver and Rich. Gets it down to the structural level.</li> </ul>
Pandemic	<ul style="list-style-type: none"> <li>• No Comments from HMPC</li> </ul>
HazMat	<ul style="list-style-type: none"> <li>• Wano Urbonas (environmental health) -We have limited local resources to identify / characterize hazardous materials <ul style="list-style-type: none"> <li>◦ 9 drums unknown material High 61. Having trouble with coordination with state on assisting with it</li> </ul> </li> <li>• The potential for transportation related incidents to increase with traffic increases was noted.</li> </ul>
Tech/Cyber Attack	<ul style="list-style-type: none"> <li>◦ Rich - Hazard can affect critical infrastructure in our towns even if we're small. Part of grants from Feds on how to mitigate cyber attacks <ul style="list-style-type: none"> <li>◦ Mitigation evaluation and all for including in plan if rest of committee okay with it</li> </ul> </li> </ul>

## **Plan Goals Update**

The HMPC reviewed the goals and objectives from the previous plan to see if they were still relevant or needed updating. In general, the group thought was they were still valid. Phillip Puckett noted that they all still resonated, but that Goal 2 to "Increase public awareness of risk from natural hazards" seems challenging and ongoing. Several other HMPC members in the chat noted that they felt some goal should be reorganized based on priority. Jeff clarified that there is no implied prioritization of the goals based on the numbering or order. Another suggestion was to remove the word "natural" from the goals now that human-caused will be included. Rich said a goals worksheet will be developed and circulated to the group to capture additional input.

## **Mitigation Action Strategy update needs**

Jeff noted that the mitigation action strategy will be revisited moving forward and will be the focus of the next HMPC meeting. Jeff said that the existing mitigation actions from the 2016 plan will need to be reviewed by the HMPC with a status indicated for each action. Jeff mentioned the Plan Update Guides had a mitigation action status worksheet to help facilitate this; most jurisdictions had provided status updates, but Wood will reach out regarding any remaining status reporting needs prior to the next meeting.

There will be an opportunity to develop new mitigation actions for the plan as well, with a requirement from FEMA that each participating jurisdiction come up with at least one new mitigation action. These will be identified at the next meeting. Rich mentioned that he wanted to do a better job of tracking mitigation actions, possibly meeting annually to do so whether actions are in the plan or not. Damon Lange with the CSFS mentioned how difficult this may be with lots of state and federal stakeholders and potential concerns about privacy issues. Damon also added

the idea of trying to use ArcGIS Online to track actions, and that the BLM and USFS track their fuels treatments. Rick clarified that he was speaking about the mitigation actions that will be in the updated HMP, not necessarily all wildfire mitigation activities.

#### **Update on Public Involvement Activities/public meeting.**

Jeff noted that there was a great deal of participation in the published online survey, with close to 200 respondents so far. He also said there were some good comments specific to hazards and ideas for mitigation. The final results will be shared after the survey closes on February 8<sup>th</sup>.

#### **Plan Timeline/Next steps**

The next and final HMPC planning meeting will be scheduled for an upcoming date in early March (March 4<sup>th</sup> is target). The purpose of this meeting is to develop mitigation actions for the plan. Once a date has been identified, a calendar update will be sent out to save the date. The meeting materials will also be shared electronically, including the presentation and handouts. The original schedule was to have a draft of the plan for HMPC to review in March and plan for State and FEMA review in April due to a grant period of performance deadline. Rich said he would check on that as there might be a slight extension.

The meeting adjourned at 3:40 pm.

Attachment: Zoom Meeting Chat Log.



Zoom Meeting Chat Log.

13:31:04 From Becky Gray to Everyone : Becky Gray, Chaffee County Director of Housing

13:31:06 From Christie Barton to Everyone : Christie Barton, Chaffee County Planning

13:31:10 From Chaffee County to Everyone : Beth Helmke, Public Affairs Officer/PIO, Chaffee County Government

13:31:15 From Chief Bess to Everyone : Doug Bess Salida Fire Chief, South Arkansas Fire Protection District Fire Chief

13:31:16 From Scott Field - Wood Facilitator to Everyone : Scott Field, Wood Environment & Infrastructure

13:31:27 From Christopher Greene to Everyone : Chris Greene BV Fire

13:31:30 From Jon Roorda to Everyone : Jon Roorda, Chaffee County Planning Manager

13:31:32 From Christopher Johnson to Everyone : Christopher Johnson, Wood Environment & Infrastructure

13:31:34 From Greg - NWS to Everyone : Greg Heavener, Warning Coordination Meteorologist, National Weather Service Pueblo, CO

13:31:35 From Dean Russell, GIS Assessor to Everyone : Dean Russell, Assessor GIS

13:31:39 From Wano Urbonas to Everyone : Wano Urbonas, Environmental Health

13:31:41 From Bill McCormick to Everyone : Bill McCormick, Colorado Dam Safety

13:31:58 From Tony Stromer to Everyone : Tony Stromer Buena Vista School Dist.

13:32:06 From Glenn C. to Everyone : Glenn Cottone, Colorado Parks and Wildlife - AHRA

13:32:10 From Kathy Rohrich to Everyone : Kathy Rohrich Salida Fire Department Assistant Chief

13:32:33 From Damon Lange to Everyone : Damon Lange SW Area Manager for the Colorado State Forest Service

13:33:09 From Adam Moore - CSFS to Everyone : Adam Moore - Colorado State Forest Service, Supervisory Forester

13:33:27 From Russ Johnson to Everyone : Russ Johnson-

13:33:35 From Phillip Puckett to Everyone : Phillip Puckett, Town of Buena Vista Administrator

13:34:00 From Commissioner Keith Baker to Everyone : Keith Baker, Chaffee County Commissioner

13:34:03 From Christy Doon to Everyone : Christy Doon - DOLA Regional Manager (I'll only be able to participate until about 2:15)

13:34:24 From Rich Atkins - CC OEM to Everyone : Richard Atkins, Chaffee County OEM

13:34:51 From Rich Atkins - CC OEM to Everyone : Please type your name, title, and affiliation in the chat for meeting documentation purposes.

13:35:27 From Daniel Tom to Everyone : Deputy County Attorney, Chaffee County Attorney's Office

13:36:25 From Andy Rohrich CCSO to Everyone : Andy Rohrich, Undersheriff, Chaffee County Sheriff's Office

13:39:38 From Andrea Carlstrom - CCPH to Everyone : Andrea Carlstrom, Chaffee County Public Health

13:42:04 From Rich Atkins - CC OEM to Everyone : Please type your name, title, and affiliation in the chat for meeting documentation purposes.

13:42:51 From Greg Felt to Everyone : Greg Felt, County Commissioner

13:44:28 From Bob to Everyone : Bob Christiansen, County Administrator

13:45:55 From Chaffee County to Everyone : It's not too late to help get the word out for community survey participation before it closes on the 8th! Please share the overview: <https://bit.ly/3bXsg2Q> or the link directly to survey at <https://bit.ly/ChaffeeHMPSurvey> ~ Thanks!

13:47:51 From 238683 to Everyone : Hi! 238683=Dale Johnson / Xcelenergy Ops Manager.

13:48:01 From John Shaver to Everyone : JT Shaver

13:48:12 From John Shaver to Everyone : Colorado State Forest Service

13:51:46 From Rich Atkins - CC OEM to Everyone : Thanks to all for being here and participating in our update project.

14:00:50 From Phillip Puckett to Everyone : Should we consider the small dam at McPhelemy pond in BV?

14:01:53 From Rich Atkins - CC OEM to Everyone : Please type your name, title, and affiliation in the chat for meeting documentation purposes.

14:02:45 From Mayor Lacy to Everyone : Duff Lacy, Mayor Buena Vista

14:03:21 From Phillip Puckett to Everyone : Makes sense, thanks Rich

14:04:25 From Bill McCormick to Everyone : <https://dnr.colorado.gov/initiatives/colorado-low-head-dams>

14:05:59 From Brian Berger to Everyone : Brian Berger, Town of Poncha Springs Administrator

14:12:18 From Rich Atkins - CC OEM to Everyone : Please type your name, title, and affiliation in the chat for meeting documentation purposes.

14:12:26 From Michael Yerman to Everyone : Michael Yerman Southern Colorado Economic Development District

14:12:47 From Marjo Curgus to Everyone : Marjo Curgus, Del Corazon Consulting

14:14:26 From Commissioner Keith Baker to Everyone : Where will the be available for replay, Rich?

14:19:46 From Adam to Everyone : Does this take into account post fire debris flow potential?

14:22:42 From Jon Roorda to Everyone : There have been significant debris flow events along CR 306 in the area of Cottonwood Hot Springs

14:30:55 From Rich Atkins - CC OEM to Everyone : Please type your name, title, and affiliation in the chat for meeting documentation purposes.

14:33:10 From Marjo Curgus to Everyone : For drought, are you looking for economic or ecological past impacts?

14:47:36 From Damon Lange to Everyone : Beetle kill is in the Spruce and Douglas fir not pine

14:53:41 From Marjo Curgus to Everyone : One question, for purposes of mitigating development in the WUI, could some of the mapping in this provide any finer detail to inform a land use code update?

14:55:52 From Christie Barton to Everyone : Dean Russell can do that.

14:56:32 From Marjo Curgus to Everyone : Should also include platted lots, not just buildings. A lot of entitled land not built on yet.

14:58:00 From Commissioner Keith Baker to Everyone : There is certainly the appetite for controlling where and what type of development is allowed in the WUI and the backcountry, and expect strings and carrots to be attached to future state and federal funding.

14:58:23 From Marjo Curgus to Everyone : Cool! That could be used to tailor code standards.

15:02:45 From Wano Urbonas to Everyone : We have limited local resources to identify / characterize hazardous materials.

15:11:30 From Marjo Curgus to Everyone : How did these work/not work in the past? Seems that would inform how they could be improved.

15:11:31 From Chaffee County to Everyone : Is the sequence of goals relevant?

15:12:27 From Commissioner Keith Baker to Everyone : I'd put public health and safety at the top. And synchronizing plans is always beneficial.

15:13:03 From Marjo Curgus to Everyone : Also seems that if we add pandemics, cyber security...it becomes "hazards/threats". So maybe natural disasters are one element and other hazards in another goal?

15:13:40 From Marjo Curgus to Everyone : They are interconnected.

15:14:01 From Commissioner Keith Baker to Everyone : More for public consumption than anything.

15:16:43 From Chaffee County to Everyone : Are there associated metrics in the plan, too, to evaluate efficacy?

15:19:03 From Marjo Curgus to Everyone : County development regulations?

15:22:36 From Commissioner Keith Baker to Everyone : I need to leave the call to do something else. Thank you for the presentation, and thanks everyone who is on!

15:27:27 From Adam to Everyone : Only each participating jurisdiction needs a new action or each identified hazard?

15:36:08 From Jon Roorda to Everyone : thank you all

From: Chaffee OEM <chaffeeoem@gmail.com>  
Sent: Wednesday, February 10, 2021 11:38 AM  
To: Adam Moore; Amber Van Luken; Carr, Amy; Amy Titterington; Andrea Carlstrom; Andy Rohrich; Annette Stolba; Becky Gray; Ben Scanga; Beth Helmke; Bill McCormick; Brandon Hawkins; Brenda Mosby; Brenda Wasielewski; Brian Burger; Brislawn, Jeff P; Cailee Hamm; Chelsey Nutter; Chris Greene; Chris McGinnis; Chris Naccarato; Christie Barton; Christy Doon; Cindy Williams; Dale Johnson; Damon Lange; Dan Osborn; Dan Short; Dan Swallow; Daniel Tom; David Blackburn; Dean Morgan; Dean Russell; Dick Eustis; Doug Bess; Drew Nelson; Duff Lacy; Eric Rasmussen; Gene Stanley; Glenn Cottone; Greg Felt; Greg Heavener; Jeffery Graf; Jenny Davis; Jim Pitts; Jimmy Jenkins; John Markalunas; John Spezze; Jon Roorda; Joseph Teipel; Josh Hadley; JT Shaver; Keith Baker; Kenneth Quintana; Kent Maxwell; Kim Marquis; Kurt Jones; Lisa Yates; Chambers, Mack; Marc Quintana; Marjo Curgus; Mark Perry; Mark Rowland; Mark Stacy; Mark Thompson; Marshall Schwarz; Matt Arsenault; Michael Yerman; Mike McHargue; Miki Hodge; Mykel Kroll; Nora Bland; P.T. Wood; Patricia Gavelda; Philip Pucket; Richard H. Atkins; Robert Bertram; Robert Christiansen; Russ Johnson; Rusty Granzella; Sally Broomfield; Field, Scott; Scott Morrill; Spencer Blades; Tony Stromer; Tyler Carlson - CDOT; Valdez, Ashley R; Wayno Urbonas; Wendell Pryor; William Plackner  
Subject: Chaffee Co HMP Update & Goals & Objectives Update Online Form Link

**CAUTION:** External email. Please do not click on links/attachments unless you know the content is genuine and safe.

All,

Thanks to all for your attendance and input at our Risk Assessment and Goals Update meeting last week. I also would like to thank you for pushing out the community outreach poll. We did receive quite a few responses before it was closed last Monday, Wood is working on putting together a summary document of the poll results and will be pushing it out as soon as possible.

As promised in our meeting, Wood has put together an online form of our project's goals and objects for the Planning Committee's review and input. It is a short form and shouldn't take more than 5 minutes to complete. Please submit your input on the goals using the below link, by February 19th.

<http://bit.ly/ChaffeeHMPGoals>

Finally, we have set the date for our Planning Committee's 3rd meeting for Thursday, March 4th, from 1:30pm to 3:30pm. This will be virtual also. I will be sending out the invite and connection information in a separate email.

Thanks again for your participation in this project. Let me know if you have any questions or concerns.

Rich

Richard H. Atkins, CO-CEM  
Chaffee County Emergency Management  
P.O. Box 699 / 16550 Highway 285  
Salida, CO 81201

(719) 539-6856 (w) | (719) 207-2730 (m)  
[ChaffeeOEM@gmail.com](mailto:ChaffeeOEM@gmail.com) | [chaffeecounty.org](http://chaffeecounty.org)



# Chaffee County

## Hazard Mitigation Plan Update

### Mitigation Strategy Meeting Agenda

---

**Date:** Thursday, March 4, 2021  
1:30 – 3:30 pm MST

**Meeting at:** Zoom meeting

Click here to join the meeting:

<https://us02web.zoom.us/j/5716103474>

+1 (346) 248-7799 United States, Houston  
(Toll)

+1 (669) 900-6833 United States (Toll-free)

Meeting ID: 571 610 3474

#### **Subject/Purpose**

This meeting will focus on updating the plan's mitigation strategy, including updating the plan's goals and objectives, actions undertaken since the last plan update, and identifying new mitigation activities. All participating jurisdictions and planning team members are encouraged to attend and provide input on new mitigation actions. The meeting will be delivered as a virtual meeting due to the COVID-19 pandemic and social distancing requirements.

**Attendees:** Hazard Mitigation Planning Committee, Stakeholders and Consultant Team

---

1. Introductions
2. Review of the Planning Process and Progress to Date
3. Update Mitigation Goals & Objectives
4. Review of progress on Mitigation Actions from 2016 Plan
5. Review of Mitigation Action Categories
6. Development of New Mitigation Actions
7. Next steps
8. Questions and Answers

# **Chaffee County Multi-Jurisdictional Hazard Mitigation Plan 2021 Update**

## **Mitigation Strategy Webinar March 4, 2021, 1:30 – 3:30 PM**

### **Introductions and Opening Remarks**

Jeff Brislawn, Project Manager, Wood Environment and Infrastructure Solutions (Wood) kicked off the webinar and thanked everyone for their participation. Jeff introduced the Wood team and led a roll call of attendees to introduce themselves. In total 25 individuals participated in the webinar representing Chaffee County and participating jurisdictions including municipalities as well as stakeholders and partner organizations.

### **Review of the Planning Process and Progress to Date**

The FEMA planning process steps were recapped; Wood is currently wrapping up the Risk Assessment process and beginning the mitigation strategy portion. This webinar addressed mitigation strategizing and goal review/development aspects.

The roles of the participating jurisdictions in the HMPC vs. Stakeholders were reviewed, as differentiated under FEMA's eyes. Only the participating jurisdictions, will be specifically addressed in the plan and will be required to meet certain criteria such as attending planning meetings, identifying mitigation actions, and tracking other aspects in order to qualify for funding in the future. While other entities (i.e. everyone else) were key stakeholders that would provide useful input and feedback as well as review the Hazard Mitigation Plan (HMP) drafts.

The progress on the plan update process to date was reviewed. Highlights include:

- Kickoff meeting held November 11<sup>th</sup>
- Risk Assessment meeting held February 4<sup>th</sup>
- Online Public Survey closed February 8<sup>th</sup>

### **Update on Public Involvement Activities**

Scott noted that the online public survey is closed on February 8<sup>th</sup> and received 216 responses. The top five hazards of concern based on this public survey were:

- Wildfire
- Drought
- Severe Wind
- Winter Storm
- Lightning

## **Mitigation Goals and Objectives**

The goals from the 2016 Hazard Mitigation Plan were revisited and results from the Webinar #2 Post Meeting Summary was discussed. Key differences between “goals,” “objectives” and “actions” were defined: goals and objectives are usually more general and broad guidelines while actions are specific and project-driven. Projects submitted for grant funding will need to tie back to goals and objectives in the HMP. For each of the goals and objectives, Jeff highlighted the proposed changes and additions and led a discussion with the committee members. Mark Thompson, CO DHSEM noted that with the new BRIC funding, projects should be tied to lifelines and suggested considering a goal related to protecting your critical services. There was consensus on the removal of “natural” in each goals to focus instead on all hazards.

## **Mitigation Actions**

Jeff led a discussion on the Mitigation Actions portion of the plan. One way to think of mitigation actions is the four A’s:

- Altering a hazard,
- Averting a hazard,
- Avoiding a hazard,
- Adapting to a hazard

FEMA suggests these four categories for mitigation actions:

- Plans and Regulations,
- Structure and Infrastructure Projects,
- Education and Awareness, and
- Natural Systems Protection.

Resources for more details on mitigation action types, categories, and example projects were provided, including a short discussion on climate change and adaptation considerations. Example hazard-specific mitigation projects were discussed including FEMA funding-eligible projects for winter weather, flood, and other hazards.

## **Review of Progress on Existing Mitigation Actions**

Prior to the webinar, a Mitigation Action Tracker was sent to the HMPC listing each jurisdictions’ 2016 mitigation actions. Each HMPC representative was asked to provide status to provide comments on the status of each action. The Tracker was emailed again following the webinar to fill in some of the missing statuses, as some jurisdictions had not yet returned the Tracker at the time of the webinar. The mitigation action statuses are categorized as one of the following: Completed, Annual Implementation, In Progress, Not Started and Deleted.

Some examples of “Deleted” actions may be due to lack of project applicability over time, or even inability to complete a project in an area where the community does not have control/jurisdiction (e.g. state owned vs. federal land).

Annual Implementation are actions that a jurisdiction is conducting on an ongoing basis, but which the jurisdiction wants to continue forward into the updated plan to maintain visibility on the action.

## Developing New Mitigation Actions

Each participating jurisdiction is required to develop at least one new action for the 2021 plan update. Ideally, jurisdictions should develop actions that address all the hazards addressed in the plan, or at least the High significance hazards, but FEMA Region VIII does not require this. All jurisdictions that participate in the National Flood Insurance Program (NFIP) will need to have a mitigation action addressing continued NFIP compliance.

The following are resources with ideas and examples of mitigation actions and implementation:

- FEMA's 'Mitigation Action Portfolio' Publication: [https://www.fema.gov/sites/default/files/2020-08/fema\\_mitigation-action-portfolio-support-document\\_08-01-2020\\_0.pdf](https://www.fema.gov/sites/default/files/2020-08/fema_mitigation-action-portfolio-support-document_08-01-2020_0.pdf)
- DOLA 'Planning for Hazard' Guide: <https://planningforhazards.com/home>

A link to the New Mitigation Action Survey was shared during the meeting and emailed after. Each HMPC member was asked to fill out the survey with at least one mitigation action by February 26<sup>th</sup>.

New Mitigation Actions Survey: <http://bit.ly/JeffCoActions>

## Next Steps

The project schedule was reviewed:

<b><u>Project Milestone</u></b>	<b><u>Anticipated Timeline</u></b>
• Updated HIRA	February 2021
• HMPC Review Draft	Mid-March 2021
• Public Review Draft	April 2021
• Public Meeting #2	April 2021
• CO DHSEM Review	Late April 2021
• Final Plan for FEMA Review (estimated)	May 2021
• FEMA Review (estimated)	May-June 2021
• Final Approved HMP for local adoption	July 2021

## Adjourn

The meeting adjourned at 11:21 am

## Chaffee County Hazard Mitigation Plan 2021 Update

### Mitigation Strategy Meeting Chat Log

13:31:35 From John Shaver : JT Shaver  
13:31:38 From John Shaver : CSFS Salida  
13:31:41 From Andrea Carlstrom : Andrea Carlstrom, Chaffee County Public Health  
13:31:43 From Phillip Puckett : Phillip Puckett, Town of Buena Vista Administrator  
13:31:47 From Adam Moore - CSFS : Adam Moore, CSFS  
13:31:53 From Mark Thompson : Mark Thompson, DHSEM  
13:31:55 From Sally Broomfield : Sally Broomfield Senior Disaster Program Manager American red Cross of Southeastern Colorado  
13:31:58 From Tony Stromer : Tony Stromer- Buena Vista School District  
13:35:16 From JOSH HADLEY : If anyone is speaking...I'm not able to hear  
13:35:34 From Chief Bess : They are speaking  
13:37:58 From Wano Urbonas : Wano Urbonas, Environmental Health Manager  
13:38:15 From Christopher Greene : Chris Greene - BV Fire Interim Chief  
13:38:16 From Beth Helmke : Beth Helmke, Public Affairs Officer  
13:38:24 From Kathy Rohrich : Kathy Rohrich, Salida Fire Department  
13:39:05 From Marjo Curgus : Marjo Curgus, Planning Commissioner.  
13:43:43 From Michael SCEDD : Michael Yerman, Southern Colorado Economic Development District  
13:48:14 From Michael SCEDD : Where can we get a copy of the risk summary?  
13:48:43 From Chief Bess : Doug Bess, Salida Fire Department  
13:48:46 From Michael SCEDD : thank you  
13:49:22 From JOSH HADLEY : Josh Hadley / Chaffee County EMS  
13:49:33 From Mark Thompson : Mark Thompson, CO DHSEM  
13:50:13 From Kent Maxwell : Kent Maxwell, Chaffee County Fire & Colorado Firecamp  
14:00:01 From Marjo Curgus : I would say it depends on the action plan. The organization of actions should be by threat (fire, drought, flood), but not a hugely long list of actions for all of the.  
14:10:30 From Marjo Curgus : the recovery in 5.1 is only natural disaster. I would assume Andrea is referring to pandemic.  
14:12:56 From Marjo Curgus : "terrorism" was what they called the Florida attack on water supply.  
14:13:30 From Mayor Lacy : I would suggest the "currently adopted building code "  
14:14:12 From Mayor Lacy : rather than date specific it would then be flexible  
14:18:16 From Mark Thompson : More isn't necessarily better. Better is better.  
14:34:00 From Marjo Curgus : For purposes of ecosystem service benefits I believe the county should be considering prioritization of avoidance in some areas of the floodplain, not simply mitigation. Land use regs can support avoidance with a number of tools (TDR, PDR, setbacks, building envelopes). A PDR program AFTER a flood is expensive and really hard to convince a person to do.  
14:47:03 From Amy Carr : FEMA Mitigation Action Portfolio:  
[https://www.fema.gov/sites/default/files/2020-08/fema\\_mitigation-action-portfolio-support-document\\_08-01-2020\\_0.pdf](https://www.fema.gov/sites/default/files/2020-08/fema_mitigation-action-portfolio-support-document_08-01-2020_0.pdf)  
14:47:31 From Amy Carr : Planning for Hazards:  
<https://www.planningforhazards.com/home>  
14:49:19 From Patricia Gavelda : <https://cwcb.colorado.gov/FACE>  
14:53:43 From Beth Helmke : I think some of the enhanced mapping tools (development & use) ideas are great ones and could serve several goals of awareness, preparation, response, etc.  
14:55:33 From Phillip Puckett : There does seem to be momentum around mapping - from housing, infrastructure and now hazard mitigation. seems like an area that we can make progress on.

14:56:23 From Patricia Gavelda : Thanks all - I need to jump on a 3pm call with FEMA so need to disconnect.  
14:56:40 From Rich Atkins - CC OEM : Definitely Phillip.  
14:57:17 From Rich Atkins - CC OEM : Thanks Patricia.



Respondent



1

Anonymous



11:05



Time to complete

## Instructions

1. Review each goal and the objectives that support them.
2. Share suggested edits to goals and objectives in the text box. Be sure to note the specific goal and/or objective you think should be revised.
3. Provide your name and contact information.

### 1. Goal 1: Reduce risk and effects of natural hazards

*Objective 1.1: Assess and improve hazard-specific mapping and warning systems associated with high risk hazards to provide accurate and accessible information for public officials, citizens, visitors, and responders.*

*Objective 1.2: Reduce the frequency, severity, and potential impacts of wildfires via proactive measures and education.*

*Objective 1.3: Reduce the severity and potential impacts of flooding via proactive measures and education*

Looks good

### 2. Goal 2: Increase public awareness of risk from natural hazards

*Objective 2.1: Assess and improve emergency notification systems to ensure reliable, diverse, and redundant public communication of potential hazards.*

*Objective 2.2: Improve community education programs to increase awareness of hazards and mitigation opportunities to reduce personal risk to citizens and visitors.*

*Objective 2.3: Conduct exercises or training with public officials and community members regarding the prevention and mitigation of natural hazards.*

Looks good.

### 3. Goal 3: Minimize loss of life and property from natural hazards

*Objective 3.1: Protect and reduce vulnerability of critical facilities, infrastructure, and other key community assets from natural hazards*

*Objective 3.2: Minimize economic impact of natural hazard events*

*Objective 3.3: Improve government and public response to natural hazard disasters*

Looks good.

### 4. Goal 4: Improve community resiliency to natural hazards

*Objective 4.1: Establish and maintain relationships with public agencies, nongovernmental organizations, businesses, and citizens to strengthen hazard communication and coordination, both within and outside of Chaffee County.*

*Objective 4.2: Incorporate hazard analysis and emergency preparedness planning into county and local future development planning.*

*Objective 4.3: Continually assess ongoing programs and activities to improve disaster resilience.*

Looks Good

### 5. Goal 5: Protect public health and safety

*Objective 5.1: Identify needs and leverage available funding streams to improve public safety, response, and recovery programs to ensure essential services can be maintained during and after a natural disaster.*

*Objective 5.2: Develop effective primary and alternative emergency operations facilities to facilitate effective incident/event support*

*Objective 5.3: Adopt codes, standards, rules, and regulations to ensure compliance with mitigation standards, goals, and requirements.*

include "guidelines" along with rules and regulations in 5.3?

## Contact Information

6. Name (first and last)

Brian Berger

7. Department or Agency you represent

Town of Poncha Springs

8. Email address

manager@ponchasprings.us



Respondent



2

Anonymous



11:20



Time to complete

## Instructions

1. Review each goal and the objectives that support them.
2. Share suggested edits to goals and objectives in the text box. Be sure to note the specific goal and/or objective you think should be revised.
3. Provide your name and contact information.

### 1. Goal 1: Reduce risk and effects of natural hazards

*Objective 1.1: Assess and improve hazard-specific mapping and warning systems associated with high risk hazards to provide accurate and accessible information for public officials, citizens, visitors, and responders.*

*Objective 1.2: Reduce the frequency, severity, and potential impacts of wildfires via proactive measures and education.*

*Objective 1.3: Reduce the severity and potential impacts of flooding via proactive measures and education*

### 2. Goal 2: Increase public awareness of risk from natural hazards

*Objective 2.1: Assess and improve emergency notification systems to ensure reliable, diverse, and redundant public communication of potential hazards.*

*Objective 2.2: Improve community education programs to increase awareness of hazards and mitigation opportunities to reduce personal risk to citizens and visitors.*

*Objective 2.3: Conduct exercises or training with public officials and community members regarding the prevention and mitigation of natural hazards.*

### 3. Goal 3: Minimize loss of life and property from natural hazards

*Objective 3.1: Protect and reduce vulnerability of critical facilities, infrastructure, and other key community assets from natural hazards*

*Objective 3.2: Minimize economic impact of natural hazard events*

*Objective 3.3: Improve government and public response to natural hazard disasters*

### 4. Goal 4: Improve community resiliency to natural hazards

*Objective 4.1: Establish and maintain relationships with public agencies, nongovernmental organizations, businesses, and citizens to strengthen hazard communication and coordination, both within and outside of Chaffee County.*

*Objective 4.2: Incorporate hazard analysis and emergency preparedness planning into county and local future development planning.*

*Objective 4.3: Continually assess ongoing programs and activities to improve disaster resilience.*

### 5. Goal 5: Protect public health and safety

*Objective 5.1: Identify needs and leverage available funding streams to improve public safety, response, and recovery programs to ensure essential services can be maintained during and after a natural disaster.*

*Objective 5.2: Develop effective primary and alternative emergency operations facilities to facilitate effective incident/event support*

*Objective 5.3: Adopt codes, standards, rules, and regulations to ensure compliance with mitigation standards, goals, and requirements.*

## Contact Information

6. Name (first and last)

Sally Broomfield

7. Department or Agency you represent

American Red Cross of Southeastern Colorado

8. Email address

sally.broomfield2@redcross.org





Respondent



3

Anonymous



07:35



Time to complete

## Instructions

1. Review each goal and the objectives that support them.
2. Share suggested edits to goals and objectives in the text box. Be sure to note the specific goal and/or objective you think should be revised.
3. Provide your name and contact information.

### 1. Goal 1: Reduce risk and effects of natural hazards

*Objective 1.1: Assess and improve hazard-specific mapping and warning systems associated with high risk hazards to provide accurate and accessible information for public officials, citizens, visitors, and responders.*

*Objective 1.2: Reduce the frequency, severity, and potential impacts of wildfires via proactive measures and education.*

*Objective 1.3: Reduce the severity and potential impacts of flooding via proactive measures and education*

I wonder if 1.1 should include "make the mapping available to each jurisdiction through their GIS system" so that on the ground planners can have this information on the front line, as they engage with developers?

### 2. Goal 2: Increase public awareness of risk from natural hazards

*Objective 2.1: Assess and improve emergency notification systems to ensure reliable, diverse, and redundant public communication of potential hazards.*

*Objective 2.2: Improve community education programs to increase awareness of hazards and mitigation opportunities to reduce personal risk to citizens and visitors.*

*Objective 2.3: Conduct exercises or training with public officials and community members regarding the prevention and mitigation of natural hazards.*

Looks great!

### 3. Goal 3: Minimize loss of life and property from natural hazards

*Objective 3.1: Protect and reduce vulnerability of critical facilities, infrastructure, and other key community assets from natural hazards*

*Objective 3.2: Minimize economic impact of natural hazard events*

*Objective 3.3: Improve government and public response to natural hazard disasters*

How is 3.2 actionable? I wonder if including the "how" would make it a more measurable goal?

### 4. Goal 4: Improve community resiliency to natural hazards

*Objective 4.1: Establish and maintain relationships with public agencies, nongovernmental organizations, businesses, and citizens to strengthen hazard communication and coordination, both within and outside of Chaffee County.*

*Objective 4.2: Incorporate hazard analysis and emergency preparedness planning into county and local future development planning.*

*Objective 4.3: Continually assess ongoing programs and activities to improve disaster resilience.*

I LOVE 4.2!!

### 5. Goal 5: Protect public health and safety

*Objective 5.1: Identify needs and leverage available funding streams to improve public safety, response, and recovery programs to ensure essential services can be maintained during and after a natural disaster.*

*Objective 5.2: Develop effective primary and alternative emergency operations facilities to facilitate effective incident/event support*

*Objective 5.3: Adopt codes, standards, rules, and regulations to ensure compliance with mitigation standards, goals, and requirements.*

## Contact Information

6. Name (first and last)

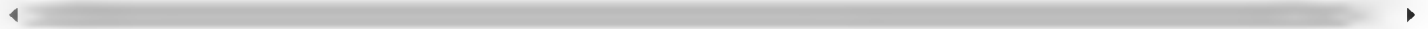
Becky Gray

7. Department or Agency you represent

Chaffee County Office of Housing

8. Email address

bgray@chaffecounty.org



Respondent



4

Anonymous



06:33



Time to complete

## Instructions

1. Review each goal and the objectives that support them.
2. Share suggested edits to goals and objectives in the text box. Be sure to note the specific goal and/or objective you think should be revised.
3. Provide your name and contact information.

### 1. Goal 1: Reduce risk and effects of natural hazards

*Objective 1.1: Assess and improve hazard-specific mapping and warning systems associated with high risk hazards to provide accurate and accessible information for public officials, citizens, visitors, and responders.*

*Objective 1.2: Reduce the frequency, severity, and potential impacts of wildfires via proactive measures and education.*

*Objective 1.3: Reduce the severity and potential impacts of flooding via proactive measures and education*

These goals still seem appropriate for the update.

### 2. Goal 2: Increase public awareness of risk from natural hazards

*Objective 2.1: Assess and improve emergency notification systems to ensure reliable, diverse, and redundant public communication of potential hazards.*

*Objective 2.2: Improve community education programs to increase awareness of hazards and mitigation opportunities to reduce personal risk to citizens and visitors.*

*Objective 2.3: Conduct exercises or training with public officials and community members regarding the prevention and mitigation of natural hazards.*

These goals still seem appropriate for the update.

### 3. Goal 3: Minimize loss of life and property from natural hazards

*Objective 3.1: Protect and reduce vulnerability of critical facilities, infrastructure, and other key community assets from natural hazards*

*Objective 3.2: Minimize economic impact of natural hazard events*

*Objective 3.3: Improve government and public response to natural hazard disasters*

Do we want to also include minimize damage and loss to non-critical assets such as property, should there also be an education aspect about this that assists people in minimizing losses or is that incorporated in Goal 2?

### 4. Goal 4: Improve community resiliency to natural hazards

*Objective 4.1: Establish and maintain relationships with public agencies, nongovernmental organizations, businesses, and citizens to strengthen hazard communication and coordination, both within and outside of Chaffee County.*

*Objective 4.2: Incorporate hazard analysis and emergency preparedness planning into county and local future development planning.*

*Objective 4.3: Continually assess ongoing programs and activities to improve disaster resilience.*

These goals still seem appropriate for the update.

### 5. Goal 5: Protect public health and safety

*Objective 5.1: Identify needs and leverage available funding streams to improve public safety, response, and recovery programs to ensure essential services can be maintained during and after a natural disaster.*

*Objective 5.2: Develop effective primary and alternative emergency operations facilities to facilitate effective incident/event support*

*Objective 5.3: Adopt codes, standards, rules, and regulations to ensure compliance with mitigation standards, goals, and requirements.*

These goals still seem appropriate for the update.

## Contact Information

6. Name (first and last)

7. Department or Agency you represent

8. Email address





Respondent



5

Anonymous



10:33



Time to complete

## Instructions

1. Review each goal and the objectives that support them.
2. Share suggested edits to goals and objectives in the text box. Be sure to note the specific goal and/or objective you think should be revised.
3. Provide your name and contact information.

### 1. Goal 1: Reduce risk and effects of natural hazards

*Objective 1.1: Assess and improve hazard-specific mapping and warning systems associated with high risk hazards to provide accurate and accessible information for public officials, citizens, visitors, and responders.*

*Objective 1.2: Reduce the frequency, severity, and potential impacts of wildfires via proactive measures and education.*

*Objective 1.3: Reduce the severity and potential impacts of flooding via proactive measures and education*

Determine whether "natural hazards" fits here or needs to be expanded. There are a number of upcoming mapping projects that will need to be included in the Obj.1.1 actions. Could you define "proactive measures?"

### 2. Goal 2: Increase public awareness of risk from natural hazards

*Objective 2.1: Assess and improve emergency notification systems to ensure reliable, diverse, and redundant public communication of potential hazards.*

*Objective 2.2: Improve community education programs to increase awareness of hazards and mitigation opportunities to reduce personal risk to citizens and visitors.*

*Objective 2.3: Conduct exercises or training with public officials and community members regarding the prevention and mitigation of natural hazards.*

good. But again, focuses on natural and ignores cybersecurity, disease vectors

### 3. Goal 3: Minimize loss of life and property from natural hazards

*Objective 3.1: Protect and reduce vulnerability of critical facilities, infrastructure, and other key community assets from natural hazards*

*Objective 3.2: Minimize economic impact of natural hazard events*

*Objective 3.3: Improve government and public response to natural hazard disasters*

We need to add something on pandemic preparation, response and recovery. What did we learn this go around that needs to be in place for the next time? Covid is not going away. So perhaps we need to either add additional objectives or remove "natural" and replace with hazards and threats.

### 4. Goal 4: Improve community resiliency to natural hazards

*Objective 4.1: Establish and maintain relationships with public agencies, nongovernmental organizations, businesses, and citizens to strengthen hazard communication and coordination, both within and outside of Chaffee County.*

*Objective 4.2: Incorporate hazard analysis and emergency preparedness planning into county and local future development planning.*

*Objective 4.3: Continually assess ongoing programs and activities to improve disaster resilience.*

I think we need an objective that deals with planning for resilience and not simply incorporating hazard analysis and OEM. It would expand the County's focus to more broadly look at resilience.

### 5. Goal 5: Protect public health and safety

*Objective 5.1: Identify needs and leverage available funding streams to improve public safety, response, and recovery programs to ensure essential services can be maintained during and after a natural disaster.*

*Objective 5.2: Develop effective primary and alternative emergency operations facilities to facilitate effective incident/event support*

*Objective 5.3: Adopt codes, standards, rules, and regulations to ensure compliance with mitigation standards, goals, and requirements.*

This is more general, but now that I look at all 5 goals, I reiterate we need to incorporate concepts other than flood, fire, drought, land movement but drought (economic/business), pandemic/disease vectors, and cybersecurity.

## Contact Information

6. Name (first and last)

Marjo

7. Department or Agency you represent

County Planning Commission

8. Email address

delcorazonconsulting@gmail.com

Respondent



6

Anonymous



04:52



Time to complete

## Instructions

1. Review each goal and the objectives that support them.
2. Share suggested edits to goals and objectives in the text box. Be sure to note the specific goal and/or objective you think should be revised.
3. Provide your name and contact information.

### 1. Goal 1: Reduce risk and effects of natural hazards

*Objective 1.1: Assess and improve hazard-specific mapping and warning systems associated with high risk hazards to provide accurate and accessible information for public officials, citizens, visitors, and responders.*

*Objective 1.2: Reduce the frequency, severity, and potential impacts of wildfires via proactive measures and education.*

*Objective 1.3: Reduce the severity and potential impacts of flooding via proactive measures and education*

### 2. Goal 2: Increase public awareness of risk from natural hazards

*Objective 2.1: Assess and improve emergency notification systems to ensure reliable, diverse, and redundant public communication of potential hazards.*

*Objective 2.2: Improve community education programs to increase awareness of hazards and mitigation opportunities to reduce personal risk to citizens and visitors.*

*Objective 2.3: Conduct exercises or training with public officials and community members regarding the prevention and mitigation of natural hazards.*

good

### 3. Goal 3: Minimize loss of life and property from natural hazards

*Objective 3.1: Protect and reduce vulnerability of critical facilities, infrastructure, and other key community assets from natural hazards*

*Objective 3.2: Minimize economic impact of natural hazard events*

*Objective 3.3: Improve government and public response to natural hazard disasters*

good

### 4. Goal 4: Improve community resiliency to natural hazards

*Objective 4.1: Establish and maintain relationships with public agencies, nongovernmental organizations, businesses, and citizens to strengthen hazard communication and coordination, both within and outside of Chaffee County.*

*Objective 4.2: Incorporate hazard analysis and emergency preparedness planning into county and local future development planning.*

*Objective 4.3: Continually assess ongoing programs and activities to improve disaster resilience.*

good

### 5. Goal 5: Protect public health and safety

*Objective 5.1: Identify needs and leverage available funding streams to improve public safety, response, and recovery programs to ensure essential services can be maintained during and after a natural disaster.*

*Objective 5.2: Develop effective primary and alternative emergency operations facilities to facilitate effective incident/event support*

*Objective 5.3: Adopt codes, standards, rules, and regulations to ensure compliance with mitigation standards, goals, and requirements.*

good

## Contact Information

6. Name (first and last)

Adam Moore

7. Department or Agency you represent

CSFS

8. Email address

Adam.Moore@colostate.edu





Respondent



7

Anonymous



10:03



Time to complete

## Instructions

1. Review each goal and the objectives that support them.
2. Share suggested edits to goals and objectives in the text box. Be sure to note the specific goal and/or objective you think should be revised.
3. Provide your name and contact information.

### 1. Goal 1: Reduce risk and effects of natural hazards

*Objective 1.1: Assess and improve hazard-specific mapping and warning systems associated with high risk hazards to provide accurate and accessible information for public officials, citizens, visitors, and responders.*

*Objective 1.2: Reduce the frequency, severity, and potential impacts of wildfires via proactive measures and education.*

*Objective 1.3: Reduce the severity and potential impacts of flooding via proactive measures and education*

Provide more specifics so the Objectives can be measured: \*Engage with Buena Vista residents regarding upstream flood mitigation issues. \*Ensure low-impact development efforts for future construction along the S. Fork of the Arkansas River.

### 2. Goal 2: Increase public awareness of risk from natural hazards

*Objective 2.1: Assess and improve emergency notification systems to ensure reliable, diverse, and redundant public communication of potential hazards.*

*Objective 2.2: Improve community education programs to increase awareness of hazards and mitigation opportunities to reduce personal risk to citizens and visitors.*

*Objective 2.3: Conduct exercises or training with public officials and community members regarding the prevention and mitigation of natural hazards.*

Perform a series of 5 preventative steps that will encourage protection of both our natural and human environment.

### 3. Goal 3: Minimize loss of life and property from natural hazards

*Objective 3.1: Protect and reduce vulnerability of critical facilities, infrastructure, and other key community assets from natural hazards*

*Objective 3.2: Minimize economic impact of natural hazard events*

*Objective 3.3: Improve government and public response to natural hazard disasters*

Identify the top 3 geographic risks within Chaffee County.

### 4. Goal 4: Improve community resiliency to natural hazards

*Objective 4.1: Establish and maintain relationships with public agencies, nongovernmental organizations, businesses, and citizens to strengthen hazard communication and coordination, both within and outside of Chaffee County.*

*Objective 4.2: Incorporate hazard analysis and emergency preparedness planning into county and local future development planning.*

*Objective 4.3: Continually assess ongoing programs and activities to improve disaster resilience.*

Create 3 specific sub-groups that will work on specific geographic concerns related to wildfire, flooding and transportation accidents.

### 5. Goal 5: Protect public health and safety

*Objective 5.1: Identify needs and leverage available funding streams to improve public safety, response, and recovery programs to ensure essential services can be maintained during and after a natural disaster.*

*Objective 5.2: Develop effective primary and alternative emergency operations facilities to facilitate effective incident/event support*

*Objective 5.3: Adopt codes, standards, rules, and regulations to ensure compliance with mitigation standards, goals, and requirements.*

Adopt the 2018 Building Code.

## Contact Information

6. Name (first and last)

Wano Urbonas

7. Department or Agency you represent

Chaffee County Public Health & Environment

8. Email address

wurbonas@chaffeecounty.org



Respondent



8

Anonymous



42:49



Time to complete

## Instructions

1. Review each goal and the objectives that support them.
2. Share suggested edits to goals and objectives in the text box. Be sure to note the specific goal and/or objective you think should be revised.
3. Provide your name and contact information.

### 1. Goal 1: Reduce risk and effects of natural hazards

*Objective 1.1: Assess and improve hazard-specific mapping and warning systems associated with high risk hazards to provide accurate and accessible information for public officials, citizens, visitors, and responders.*

*Objective 1.2: Reduce the frequency, severity, and potential impacts of wildfires via proactive measures and education.*

*Objective 1.3: Reduce the severity and potential impacts of flooding via proactive measures and education*

Amend the Land Use Code (LUC) to strengthen wording to require avoidance of hazards: add disturbance distance from drainages, streams & rivers; amend the floodplain regulations to stop houses being built there with a permit (increases insurance costs for society); and no building in flash flood areas, debris flow hazard areas, fluvial hazard areas, etc. (we'll have them mapped at some point).

### 2. Goal 2: Increase public awareness of risk from natural hazards

*Objective 2.1: Assess and improve emergency notification systems to ensure reliable, diverse, and redundant public communication of potential hazards.*

*Objective 2.2: Improve community education programs to increase awareness of hazards*

*and mitigation opportunities to reduce personal risk to citizens and visitors.*

*Objective 2.3: Conduct exercises or training with public officials and community members regarding the prevention and mitigation of natural hazards.*

CR 162 is such a popular area and the Chalk Cliffs make such an impact with flows into roads and streams, including St. Elmo area. The Chaffee County Road & Bridge crews often fix these areas when there is a debris flow.

### 3. Goal 3: Minimize loss of life and property from natural hazards

*Objective 3.1: Protect and reduce vulnerability of critical facilities, infrastructure, and other key community assets from natural hazards*

*Objective 3.2: Minimize economic impact of natural hazard events*

*Objective 3.3: Improve government and public response to natural hazard disasters*

LUC: look at the campground regulations in flood areas; map subsidence areas (like Methodist Mt.)

### 4. Goal 4: Improve community resiliency to natural hazards

*Objective 4.1: Establish and maintain relationships with public agencies, nongovernmental organizations, businesses, and citizens to strengthen hazard communication and coordination, both within and outside of Chaffee County.*

*Objective 4.2: Incorporate hazard analysis and emergency preparedness planning into county and local future development planning.*

*Objective 4.3: Continually assess ongoing programs and activities to improve disaster resilience.*

CR 289 is a by-pass to the 'low water crossing' on CR 162 where the debris is channeled when there's a rainstorm event. I think there are signs there but may need to update them (and make sure people don't drive down CR 289-A, which is a privately maintained road and goes to a private bridge).

### 5. Goal 5: Protect public health and safety

*Objective 5.1: Identify needs and leverage available funding streams to improve public safety, response, and recovery programs to ensure essential services can be maintained during and after a natural disaster.*

*Objective 5.2: Develop effective primary and alternative emergency operations facilities*

*to facilitate effective incident/event support*

*Objective 5.3: Adopt codes, standards, rules, and regulations to ensure compliance with mitigation standards, goals, and requirements.*

Seems like 2019 and 2020 have had their share of disasters - maybe an evaluation with the emergency and health providers to see what they need.

## Contact Information

6. Name (first and last)

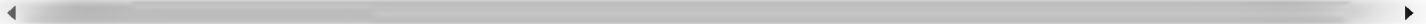
Christie Barton

7. Department or Agency you represent

Chaffee County Planning

8. Email address

cbarton@chaffeecounty.org



Respondent



9

Anonymous



04:26



Time to complete

## Instructions

1. Review each goal and the objectives that support them.
2. Share suggested edits to goals and objectives in the text box. Be sure to note the specific goal and/or objective you think should be revised.
3. Provide your name and contact information.

### 1. Goal 1: Reduce risk and effects of natural hazards

*Objective 1.1: Assess and improve hazard-specific mapping and warning systems associated with high risk hazards to provide accurate and accessible information for public officials, citizens, visitors, and responders.*

*Objective 1.2: Reduce the frequency, severity, and potential impacts of wildfires via proactive measures and education.*

*Objective 1.3: Reduce the severity and potential impacts of flooding via proactive measures and education*

I just wonder if 1.2 and 1.3 can be merged to state "natural hazards" rather than separate out wildfires and flooding. Aren't there other natural hazards that could be included in this?

### 2. Goal 2: Increase public awareness of risk from natural hazards

*Objective 2.1: Assess and improve emergency notification systems to ensure reliable, diverse, and redundant public communication of potential hazards.*

*Objective 2.2: Improve community education programs to increase awareness of hazards and mitigation opportunities to reduce personal risk to citizens and visitors.*



*Objective 2.3: Conduct exercises or training with public officials and community members regarding the prevention and mitigation of natural hazards.*

I think this is SO important.

### 3. Goal 3: Minimize loss of life and property from natural hazards

*Objective 3.1: Protect and reduce vulnerability of critical facilities, infrastructure, and other key community assets from natural hazards*

*Objective 3.2: Minimize economic impact of natural hazard events*

*Objective 3.3: Improve government and public response to natural hazard disasters*

I would think that loss of life and property should/could also be tied into 2.

### 4. Goal 4: Improve community resiliency to natural hazards

*Objective 4.1: Establish and maintain relationships with public agencies, nongovernmental organizations, businesses, and citizens to strengthen hazard communication and coordination, both within and outside of Chaffee County.*

*Objective 4.2: Incorporate hazard analysis and emergency preparedness planning into county and local future development planning.*

*Objective 4.3: Continually assess ongoing programs and activities to improve disaster resilience.*

Could recovery be incorporated into this?

### 5. Goal 5: Protect public health and safety

*Objective 5.1: Identify needs and leverage available funding streams to improve public safety, response, and recovery programs to ensure essential services can be maintained during and after a natural disaster.*

*Objective 5.2: Develop effective primary and alternative emergency operations facilities to facilitate effective incident/event support*

*Objective 5.3: Adopt codes, standards, rules, and regulations to ensure compliance with mitigation standards, goals, and requirements.*

Where does bioterrorism or terrorism fall?

## Contact Information

6. Name (first and last)

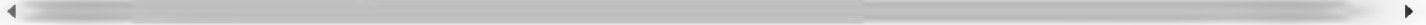
Andrea Carlstrom

7. Department or Agency you represent

Chaffee County Public Health

8. Email address

acarlstrom@chaffeecounty.org



## Chaffee County HMP Goals Revised 3/5/2021

Based on Input from online form and dialogue from HMPC Meeting 3 on 3-4-2021.

Note: Red text is new

### Goal 1: Reduce risk and effects of ~~natural~~ hazards

Objective 1.1: Assess and improve hazard-specific mapping and warning systems associated with high risk hazards to provide accurate and accessible information for public officials, citizens, visitors, and responders

1.2: Reduce the frequency, severity, and potential impacts of wildfires via proactive measures and education.

1.3: Reduce the severity and potential impacts of flooding via proactive measures and education

### Goal 2: Increase public awareness of risk from ~~natural~~ hazards

Objective 2.1: Assess and improve emergency notification systems to ensure reliable, diverse, and redundant public communication of potential hazards.

Objective 2.2: Improve community education programs to increase awareness of hazards and mitigation opportunities to reduce personal risk to citizens and visitors.

Objective 2.3: Conduct exercises or training with public officials and community members regarding the prevention and mitigation of ~~natural~~ hazards.

### Goal 3: Minimize loss of life and property from ~~natural~~ hazards

Objective 3.1: Protect and reduce vulnerability of critical facilities, infrastructure, and other key community lifelines and assets from ~~natural~~ hazards.

Objective 3.2: Minimize economic impact of ~~natural~~ hazard events **and reduce private property losses.**

Objective 3.3: Improve government and public response to ~~natural~~ hazards **and** disasters.

### Goal 4: Improve community resiliency to ~~natural~~ hazards

Objective 4.1: Establish and maintain relationships with public agencies, nongovernmental organizations, businesses, and citizens to strengthen hazard communication and coordination, both within and outside of Chaffee County.

Objective 4.2: **Build resilience through integrated planning including** incorporating hazard analysis, **hazard mitigation,** and emergency preparedness ~~planning~~ **considerations** into county and local future development planning.

Objective 4.3: Continually assess ongoing programs and activities to improve disaster resilience.

**Objective 4.4: Assess opportunities to incorporate mitigation during recovery from hazard events to reduce repeated damages.**

Formatted: Font color: Red

**Goal 5: Protect public health and safety**

Objective 5.1: Identify needs and leverage available funding streams to improve public safety, response, and recovery programs to ensure essential services can be maintained during and after a ~~natural~~ hazard ~~event~~ or disaster.

Objective 5.2: Develop effective primary and alternative emergency operations facilities to facilitate effective incident/event support.

Objective 5.3: Adopt codes, standards, rules, ~~guidelines~~, and regulations to ensure compliance with mitigation standards, goals, and requirements.

## Mitigation Action Selection and Prioritization Criteria

---

Does the proposed action protect lives or vulnerable populations?

Does the proposed action address hazards or areas with the highest risk?

Does the proposed action protect critical facilities, infrastructure, or community assets?

Does the proposed action meet multiple objectives (multi-objective management)?

### **STAPLE/E**

Developed by FEMA, this method of applying evaluation criteria enables the planning team to consider in a systematic way the social, technical, administrative, political, legal, economic, and environmental opportunities and constraints of implementing a particular mitigation action. For each action, the HMPC should ask, and consider the answers to, the following questions:

#### **Social**

Does the measure treat people fairly (different groups, different generations)? Does it consider social equity, disadvantaged communities, or vulnerable populations?

#### **Technical**

Will it work? (Does it solve the problem? Is it feasible?)

#### **Administrative**

Is there capacity to implement and manage project?

#### **Political**

Who are the stakeholders? Did they get to participate? Is there public support? Is political leadership willing to support it?

#### **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?

**Example Mitigation Actions by FEMA categories with Hazards Identified in the Chaffee County Hazard Mitigation Plan Update 2021**

Alternative Mitigation Actions	Dam Incidents	Floods	Epidemic/ Pandemic Cyber Threat, HazMat	Avalanches; Landslide, Mud/Debris Flow, Rockfall; Erosion and Deposition, Expansive soils, and subsidence	Weather Extremes: (drought and extreme heat; hail, lightning, and severe wind; tornado)	Earthquakes	Wildfire	Winter Storm
<b>PLANS and REGULATIONS</b>								
Building codes and enforcement		■		■	■	■	■	■
Comprehensive Watershed Tax		■						
Density controls	■	■		■			■	
Design review standards		■		■		■	■	
Easements		■		■			■	
Environmental review standards		■		■		■	■	
Floodplain development regulations	■	■						
Hazard mapping	■	■		■			■	
Fluvial Hazard Zone mapping and regulations		■		■				
Floodplain zoning	■	■						
Forest fire fuel reduction							■	
Housing/landlord codes					■			
Slide-prone area/grading/hillside development regulations				■			■	
Manufactured home guidelines/regulations		■			■	■		
Multi-Jurisdiction Cooperation within watershed	■	■						
Open burning regulations							■	
Open space preservation	■	■		■			■	
Performance standards	■	■		■	■	■	■	■
Special use permits	■	■		■			■	
Stormwater management regulations		■						

Alternative Mitigation Actions	Dam Incidents	Floods	Epidemic/ Pandemic Cyber Threat, HazMat	Avalanches; Landslide, Mud/Debris Flow, Rockfall; Erosion and Deposition, Expansive soils, and subsidence	Weather Extremes: (drought and extreme heat; hail, lightning, and severe wind; tornado)	Earthquakes	Wildfire	Winter Storm
Subdivision and development regulations	■	■		■		■	■	
Surge protectors and lightning protection					■			
Tree Management					■		■	■
Transfer of development rights		■		■			■	
Utility location		■		■	■		■	■
<b>STRUCTURE AND INFRASTRUCTURE PROJECTS</b>								
Acquisition of hazard prone structures	■	■		■			■	
Facility inspections/reporting	■	■				■		
Construction of barriers around structures	■	■						
Elevation of structures	■	■						
Relocation out of hazard areas	■	■		■			■	
Structural retrofits (e.g., reinforcement, floodproofing, bracing, etc.)		■	■	■	■	■	■	■
Channel maintenance		■		■				
Dams/reservoirs (including maintenance)	■	■						
Levees and floodwalls (including maintenance)		■						
Safe room/shelter					■	■		■
Secondary containment system								
Site reclamation/restoration/revegetation		■		■				
Snow fences					■			■
Water supply augmentation					■			
Debris Control/Debris basins		■		■				
Defensible Space							■	
Stream stabilization		■		■				



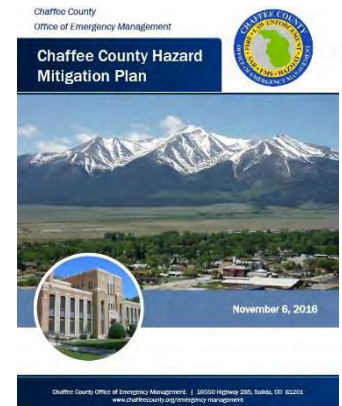
Alternative Mitigation Actions	Dam Incidents	Floods	Epidemic/ Pandemic Cyber Threat, HazMat	Avalanches; Landslide, Mud/Debris Flow, Rockfall; Erosion and Deposition, Expansive soils, and subsidence	Weather Extremes: (drought and extreme heat; hail, lightning, and severe wind; tornado)	Earthquakes	Wildfire	Winter Storm
<b>EDUCATION AND AWARENESS</b>								
Flood Insurance	■	■						
Hazard information centers	■	■	■	■	■	■	■	■
Public education and outreach programs	■	■	■	■	■	■	■	■
Real estate disclosure	■	■		■	■	■	■	■
Crop Insurance					■	■		
Lightning detectors in public areas					■			
Disease contact tracing protocols and tools			■					
<b>NATURAL SYSTEMS PROTECTION</b>								
Best Management Practices (BMPs)		■		■	■		■	
Forest and vegetation management	■	■		■	■		■	■
Hydrological Monitoring	■	■		■	■			
Sediment and erosion control regulations	■	■		■				
Stream corridor restoration		■		■				
Stream dumping regulations		■						
Urban forestry and landscape management		■		■	■		■	■
Wetlands development regulations		■		■			■	
<b>EMERGENCY SERVICES</b>								
Critical facilities protection	■	■	■	■	■	■	■	■
Emergency response services	■	■	■	■	■	■	■	■
Facility employee safety training programs	■	■	■	■	■	■	■	■
Hazard threat recognition	■	■	■	■	■	■	■	■
Hazard warning systems (community sirens, NOAA weather radio)	■	■	■	■	■	■	■	■
Health and safety maintenance	■	■	■	■	■	■	■	■

Alternative Mitigation Actions	Dam Incidents	Floods	Epidemic/ Pandemic Cyber Threat, HazMat	Avalanches; Landslide, Mud/Debris Flow, Rockfall; Erosion and Deposition, Expansive soils, and subsidence	Weather Extremes: (drought and extreme heat; hail, lightning, and severe wind; tornado)	Earthquakes	Wildfire	Winter Storm
Post-disaster mitigation	■	■		■	■	■	■	■
Evacuation planning	■	■	■	■			■	

# Chaffee County Hazard Mitigation Plan Update 2021

## Project Backgrounder

Chaffee County in collaboration with City of Salida, Town of Buena Vista, and Town of Poncha Springs are updating their Multi-Jurisdictional Hazard Mitigation Plan. This plan develops community mitigation strategies, to work towards reducing the risks posed by hazards. The plan must be updated and approved by FEMA every five years to keep it current and to maintain eligibility for mitigation grant assistance. The plan is currently being updated under the guidance of a multi-jurisdictional Hazard Mitigation Planning Committee



### What is hazard mitigation?

The term “Hazard Mitigation” describes actions that can help reduce or eliminate long-term risks caused by hazards, such as floods, wildfires, tornadoes, and earthquakes. Hazard mitigation is best accomplished when based on a comprehensive, long-term plan developed before a disaster strikes.

As the costs of disaster and hazard impacts continue to rise, governments and citizens must find ways to reduce hazard risks to our communities. Oftentimes after disasters, repairs and reconstruction are often completed in such a way as to simply restore damaged property to pre-disaster conditions. These efforts may “get things back to normal,” but the replication of pre-disaster conditions often results in a repetitive cycle of damage, reconstruction, and repeated damage.

Hazard mitigation breaks this repetitive cycle by producing less vulnerable conditions through pre- and post- disaster actions, projects, and resilient reconstruction. The implementation of such hazard mitigation actions now by local governments means building stronger, safer, and smarter communities that will be able to reduce future injuries and damages.



### Project Benefits

Mitigation is an investment in a community’s future safety, sustainability, and resiliency. Recent cost-benefit studies have proven mitigation to be cost effective for communities, with mitigation projects returning \$6 for every \$1 spent. Mitigation planning helps communities take action now, before a disaster, to reduce impacts when a disaster occurs.

Hazard mitigation planning helps residents, business owners, elected officials, and municipal departments think through how to plan, design, build, and establish partnerships for risk reduction. Consider the critical importance of hazard mitigation to:

- Protect public safety and prevent loss of life and injury.
- Reduce harm to existing and future development.
- Maintain community continuity and strengthen the social connections that are essential for recovery.
- Prevent damage to your community’s unique economic, cultural, and environmental assets.
- Minimize operational downtime and accelerate recovery of government and business after disasters.
- Reduce the costs of disaster response and recovery and the exposure to risk for first responders.
- Help accomplish other community objectives, such as capital improvements, infrastructure protection, open space preservation, and economic resiliency.



**Additionally, the County and their municipalities will benefit from this project by:**

- Ensuring eligibility for all sources of hazard mitigation funds made available through FEMA.
- Increasing public awareness and understanding of vulnerabilities as well as support for specific actions to reduce losses from future disasters.
- Ensuring community policies, programs, and goals are compatible with reducing vulnerability to all hazards and identifying those that are incompatible.
- Building partnerships with diverse stakeholders, increasing opportunities to leverage data and resources in reducing workloads, as well as achieving shared community objectives.
- Expanding the understanding of potential risk reduction measures to include: local plans and regulations; structure and infrastructure projects; natural systems protection; education and awareness programs; and other tools.
- Informing the development, prioritization, and implementation of mitigation projects. Benefits accrue over the life of these projects as losses are avoided from each subsequent hazard event.

**The Plan Update Process**

The County is following a 4 phase/9 step process to update the plan over the first quarter of 2021, following FEMA guidance with consultant assistance.

**How to Get Involved:**

Residents, organizations, interested stakeholders and businesses are encouraged to contribute to the planning process. One way is to take a short public survey designed to gather input on hazards and their mitigation.

Take the Public Survey!  
Open until February 8th  
<https://bit.ly/ChaffeeHMPSurvey>



The updated plan is anticipated to be ready for public review and comment in the spring of 2021.

**For more information please contact:**

<b>Jeff Brislawn, Project Manager</b> Wood Environment & Infrastructure Solutions, Inc Planning consultant	<b>Rich Atkins, Emergency Manager</b> Chaffee County Office of Emergency Management
Phone: (303) 742-5315	Phone: (719) 207-2730
Email: <a href="mailto:jeff.brislawn@woodplc.com">jeff.brislawn@woodplc.com</a>	Email: <a href="mailto:chaffeeoem@gmail.com">chaffeeoem@gmail.com</a>



From: Chaffee OEM <chaffeeoem@gmail.com>  
Sent: Tuesday, January 19, 2021 4:29 PM  
To: Adam Moore; Amber Van Luken; Amy Titterington; Andrea Carlstrom; Andy Rohrich; Annette Stolba; Becky Gray; Ben Scanga; Beth Helmke; Bill McCormick; Brandon Hawkins; Brenda Mosby; Brenda Wasielewski; Brian Burger; Brislawn, Jeff P; Cailee Hamm; Chelsey Nutter; Chris Greene; Chris McGinnis; Chris Naccarato; Christie Barton; Christy Doon; Cindy Williams; Dale Johnson; Damon Lange; Dan Osborn; Dan Short; Dan Swallow; Daniel Tom; David Blackburn; Dean Morgan; Dean Russell; Dick Eustis; Doug Bess; Drew Nelson; Duff Lacy; Eric Rasmussen; Gene Stanley; Glenn Cottone; Greg Felt; Greg Heavener; Jeffery Graf; Jenny Davis; Jim Pitts; Jimmy Jenkins; John Markalunas; John Spezze; Jon Roorda; Josh Hadley; JT Shaver; Keith Baker; Kenneth Quintana; Kent Maxwell; Kim Marquis; Kurt Jones; Lisa Yates; Chambers, Mack; Marc Quintana; Marjo Curgus; Mark Perry; Mark Rowland; Mark Stacy; Mark Thompson; Marshall Schwarz; Matt Arsenault; Michael Yerman; Mike McHargue; Miki Hodge; Mykel Kroll; Nora Bland; P.T. Wood; Patricia Gavelda; Philip Pucket; Richard H. Atkins; Robert Bertram; Robert Christiansen; Russ Johnson; Rusty Granzella; Sally Broomfield; Field, Scott; Scott Morrill; Spencer Blades; Tony Stromer; Tyler Carlson - CDOT; Valdez, Ashley R; Wayno Urbonas; Wendell Pryor; William Plackner  
Subject: ACTION REQUESTED: Chaffee County HMP Update - Public Survey and Background Information  
Attachments: Chaffee HMP Update 2021 Overview.pdf

**CAUTION:** External email. Please do not click on links/attachments unless you know the content is genuine and safe.

All,

As discussed in the Kickoff Meeting, there is a brief survey that is to be presented to the public for their input, in accordance with FEMA requirements. In a pledge of support for this project, would you kindly publish this to your website and/or social media sites. When you do, please email me that you did publish it, your jurisdiction/municipality, and where it was published (ie: Facebook, Twitter, websites, etc), as the distribution must be tracked for credit. I will share your email with Wood, our contractor. Also, please complete the survey yourself.

There is also a hazard mitigation background document attached, that summarizes the project. This document can be posted on websites, shared by email etc. Please share!

Also, please share this email with others that you feel that can assist us with pushing our message out. Any and all assistance is greatly appreciated!

-----  
**Please take our Survey!**

Chaffee County is in the process of updating our multi-jurisdictional Hazard Mitigation Plan. A public survey has been published online as part of this effort. The survey is intended to gauge the public's concern about natural hazards in the county, identify specific issues, and gauge interest on Hazard Mitigation options. It is short and should only take about 5 minutes to complete. The survey can be found at the link below and will be open through February 8th, 2021.

<https://bit.ly/ChaffeeHMPSurvey>

-----

Rich

Richard H. Atkins, CO-CEM  
Chaffee County Emergency Management  
P.O. Box 699 / 16550 Highway 285  
Salida, CO 81201

(719) 539-6856 (w) | (719) 207-2730 (m)  
[ChaffeeOEM@gmail.com](mailto:ChaffeeOEM@gmail.com) | [chaffeecounty.org](http://chaffeecounty.org)





## Chaffee County Government

PO Box 699 ~ 104 Crestone Ave, Salida, CO 81201

719.539.2218 ~ [www.ChaffeeCounty.org](http://www.ChaffeeCounty.org)

### CONTACT:

Beth Helmke, Public Affairs Officer

[bhelmke@chaffeecounty.org](mailto:bhelmke@chaffeecounty.org)

719.221.1579

**MEDIA RELEASE:** January 20, 2021

**SALIDA, COLORADO**

### Public Input Requested for Chaffee County Hazards Mitigation Plan

Chaffee County residents are invited to share their input into the County's 2021 multi-jurisdictional Hazards Mitigation Plan by completing a 5-minute survey at <https://bit.ly/ChaffeeHMPSurvey>. The survey is open until February 8th. Survey responses will help gauge local community members' perceptions of dangers, natural hazards' significance and impacts, and specific issues of concern.

The Hazard Mitigation Plan establishes the joint efforts of the County, City of Salida, Town of Buena Vista, and the Town of Poncha Springs to comprehensively assess and plan for natural hazards' mitigation, response, and recovery efforts. It brings together local municipalities for pre-disaster planning on multiple natural hazard topics and incident types, ranging from avalanches to wildfires. It also ensures the County and their municipalities remain eligible for federal and state grant funding for hazards mitigation.




Chaffee County's Office of Emergency Management (OEM) updates the county's Hazard Mitigation Plan every 5 years in keeping with Federal Emergency Management Agency requirements. Chaffee's prior Hazard Mitigation Plan was completed in 2016. It can be viewed at <http://bit.ly/ChaffeeHMP2016>. OEM is working in concert with the Hazard Mitigation Planning Committee composed of stakeholders from all represented jurisdictions, with assistance from Wood Environment & Infrastructure Solutions, Inc, a planning consultant, to update Chaffee County's Plan. The updated draft Plan will be shared for public review and comment in spring 2021 and the final Plan will be adopted by fall 2021.




Chaffee County OEM Director Richard Atkins states, "Development of this updated Hazard Mitigation Plan greatly benefits from the public's input. We encourage all residents to share their opinions to help us prioritize our mitigation efforts, proactively manage risks, and best reduce the negative impacts of natural hazards in Chaffee County."




For more information, please visit <http://chaffeecounty.org/Emergency-Management>

###



 	<p><b><i>Your input is important to us!</i></b>  <b>Please take 5 minutes to share your opinions on natural hazards in Chaffee County.</b></p> <p>Chaffee County Office of Emergency Management is updating the Hazard Mitigation Plan that helps plan for and reduce impacts of natural hazards in our area such as avalanches, wildfires, and storms.</p> <p><i>Your survey response will help gauge our community members' perceptions of dangers, natural hazards' significance and impacts, and specific issues of concern so we can best prepare for and mitigate hazard risks.</i></p>	<p>Link to the survey:  <a href="https://bit.ly/ChaffeeHMPSurvey">bit.ly/ChaffeeHMPSurvey</a></p> <p>Or scan:</p>  <p>Survey open through Feb 8th, 2021</p>
---	---	--

 	<p><b><i>Your input is important to us!</i></b>  <b>Please take 5 minutes to share your opinions on natural hazards in Chaffee County.</b></p> <p>Chaffee County Office of Emergency Management is updating the Hazard Mitigation Plan that helps plan for and reduce impacts of natural hazards in our area such as avalanches, wildfires, and storms.</p> <p><i>Your survey response will help gauge our community members' perceptions of dangers, natural hazards' significance and impacts, and specific issues of concern so we can best prepare for and mitigate hazard risks.</i></p>	<p>Link to the survey:  <a href="https://bit.ly/ChaffeeHMPSurvey">bit.ly/ChaffeeHMPSurvey</a></p> <p>Or scan:</p>  <p>Survey open through Feb 8th, 2021</p>
---	---	---

 	<p><b><i>Your input is important to us!</i></b>  <b>Please take 5 minutes to share your opinions on natural hazards in Chaffee County.</b></p> <p>Chaffee County Office of Emergency Management is updating the Hazard Mitigation Plan that helps plan for and reduce impacts of natural hazards in our area such as avalanches, wildfires, and storms.</p> <p><i>Your survey response will help gauge our community members' perceptions of dangers, natural hazards' significance and impacts, and specific issues of concern so we can best prepare for and mitigate hazard risks.</i></p>	<p>Link to the survey:  <a href="https://bit.ly/ChaffeeHMPSurvey">bit.ly/ChaffeeHMPSurvey</a></p> <p>Or scan:</p>  <p>Survey open through Feb 8th, 2021</p>
---	---	--



Town of Buena Vista

@tobvco

Home

Posts

Reviews

Videos

Photos

About

Community

Create a Page



Like



Share



Contact Us



Send Message

## Posts



Town of Buena Vista

6 hrs · 🌐

Please take the Chaffee County Hazard Mitigation Plan Survey!

Chaffee County is in the process of updating our multi-jurisdictional Hazard Mitigation Plan. A public survey has been published online as part of this effort. The survey is intended to gauge the public's concern about natural hazards in the county, identify specific issues, and gauge interest on Hazard Mitigation options. It is short and should only take about 5 minutes to complete. The survey can be found at the link below and will be open through February 8th, 2021.

Take the Survey here: <https://bit.ly/ChaffeeHMPSurvey>

FORMS.OFFICE.COM

Microsoft Forms



Like



Comment



Share

City in Buena Vista, Colorado

Closed Now

## Our Story

If you are looking for more information about Buena Vista, Colorado, please visit [www.buenavistaco.g...](http://www.buenavistaco.g...)

See More

## Community

See All



2,014 people like this



2,102 people follow this



1,061 check-ins

E-71

## About

See All



[Home](#) > News Flash[Home Page](#)

Posted on: January 20, 2021

### Please Take Chaffee County Hazard Mitigation Plan Survey

Chaffee County is in the process of updating our multi-jurisdictional Hazard Mitigation Plan. A public survey has been published online as part of this effort. The survey is intended to gauge the public's concern about natural hazards in the county, identify specific issues, and gauge interest on Hazard Mitigation options. It is short and should only take about 5 minutes to complete. The survey can be found at the link below and will be open through February 8th, 2021.

[Read the Chaffee County Hazard Mitigation Plan Update 2021 Overview \(PDF\)](#)[Take Survey Now!](#)

#### Search

All categories ▾



#### Tools

RSS

Notify Me

#### Categories

- All Categories
- Home Page
- Job Opportunities

Next ⇒

Board of Trustees Join Work Session with Planning and  
Zoning on 1-20-21

E-72

## Home Page

---

Posted on: January 20, 2021

### Please Take Chaffee County Hazard Mitigation Plan Survey

Chaffee County is in the process of updating our multi-jurisdictional Hazard Mitigation Plan. A public survey has been published online as part of this effort. The survey is intended to gauge the public's concern about natural hazards in the county, identify specific issues, and gauge interest on Hazard Mitigation options. It is short and should only take about 5 minutes to complete. The survey can be found at the link below and will be open through February 8th, 2021.

[Read the Chaffee County Hazard Mitigation Plan Update 2021 Overview \(PDF\).](#)

[Take Survey Now!](#)

#### Tools

[RSS](#)

[Notify Me](#)

#### Categories

- [All Categories](#)
- [Home Page](#)
- [Job Opportunities](#)

**Next** ⇒

[Phase 1 Marijuana Establishment Applications Now Available. Due March 8th, 2021.](#)

---

## Other News in Home Page

---

**[Phase 1 Marijuana Establishment Applications Now Available. Due March 8th, 2021.](#)**

Posted on: January 6, 2021





Keith Baker and 25 others



Like



Comment



Share



Write a comment...



**Chaffee County Commissioner Keith Baker** ✓



January 19 at 6:30 PM · 🌐

Please complete this survey to help us update our interagency Hazard Mitigation Plan.

FORMS.OFFICE.COM

**Microsoft Forms**



5

5 Comments 1 Share



Like



Comment



Share



Most Relevant ▼



Write a comment...



**Evelyn Gottschall Baker**  
done



1

Like · Reply · 1d

View 3 more comments



**Chaffee County Commissioner Keith Baker** ✓



January 19 at 4:11 PM · 🌐

**For the record, I grew up in Georgia. 🙌**





While you are tucked away in your homes, please set aside...



Keith Baker, Jeff Graf and 9 others

1.9K Views · 44 weeks ago



## Page Transparency

[See All](#)

Facebook is showing information to help you better understand the purpose of a Page. See actions taken by the people who manage and post content.



Page created - March 12, 2015



Page manager location: United States

## Related Pages



**A Church**

[Anderson Horne](#) likes this

Church

Like



**Chaffee County Crime Stoppers**

[Kelsey McNeill](#) likes this

Nonprofit Organization

Like



**Salida Citizen**

[Debbie McNulty Fesenmeyer](#) likes this

Interest

Like

## Add Your Business to Facebook

Showcase your work, create ads and connect with customers or supporters.

Create Page







Chaffee County in collaboration with City of Salida, Town of Buena Vista, and Town of Poncha Springs are updating their Multi-Jurisdictional Hazard Mitigation Plan. This plan develops community mitigation strategies, to work towards reducing the risks posed by hazards. For more information on the Multi-Jurisdictional Hazard Mitigation Plan please visit us here:

#### What is hazard mitigation?

The term "Hazard Mitigation" describes actions that can help reduce or eliminate long-term risks caused by hazards, such as floods, wildfires, tornadoes, and earthquakes. Hazard mitigation is best accomplished when based on a comprehensive, long-term plan developed before a disaster strikes.

As the costs of disaster and hazard impacts continue to rise, governments and citizens must find ways to reduce hazard risks to our communities. Oftentimes after disasters, repairs and reconstruction are often completed in such a way as to simply restore damaged property to pre-disaster conditions. These efforts may "get things back to normal" but the replication of pre-disaster conditions often results in a repetitive cycle of damage, reconstruction, and repeated damage.

Hazard mitigation breaks this repetitive cycle by producing less vulnerable conditions through pre- and post-disaster actions, projects, and resilient reconstruction. The implementation of such hazard mitigation actions now by local governments means building stronger, safer, and smarter communities that will be able to reduce future injuries and damages.

#### Project Benefits

Mitigation is an investment in a community's future safety, sustainability, and resiliency. Recent cost-benefit studies have proven mitigation to be cost effective for communities, with mitigation projects returning \$6 for every \$1 spent.

Mitigation planning helps communities take action now, before a disaster, to reduce impacts when a disaster occurs.

Hazard mitigation planning helps residents, business owners, elected officials, and municipal departments think through how to plan, design, build, and establish partnerships for risk reduction. Consider the critical



DRIVE.GOOGLE.COM

### Chaffee HMP Update 2021 Overview.pdf



Like



Comment



Share



### Chaffee County Public Health

January 19 at 8:01 AM · 🌐



We continue to seek nominations for Chaffee's Got HEART Community Spotlight! To learn more about this initiative, check out this post on our COVID-19 Chaffee County Facebook page.







Write a comment...



Author

**Chaffee County Sheriff's Office**

The best thing to do is contact your phone system provider and see if it is configured correctly and compliant with the new laws. If you opt to test it, please call dispatch 719-539-2596 before you do so.

Like · Reply · 4h

View 1 more comment



**Chaffee County Sheriff's Office**

January 19 at 4:47 PM · 🌐

Chaffee County Office of Emergency Management is requesting the public to take their Survey!

Chaffee County is in the process of updating our multi-jurisdictional Hazard Mitigation Plan. A public survey has been published online as part of this effort. The survey is intended to gauge the public's concern about natural hazards in the county, identify specific issues, and gauge interest on Hazard Mitigation options. It is short and should only take about 5 minutes to compl... [See More](#)

## County Hazard Mitigation Plan Update 2021 Backgrounder

In collaboration with City of Salida, Town of Buena Vista, and Town of... are updating their Multi-jurisdictional Hazard Mitigation Plan. This plan... hazard mitigation strategies, to work towards reducing the risks posed by... plan must be updated and approved by FEMA every five years to keep it... maintain eligibility for mitigation grant assistance. The plan is currently... under the guidance of a multi-jurisdictional Hazard Mitigation Planning...

### Hazard Mitigation?

Hazard Mitigation describes actions that can help reduce or eliminate long-term risks caused by wildfires, tornadoes, and earthquakes. Hazard mitigation is best accomplished when a long-term plan developed before a disaster strikes.

As disaster and hazard impacts continue to rise, governments and citizens must find ways to protect our communities. Oftentimes after disasters, repair and reconstruction efforts are directed in such a way as to simply restore damaged property to previous conditions. These efforts may "get things back to normal," but the replication of conditions often results in a repetitive cycle of damage, reconstruction, and damage.

Hazard mitigation breaks this repetitive cycle by producing less vulnerable conditions and post-disaster actions, projects, and resilient reconstruction. The result of such hazard mitigation actions now by local governments, residents, businesses, and smarter communities that will be able to reduce future damages.

### Benefits

Investment in a community's future safety, sustainability, and resiliency. Recent cost-benefit analysis has shown that hazard mitigation projects returning \$6 for every \$1 invested helps communities take action now, before a disaster, to reduce impacts when a disaster strikes.

Hazard mitigation planning helps residents, business owners, elected officials, and municipal departments think through how to plan, design, and implement strategies for risk reduction. Consider the critical role of hazard mitigation to:

- protect public safety and prevent loss of life and injury;
- conform to existing and future development;
- maintain community continuity and strengthen the connections that are essential for recovery;
- reduce damage to your community's unique historic, cultural, and environmental assets;
- reduce operational downtime and accelerate recovery after disasters;
- reduce the costs of disaster response and recovery and ensure a safe return to risk for first responders;
- accomplish other community objectives, such as economic development, infrastructure protection, open space preservation, and economic resiliency.



The County and their municipalities will benefit from this project by:

- increasing eligibility for all sources of hazard mitigation funds made available through FEMA;
- increasing public awareness and understanding of vulnerabilities as well as support for strategies to reduce losses from future disasters;
- ensuring community policies, programs, and goals are compatible with reducing vulnerabilities and identifying those that are incompatible;
- increasing partnerships with diverse stakeholders, increasing opportunities to leverage resources in reducing workloads, as well as achieving shared community objectives;
- increasing the understanding of potential risk reduction measures to include: local planning, structure and infrastructure projects; natural systems protection; education and outreach programs; and other tools.
- increasing the development, prioritization, and implementation of mitigation projects, ensuring the life of these projects as losses are avoided from each subsequent hazard event.

### Process

Following a 4-phase step process to update the plan, the County is currently in the first quarter of 2021, following FEMA guidance with the following steps:

### Involved:

Stakeholders, interested stakeholders and businesses to contribute to the planning process. One way is through a public survey designed to gather input on hazards and risk.

Take the Public Survey!  
Open until February 8th  
<https://bit.ly/ChaffeeHMPsurvey>



The plan is anticipated to be ready for public review and comment in the spring of 2021.

### For more information please contact:

<b>Brad Slawn, Project Manager</b> Environment & Infrastructure Solutions, Inc. a consultant (303) 742-5315 <a href="mailto:brad.slawn@woodscoinc.com">brad.slawn@woodscoinc.com</a>	<b>Rich Atkins, Emergency Manager</b> Chaffee County Office of Emergency Management Phone: (719) 207-2730 Email: <a href="mailto:chaffeeem@gmail.com">chaffeeem@gmail.com</a>
--	---



Welcome to

**CHAFFEE COUNTY  
COLORADO**

OFFICIAL GOVERNMENT SITE

## EMERGENCY MANAGEMENT

[HOME](#) [DEPARTMENTS A - E](#) [DEPARTMENTS F - Z](#) [RESOURCES](#) [VISITORS BUREAU](#) [HOW TO](#) [BOARDS](#)

### SEARCH

Google Custom Search

[search site ►](#)

### DEPARTMENT LINKS

[Department Home](#)

[Helpful Links](#)

[Fire Ban Status](#)

[Red Flag Warning  
Information](#)

[Access & Functional  
Needs Database Form](#)

[American Red Cross](#)

[Avalanche Information](#)

[Chaffee County Citizen  
Emergency Preparedness  
Guide](#)

[Chaffee County  
Community Wildfire  
Protection Plans \(CWPP\)](#)

[Chaffee County Hazard  
Mitigation Plan \(HMP\)](#)

[Colorado Division of  
Homeland Security &  
Emergency Management](#)

[Colorado Road Conditions](#)

[Federal Emergency  
Management Agency  
\(FEMA\)](#)

[ReadyColorado](#)

[Ready.gov](#)

[Sign Up for Emergency  
Notifications](#)

[Stream Gauges](#)

[Weather Forecast](#)

[Fire Restrictions](#)

### DEPARTMENT CONTACT

16550 Highway 285  
Salida, Colorado 81201

(719) 539-6856

## Chaffee County Emergency Management

### What is the OEM

The Chaffee County Office of Emergency Management (OEM) plans, coordinates and supports a wide-range of activities that help prepare for, respond to, and recover from disasters and large-scale emergencies, while also reducing vulnerabilities to hazards.

In Chaffee County, the Office of Emergency Management is a department within the county government that also serves the local municipalities, and special districts throughout the county. The OEM works very closely with the Colorado Office of Emergency Management and coordinates all efforts that require state and federal assistance.

### What is the EOC

An Emergency Operations Center (EOC) is a command and control facility from which local governments can provide interagency coordination and executive decision making in support of incident response and recovery operations.

The purpose of the EOC is to provide a centralized location where public safety, emergency response, and support agencies coordinate planning, preparedness, and response activities.

The EOC is responsible for the strategic overview, or "big picture", of the disaster, and does not directly control field assets. Instead, the Emergency Support Functions (ESF's) make operational decisions and leave tactical decisions to the on-scene Incident Commander.

The common functions of all EOC's are to:

- Make decisions that protect life and property and disseminate those decisions to all concerned agencies and individuals
- Set priorities and give guidance to Incident Management Teams
- Collect gather and analyze data
- Maintain continuity of government within the scope of applicable laws
- Manage, prioritize and procure resource requests
- Issue public information during disasters

## Help Inform the 2021 Hazards Mitigation Plan!

Chaffee County residents are invited to share their input into the County's 2021 multi-jurisdictional Hazards Mitigation Plan by completing a 5-minute survey at <https://bit.ly/ChaffeeHMPSurvey>. The survey is open until February 8th.

Survey responses will help gauge local community members' perceptions of dangers, natural hazards' significance and impacts, and specific issues of concern.

Learn more on the 2021 Hazards Mitigation Plan process and background [here](#).

The Hazard Mitigation Plan establishes the joint efforts of the County, City of Salida, Town of Buena Vista, and the Town of Poncha Springs to comprehensively assess and plan for natural hazards' mitigation, response, and recovery efforts. It brings together local municipalities for pre-disaster planning on multiple natural hazard topics and incident types, ranging from avalanches to wildfires. It also ensures the County and their municipalities remain eligible for federal and state grant funding for hazards mitigation.

### STAFF

Richard Atkins  
Emergency Manager  
Cell 719.207.2730  
[ratkins@chaffeecounty.org](mailto:ratkins@chaffeecounty.org)

*Social Media for  
Emergency Management*

**Facebook**

*Local Emergency  
Response Agencies*

(For emergencies, please  
call 911)

[Buena Vista Fire  
Department](#)

[Buena Vista Police  
Department](#)

[Chaffee County EMS](#)

[Chaffee County Fire  
Protection District](#)

[Chaffee County Search &  
Rescue-North](#)

[Chaffee County Search &  
Rescue-South](#)

[Chaffee County Sheriff's  
Office](#)

[Salida Fire Department](#)

[Salida Police Department](#)

[South Arkansas Fire  
Protection District](#)

## Other Items of Interest



City Administration

Agendas / Minutes

Job Openings

COVID-19 Information

City Council

Transparency

CONTACT INFORMATION

The Toubert Building  
448 E. First Street, Suite 112  
Phone: 719-539-4555  
Fax: 719-539-5271  
Office Hours: M-F 9:00 a.m. – 4:00 p.m.; closed weekends

View Full Contact Details

Chaffee County Hazard Mitigation Plan Update 2021 Project Backgrounder & SURVEY

Please see the attached Hazard Mitigation Plan Update and [take the SURVEY!](#)

<https://bit.ly/ChaffeeHMPSurvey>

Chaffee County is in the process of updating our multi-jurisdictional Hazard Mitigation Plan. A public survey has been published online as part of this effort. The survey is intended to gauge the public’s concern about natural hazards in the county, identify specific issues, and gauge interest on Hazard Mitigation options. It is short and should only take about 5 minutes to complete. The survey can be found at the link below and will be open through February 8th, 2021.

Supporting Documents

 [Chaffee County Hazard Mitigation Plan Update 2021 Project Backgrounder \(343 KB\)](#)





## City of Salida, Colorado

@CityofSalida · Government Organization

Sign Up

[cityofsalida.com](http://cityofsalida.com)

Home

About

More ▼

Liked

Message



### About

[See All](#)

Welcome to the official City of Salida Facebook page. If you are looking for more information about our beautiful city, visit [www.cityofsalida.com](http://www.cityofsalida.com).

Situated at 7,000 feet in the Arkansas River Valley, Salida is surrounded by fifteen peaks in excess of 14,000 feet as well as Bureau of Land Manageme... [See More](#)

4,311 people like this including 18 of your friends



4,484 people follow this

<http://www.cityofsalida.com/>

(719) 539-4555

Typically replies within a day



E-80



info@cityofsalida.com  
Government Organization

## Photos

[See All](#)


## Videos

[See All](#)


We are all essential! Salida, we are all in this together. Plea...



Kelsey McNeill and 50 others

1.7K Views · 41 weeks ago



## Page Transparency

[See All](#)

Facebook is showing information to help you better understand the purpose of a Page. See actions taken by the people who manage and post content.



Page created - May 18, 2012







## Related Pages



### Salida Chamber of Commerce

[Anderson Horne](#) likes this

Community Organization

Like



### Salida Parks and Recreation

[Anderson Horne](#) likes this

Public Swimming Pool

Like



### Summit County, Colorado

[Mykel Kroll](#) likes this

Local Business

Like

## Add Your Business to Facebook

Showcase your work, create ads and connect with customers or supporters.

Create Page

[Privacy](#) · [Terms](#) · [Advertising](#) · [Ad Choices](#) · [Cookies](#) · [More](#) · Facebook © 2021



### This Page Posts About COVID-19

Visit the COVID-19 Info Center for updates and answers to questions you may have about coronavirus.

[See Info](#)



### City of Salida, Colorado

23h ·



Chaffee County is in the process of updating our multi-jurisdictional Hazard Mitigation Plan. A public survey has been published online as part of this effort. The survey is intended to gauge the public's concern about natural hazards in the county, identify specific issues, and gauge interest on Hazard Mitigation options.

It is short and should only take about 5 minutes to complete. The survey can be found at the link below and will be open through February 8th, 2021.

Please see the link below for more details:

<https://cityofsalida.com/.../chaffee-county-hazard...>



CITYOFSALIDA.COM

**Chaffee County Hazard Mitigation Plan  
Update 2021 Project Backgrounder &...**





Chaffee County Office of Emergency Management is requesting the public to take their Survey!

Chaffee County is in the process of updating our multi-jurisdictional Hazard Mitigation Plan. A public survey has been published online as part of this effort. The survey is intended to gauge the public's concern about natural hazards in the county, identify specific issues, and gauge interest on Hazard Mitigation options. It is short and should only take about 5 minutes to compl... See More

## County Hazard Mitigation Plan Update 2021 Backgrounder

In collaboration with City of Salida, Town of Buena Vista, and Town of... are updating their multi-jurisdictional Hazard Mitigation Plan. This plan... county mitigation strategies to work toward reducing the risk posed by... must be updated and approved by FEMA every five years at least. It... maintain eligibility for mitigation grant assistance. The plan is currently... under the guidance of a multi-jurisdictional Hazard Mitigation Planning

### Hazard Mitigation

Hazard mitigation describes actions that can help reduce or eliminate long-term risks caused by wildfires, tornadoes, and earthquakes. Hazard mitigation is best accomplished when a long-term plan developed before a disaster strikes.

Disaster and hazard impacts continue to rise, governments and citizens must find ways to protect their communities. Otherwise their assets, repair, and reconstruction are forced in such a way as to simply restore damaged property to the status quo. These efforts may "get things back to normal," but the replication of conditions often results in a repetitive cycle of damage, reconstruction, damage.

Disaster breaks this repetitive cycle by producing less vulnerable conditions and post-disaster actions, projects, and resilient reconstruction. The result of such hazard mitigation actions now by local governments means that communities are safer, and smarter communities that will be able to reduce future damages.

Investment in a community's future safety, sustainability, and resiliency. Recent cost-benefit analysis to be cost effective for communities, with mitigation projects returning \$6 for every \$1 invested helps communities take action now, before a disaster, to reduce impacts when a disaster strikes.

Hazard mitigation planning helps residents, business owners, elected officials, and municipal departments think through how to plan, design, and implement partnerships for risk reduction. Consider the critical role of hazard mitigation to:

- protect public safety and prevent loss of life and injury.
- protect existing and future development.
- protect community continuity and strengthen the economic foundations that are essential for recovery.
- protect damage to your community's unique cultural, historic, and environmental assets.
- protect operational downtime and accelerate recovery after disasters.
- protect investment and business after disasters.
- protect the costs of disaster response and recovery and reduce the risk for first responders.
- accomplish other community objectives, such as infrastructure improvements, infrastructure protection, open space preservation, and economic resiliency.



The County and their municipalities will benefit from this project by: increasing eligibility for all sources of hazard mitigation funds made available through FEMA; increasing public awareness and understanding of vulnerabilities as well as support for actions to reduce losses from future disasters.

Ensuring community policies, programs, and goals are compatible with reducing vulnerabilities and identifying those that are incompatible.

Increasing partnerships with diverse stakeholders, increasing opportunities to leverage resources in reducing workloads, as well as achieving shared community objectives. Increasing the understanding of potential risk reduction measures to include: local planning; structure and infrastructure projects; natural systems protection; education; business programs; and other tools.

Facilitating the development, prioritization, and implementation of mitigation projects. Limiting the over the life of these projects as losses are avoided from each subsequent hazard event.

### Process

Following a 4 phase/5 step process to update the plan in the first quarter of 2021, following FEMA guidance with the following steps:

### Steps:

1. Planning: Involves all stakeholders and businesses to contribute to the planning process. One way is to conduct a public survey designed to gather input on hazard mitigation.

Take the Public Survey!  
Open until February 3rd  
In <https://bit.ly/ChaffeeHMPsurvey>



The plan is anticipated to be ready for public review and comment in the spring of 2021.

### For more information please contact:

<b>John Brown, Project Manager</b> Environment & Infrastructure Solutions, Inc. consultant (303) 742-5315 <a href="mailto:john.brown@woodsinc.com">john.brown@woodsinc.com</a>	<b>Rish Adams, Emergency Manager</b> Chaffee County Office of Emergency Management Phone: (719) 207-2730 Email: <a href="mailto:chaffeeoem@gmail.com">chaffeeoem@gmail.com</a>
--	--





**SEARCH**

[search site ►](#)
**DEPARTMENT  
LINKS**
[Department Home](#)
[Helpful Links](#)
[Fire Ban Status](#)
[Red Flag Warning  
Information](#)
[Access & Functional  
Needs Database Form](#)
[American Red Cross](#)
[Avalanche Information](#)
[Chaffee County Citizen  
Emergency Preparedness  
Guide](#)
[Chaffee County  
Community Wildfire  
Protection Plans \(CWPP\)](#)
[Chaffee County Hazard  
Mitigation Plan \(HMP\)](#)
[Colorado Division of  
Homeland Security &  
Emergency Management](#)
[Colorado Road Conditions](#)
[Federal Emergency  
Management Agency  
\(FEMA\)](#)
[ReadyColorado](#)
[Ready.gov](#)
[Sign Up for Emergency  
Notifications](#)
[Stream Gauges](#)
[Weather Forecast](#)
[Fire Restrictions](#)
**DEPARTMENT  
CONTACT**

16550 Highway 285  
Salida, Colorado 81201

**Chaffee County Emergency Management****What is the OEM**

The Chaffee County Office of Emergency Management (OEM) plans, coordinates and supports a wide-range of activities that help prepare for, respond to, and recover from disasters and large-scale emergencies, while also reducing vulnerabilities to hazards.

In Chaffee County, the Office of Emergency Management is a department within the county government that also serves the local municipalities, and special districts throughout the county. The OEM works very closely with the Colorado Office of Emergency Management and coordinates all efforts that require state and federal assistance.

**What is the EOC**

An Emergency Operations Center (EOC) is a command and control facility from which local governments can provide interagency coordination and executive decision making in support of incident response and recovery operations.

The purpose of the EOC is to provide a centralized location where public safety, emergency response, and support agencies coordinate planning, preparedness, and response activities.

The EOC is responsible for the strategic overview, or "big picture", of the disaster, and does not directly control field assets. Instead, the Emergency Support Functions (ESF's) make operational decisions and leave tactical decisions to the on-scene Incident Commander.

The common functions of all EOC's are to:

- Make decisions that protect life and property and disseminate those decisions to all concerned agencies and individuals
- Set priorities and give guidance to Incident Management Teams
- Collect, gather and analyze data
- Maintain continuity of government within the scope of applicable laws
- Manage, prioritize and procure resource requests
- Issue public information during disasters

**Help Inform the 2021 Hazards Mitigation Plan!**

Chaffee County residents are invited to share their input into the County's 2021 multi-jurisdictional Hazards Mitigation Plan by completing a 5-minute survey at <https://bit.ly/ChaffeeHMPSurvey>. The survey is open until February 8th.

Survey responses will help gauge local community members' perceptions of dangers, natural hazards' significance and impacts, and specific issues of concern.

Learn more on the 2021 Hazards Mitigation Plan process and background [here](#).

The Hazard Mitigation Plan establishes the joint efforts of the County, City of Salida, Town of Buena Vista, and the Town of Poncha Springs to comprehensively assess and plan for natural hazards' mitigation, response, and recovery efforts. It brings together local municipalities for pre-disaster planning on multiple natural hazard topics and incident types, ranging from avalanches to wildfires. It also ensures the County and their municipalities remain eligible for federal and state grant funding for hazards mitigation.

**STAFF**

Richard Atkins  
Emergency Manager  
Cell 719.207.2730  
[ratkins@chaffeecounty.org](mailto:ratkins@chaffeecounty.org)

*Social Media for  
Emergency Management*

[Facebook](#)

*Local Emergency  
Response Agencies*

(For emergencies, please  
call 911)

[Buena Vista Fire  
Department](#)

[Buena Vista Police  
Department](#)

[Chaffee County EMS](#)

[Chaffee County Fire  
Protection District](#)

[Chaffee County Search &  
Rescue-North](#)

[Chaffee County Search &  
Rescue-South](#)

[Chaffee County Sheriff's  
Office](#)

[Salida Fire Department](#)

[Salida Police Department](#)

[South Arkansas Fire  
Protection District](#)

**From:** [Chaffee OEM](#)  
**To:** [Brislawn, Jeff P](#); [Carr, Amy](#)  
**Subject:** Fwd: Chaffee County Media Release: Public Input Requested for Hazards Mitigation Plan  
**Date:** Wednesday, January 20, 2021 2:30:05 PM  
**Attachments:** [image001.png](#)

---

**CAUTION:** External email. Please do not click on links/attachments unless you know the content is genuine and safe.

Jeff / Amy,  
See below for an outreach for survey input.

Rich

**Richard H. Atkins, CO-CEM**

Chaffee County Emergency Management

P.O. Box 699 / 16550 Highway 285

Salida, CO 81201

(719) 539-6856 (w) | (719) 207-2730 (m)

[ChaffeeOEM@gmail.com](mailto:ChaffeeOEM@gmail.com) | [chaffeecounty.org](http://chaffeecounty.org)

----- Forwarded message -----

**From:** **Beth Helmke** <[bhelmke@chaffeecounty.org](mailto:bhelmke@chaffeecounty.org)>

**Date:** Wed, Jan 20, 2021 at 12:47 PM

**Subject:** Chaffee County Media Release: Public Input Requested for Hazards Mitigation Plan

**To:** <[ChaffeePublicAffairs@gmail.com](mailto:ChaffeePublicAffairs@gmail.com)>

Hello –

Chaffee County Office of Emergency Management is soliciting the public's input for the County's updated 2021 multi-jurisdictional Hazards Mitigation Plan.

Please read the associated [Media Release for more information here](#) and review [additional background on the project here](#).

**Residents are invited to complete a 5-minute survey identifying their natural hazard and risk concerns at <https://bit.ly/ChaffeeHMPSurvey>. The survey is open until February 8th.**

Please help spread the word!

Thank you,

--Beth



Beth Helmke

Chaffee County Government

Public Affairs Officer

Office: 719.539.2218 | Cell: 719.221.1579

[bhelmke@chaffeecounty.org](mailto:bhelmke@chaffeecounty.org)

[ChaffeePublicAffairs@gmail.com](mailto:ChaffeePublicAffairs@gmail.com)

[www.ChaffeeCounty.org](http://www.ChaffeeCounty.org)

**A Church**Anderson Horne likes this  
Church

Like

## Add Your Business to Facebook

Showcase your work, create ads and connect with customers or supporters.

[Create Page](#)[Privacy](#) · [Terms](#) · [Advertising](#) · [Ad Choices](#) · [Cookies](#) · [More](#) · Facebook © 2021[Create Post](#)

Photo/Video



Check in



Tag Friends

**Greg Felt Chaffee County Commissioner**

23h ·



I encourage Chaffee County residents to take the survey below. It will help us to update our Hazard Mitigation Plan. Should take about 5 minutes.

[FORMS.OFFICE.COM](#)**Microsoft Forms**

1



Like



Comment



Share



Write a comment...

**Greg Felt Chaffee County Commissioner**

January 8 at 12:53 PM ·



Here is an interesting article concerning the reactivation proposals for the Tennessee Pass railroad line through Chaffee County.

<https://coloradosun.com/.../tennessee-pass-railroad-rio.../>





Church

**Ark Valley Helping Hands**

Kelsey McNeill likes this

Nonprofit Organization

Like

**Salida Creativity Lab**

Kelsey McNeill likes this

Visual Arts

Like

**Add Your Business to Facebook**

Showcase your work, create ads and connect with customers or supporters.

[Create Page](#)[Privacy](#) · [Terms](#) · [Advertising](#) · [Ad Choices](#) · [Cookies](#) · [More](#) · Facebook © 2021**Create Post**

Photo/Video



Check in



Tag Friends

**Housing Policy Advisory Committee**

January 19 at 5:58 PM ·



Our friends at Chaffee County Emergency Management are in the process of updating a multi-jurisdictional Hazard Mitigation Plan, and are looking for public input.

The survey below is intended to gauge the public's concern about natural hazards in the county, identify specific issues, and gauge interest on Hazard Mitigation options. It is short and should only take about 5 minutes to complete. The survey can be found at the link below and will be open through February 8th, 2021.

<https://bit.ly/ChaffeeHMPSurvey>

FORMS.OFFICE.COM

**Microsoft Forms**

Like



Comment



Share

**Housing Policy Advisory Committee**

January 15 at 10:03 AM ·



The new multi-jurisdictional Housing Authority representing Chaffee



E-88

# **Chaffee County Hazard Mitigation Plan Update**

## **Please take our Survey!**

*Chaffee County is in the process of updating our multi-jurisdictional Hazard Mitigation Plan. A public survey has been published online as part of this effort. The survey is intended to gauge the public's concern about natural hazards in the county, identify specific issues, and gauge interest on Hazard Mitigation options. It is short and should only take about 5 minutes to complete. The survey can be found at the link below and will be open through February 8th, 2021.*

**Hazard Mitigation Plan Survey**

E-89

**Chaffee HMP Update 2021 Overview**

## Posts



City of Salida, Colorado

1 hr · 🌐

Chaffee County is in the process of updating our multi-jurisdictional Hazard Mitigation Plan. A public survey has been published online as part of this effort. The survey is intended to gauge the public's concern about natural hazards in the county, identify specific issues, and gauge interest on Hazard Mitigation options.

It is short and should only take about 5 minutes to complete. The survey can be found at the link below and will be open through February 8th, 2021.

Please see the link below for more details:

<https://cityofsalida.com/.../chaffee-county-hazard-mitigation...>



CITYOFSALIDA.COM

### **Chaffee County Hazard Mitigation Plan Update 2021 Project Backgrounder & SURVEY**

Please see the attached Hazard Mitigation Plan Update and take the SURVEY!...

E-90







## Page Transparency

[See All](#)

Facebook is showing information to help you better understand the purpose of a Page. See actions taken by the people who manage and post content.



Page created - August 28, 2014



Page manager location: United States

## Related Pages



**Buena Vista Welcome Center & Chamber of C...**

[Kelsey McNeill](#) likes this

Community Organization

Like



**Buena Vista Heritage**

[Phillip Puckett](#) likes this

History Museum

Like



**City of Woodland Park**

[Micki Freeman Trost](#) likes this

Government Organization

Like

## Add Your Business to Facebook

Showcase your work, create ads and connect with customers or supporters.

Create Page

[Privacy](#) · [Terms](#) · [Advertising](#) · [Ad Choices](#) · [Cookies](#) · [More](#) · Facebook © 2021



**Town of Buena Vista**

Yesterday at 10:53 AM ·



Please take the Chaffee County Hazard Mitigation Plan Survey!

Chaffee County is in the process of updating our multi-jurisdictional Hazard Mitigation Plan. A public survey has been published online as part of this effort. The survey is intended to gauge the public's concern about natural hazards in the county, identify specific issues, and gauge interest on Hazard Mitigation options. It is short and should only take about 5 minutes to complete. The survey can be found at the link below and will be open through February 8th, 2021.



FORMS.OFFICE.COM  
Microsoft Forms

Like



Comment



Share

**Town of Buena Vista**

January 14 at 9:09 AM · 🌐



The Town of Buena Vista is hiring a Full-Time Street Maintenance Worker/Water System Technician.

Perform a variety of manual labor and equipment operation duties required in the daily operations of the Public Works Department.

Job description, town application and more information here:

<https://www.buenavistaco.gov/2227/Employment-Opportunities>

# NOW HIRING!



## FULL-TIME STREET MAINTENANCE WORKER/ WATER SYSTEM TECHNICIAN

4 Shares



Like



Comment



Share



Most Relevant ▾

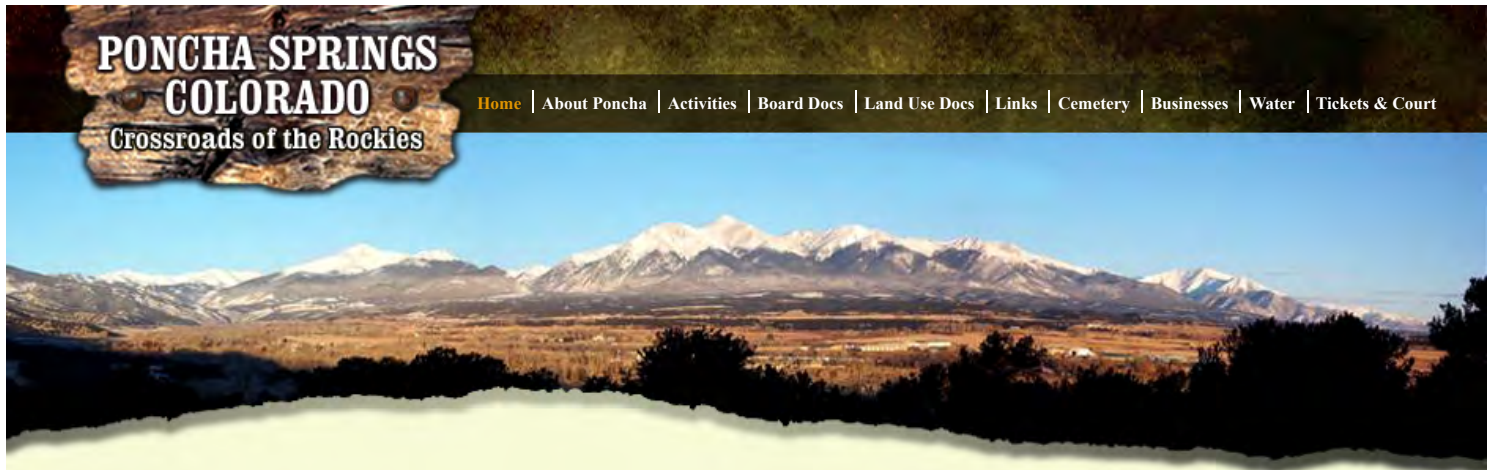


Write a comment...



Most Relevant is selected, so some comments may have been filtered out.





## Welcome

### The Town of Poncha Springs

To paint a portrait of Poncha Springs is to picture the diversity and richness of the Old Western Colorado alongside the image of a typical small town in rural America. Located in [Chaffee County](#) Colorado, in the upper reaches of the Arkansas River Basin, Poncha Springs is nestled in a valley surrounded by the scenic San Isabel National Forest. Poncha Springs calls itself the Crossroads of the Rockies, an appropriate nickname given that the town, at an elevation of 7,465 feet, is nearby to 14 mountain peaks of more than 14,000 feet above mean sea level and is situated at the junction of two transcontinental highways.



The immediate area and surrounding region are blessed with natural beauty and environments sought out by many visitors who arrive to enjoy the numerous available leisure-time activities. Winter sports and skiing are possible at [Monarch Ski Area](#) approximately 15 miles west of Poncha Springs. Small and big game hunting, stream and lake fishing, hiking, horseback riding, camping and picnicking, sight-seeing, 4-wheeling, and white water rafting are among the pursuits enjoyed by locals and tourists alike. There are two public 9 hole golf courses located nearby, the [Salida Golf Club](#) at 404 Grant St in Salida and the [Collegiate Peaks Golf Course](#) at 28775 Fairway Drive in Buena Vista. The many area points of interest include the individual mountain peaks, forests, lakes, streams and scenic wonders, but also include ruins of old narrow gauge railroads and ghost towns from the gold rush era of the late 1800's.

## [Pay your Water Utility Bill here](#)

### ***Chaffee County Hazard Mitigation Plan Update***

#### ***Please take our Survey!***

*Chaffee County is in the process of updating our multi-jurisdictional Hazard Mitigation Plan. A public survey has been published online as part of this effort. The survey is intended to gauge the public's concern about natural hazards in the county, identify specific issues, and gauge interest on Hazard Mitigation options. It is short and should only take about 5 minutes to complete. The survey can be found at the link below and will be open through February 8th, 2021.*

**[Hazard Mitigation Plan Survey](#)**

Chaffee HMP Update 2021 Overview

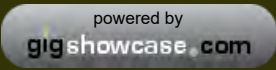


[View Larger Map](#)

**TOWN OF PONCHA SPRINGS**

333 Burnett Avenue / PO Box 190 / Poncha Springs, CO 81242

[mail@ponchasprings.us](mailto:mail@ponchasprings.us) / Phone: 719-539-6882 / Fax: 719-539-6898



# Chaffee County Hazard Mitigation Plan Update Public Input Survey

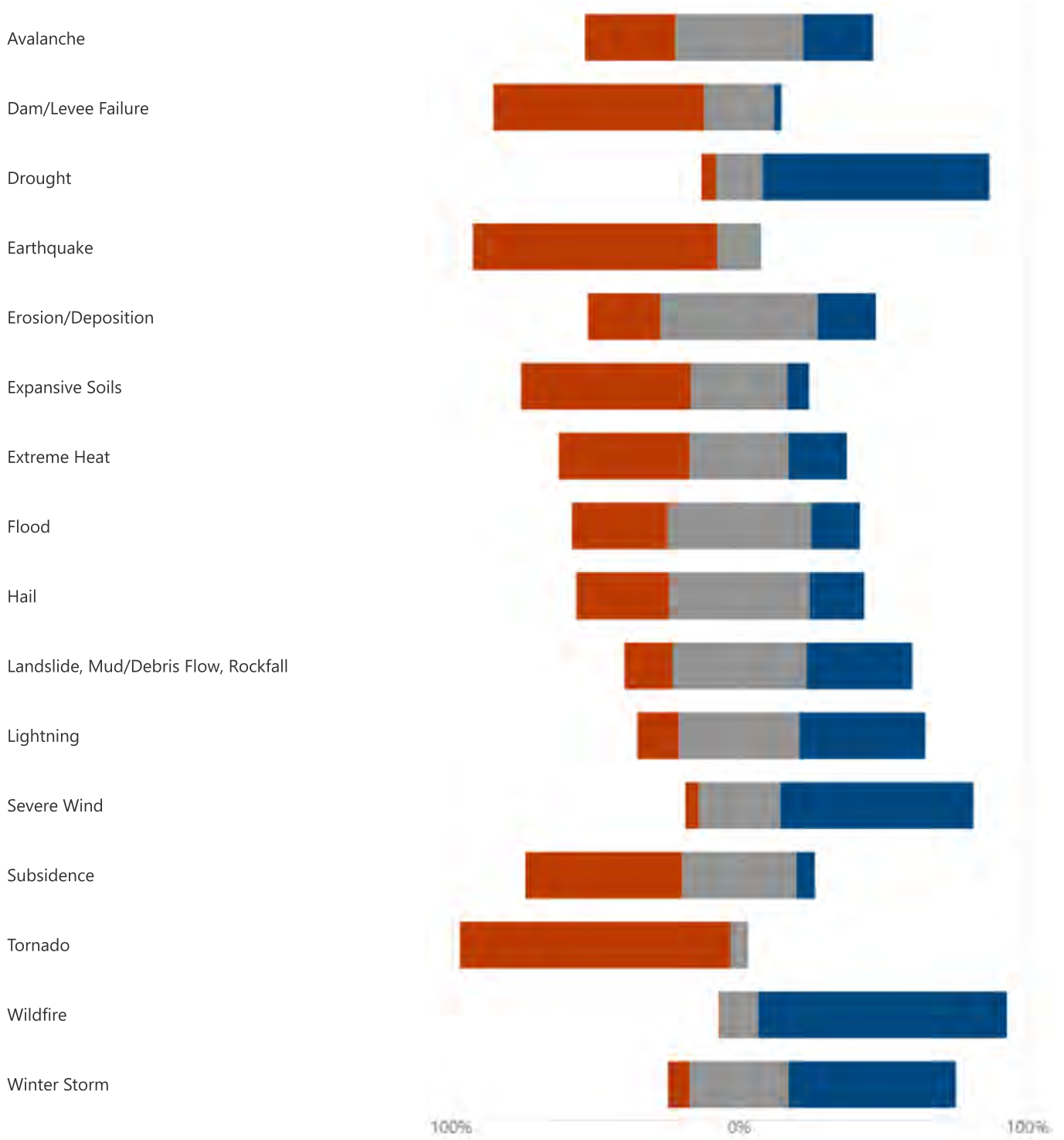
216  
Responses

26:47  
Average time to complete

Closed  
Status

1. The hazards addressed in the Chaffee County Multi-Jurisdictional Hazard Mitigation Plan update. Please indicate the level of significance in Chaffee County that you perceive for each hazard.

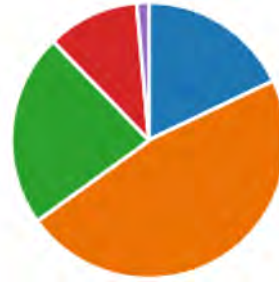
Low Moderate High





## 2. How many times has a natural hazard disrupted your daily life in the last five years?

0	38
1-2	100
3-5	48
More than 5 times	23
Other	3



## 3. Do you have information on specific hazard issues/problem areas that you would like the planning committee to consider? Note the jurisdiction to which it applies:

**97**  
Responses

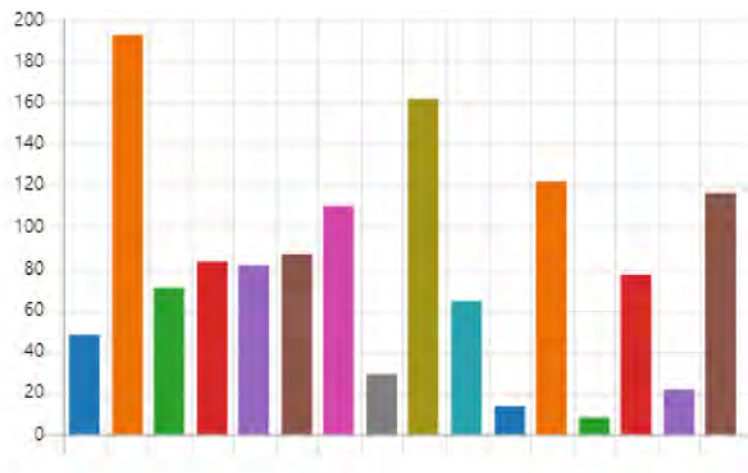
Latest Responses

"Wildfire is the greatest concern. Continued drought and extreme fire ...

"County Rd 162 is highly trafficked all year. It is a narrow and dangero...

## 4. The following types of mitigation actions may be considered in Chaffee County. Please indicate the types of mitigation actions that you think should have the highest priority in the Chaffee County Multi-Jurisdictional Hazard Mitigation Plan.

Indoor/Outdoor Warning syst...	48
Wildfire Fuels Treatment proje...	193
Continued Participation in the ...	71
Critical Facilities Protection	84
Generators for Critical Facilities	82
Planning/Zoning	87
Public Education/Awareness	110
Stormwater Drainage Improve...	29
Forest Health/Watershed Prot...	162
Stream Restoration	65
Education and Discounts on Fl...	14
Water Conservation	122
Floodprone Property Buyout	8
Evacuation route development	77
Dam safety	22
Improve reliability of commun...	116





5. Please comment on any other pre-disaster mitigation actions that the planning committee should consider for reducing future losses caused by disasters:

81

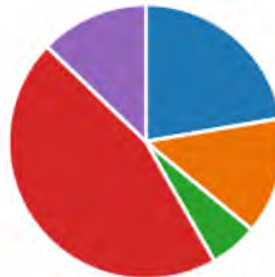
Responses

Latest Responses

*"Public warning systems, reliable well-leveraged communications platf...**"During high fire danger months, campers in upper Chalk Creek Cany...*

6. Please indicate the community you live in

<span style="color: blue;">●</span> City of Salida	47
<span style="color: orange;">●</span> Town of Buena Vista	29
<span style="color: green;">●</span> Town of Poncha Springs	12
<span style="color: red;">●</span> Unincorporated Chaffee County	96
<span style="color: purple;">●</span> Other	27



7. How long have you lived in this community?

<span style="color: blue;">●</span> Less than 1 year	16
<span style="color: orange;">●</span> 1-5 years	55
<span style="color: green;">●</span> 5-10 years	52
<span style="color: red;">●</span> over 10 years	91



8. Optional: Provide your name and email address if you would like to be added to a distribution list for upcoming activities related to this planning process:

76

Responses

Latest Responses

*"Sharon Glidden-Cole sharon@ghosttownguesthouse.com"*

ID	Do you have information on specific hazard issues/problem areas that you would like the planning committee to consider? Note the jurisdiction to which it applies:	Please comment on any other pre-disaster mitigation actions that the planning committee should consider for reducing future losses caused by disasters:	Please indicate the community you live in	How long have you lived in this community?
1			City of Salida	over 10 years
2			City of Salida	over 10 years
3			Town of Buena Vista	over 10 years
4			Town of Buena Vista	1-5 years
5	Wildfire. North of BV, east of the Arkansas		Unincorporated Chaffee County	1-5 years
6			Town of Poncha Springs	over 10 years
7			Nathrop	1-5 years
8	Dip cr 162 and the dead trees through out the county	Cut dead trees	Unincorporated Chaffee County	over 10 years
9			Town of Poncha Springs	1-5 years
10	Mudslides/blizzard/other traffic closures at the edge of our county our other surrounding counties.	Publicizing of grants and education opportunities for individuals and HOAs	Unincorporated Chaffee County	1-5 years
11		Self education	Maysville	over 10 years
12			City of Salida	1-5 years
13	Pandemic	Get Ham Radio Operators to form an ARES group	City of Salida	1-5 years
14			City of Salida	over 10 years
15		Promote effective use and harvest of our forests	Unincorporated Chaffee County	over 10 years
16	Chaffee county forest fires Chaffee county drought		Town of Poncha Springs	over 10 years
17			Town of Buena Vista	5-10 years
18			Unincorporated Chaffee County	5-10 years
19		Updated land use and building codes, especially in	Town of Buena Vista	over 10 years
20	Wind impact on internet service. Just had a 5 day outage with		Unincorporated Chaffee County	5-10 years
21			Town of Buena Vista	over 10 years
22	Fire mitigation		Town of Buena Vista	over 10 years
23			Town of Buena Vista	over 10 years
24		Mitigation of our forests. Underbrush and wild growth just a	Unincorporated Chaffee County	over 10 years
25			Town of Buena Vista	over 10 years
26	Climate change		Unincorporated Chaffee County	over 10 years
27	Decker Fire, Chaffee/Fremont/Saguache	NOAA Weather Alert Radio Tower	City of Salida	1-5 years
28			City of Salida	over 10 years
29			City of Salida	5-10 years
30		NOAA weather alert radio tower	City of Salida	1-5 years
31			Unincorporated Chaffee County	over 10 years
32	Chaffee County Wildfire Protection Plan and related information on fire hazard Chaffee County Wildfire Survey and related information on community preparedness for emergencies Chaffee County recreation information indicating estimated visitor numbers (4 million /year) and visitation growth rate	Proactive post wildfire flood mitigation	Unincorporated Chaffee County	5-10 years
33			Unincorporated Chaffee County	1-5 years
34	There is a serious rockfall hazard on CR 371 north of Railroad Bridge. After rains or thaw cycles rockfall occurs. It should be mitigated with scaling / removing unstable boulders. The tunnels on CR 371 have unstable ceiling rock that is weakened by freeze/thaw cycles. It is in Northern Chaffee County, and in Leadville Ranger District and BLM.	Consider which properties and buildings can be used for evacuation shelters. Stock those places with equipment needed for sheltering evacuees. Have more effective ways to communicate burn bans and fire precautions to visitors.	Unincorporated Chaffee County	over 10 years
35			City of Salida	over 10 years
36	Homeless populations.		Unincorporated Chaffee County	over 10 years
37			City of Salida	Less than 1 year

38			Town of Buena Vista	1-5 years
39			Unincorporated Chaffee County	over 10 years
40	Wildland Fire and Flood Mitigation for areas of past avalanches and fire lines. Being evacuated due to the inability to initially control the Decker Fire was quite frightening!		Unincorporated Chaffee County	5-10 years
41			Town of Poncha Springs	5-10 years
42			Unincorporated Chaffee County	1-5 years
43			City of Salida	5-10 years
44	Wildfire mitigation county wide.		Unincorporated Chaffee County	1-5 years
45				
46			Unincorporated Chaffee County	over 10 years
47			Town of Buena Vista	over 10 years
48			Town of Poncha Springs	over 10 years
49	Communication backup options, or alternative methods		Town of Poncha Springs	over 10 years
50	Consider climate change as it relates to wildfires and drought.		Unincorporated Chaffee County	1-5 years
51			Unincorporated Chaffee County	5-10 years
52	Flood, debris flow, subsidence, wildfire, fluvial hazard. Chaffee County		Unincorporated Chaffee County	over 10 years
53			Unincorporated Chaffee County	over 10 years
54	Long Term Investments in Climate health to do our part in helping reverse the effects of the drought on the west.		City of Salida	5-10 years
55			Unincorporated Chaffee County	over 10 years
56			City of Salida	1-5 years
57	Hayden and Methodist Mountain Fires.		Unincorporated Chaffee County	5-10 years
58			City of Salida	over 10 years
59			Town of Buena Vista	1-5 years
60	wildfire prevention, keeping water supply safe during flooding or wildfires	more firewood permits in areas that need clearing, more controlled burns, educate property owners about clearing the property of excess ground cover. clearing streams of brush and debris, replanting vegetation where slides have	Town of Buena Vista	over 10 years
61	no	mud slides	City of Salida	over 10 years
62	Like everyone else, I'm always concerned about wildfire.	None that I can comment on intelligently	Unincorporated Chaffee County	5-10 years
63	Wildfire is #1. A lot of good effort is underway. Drought is	Forest health/wildfire mitigation.	Unincorporated Chaffee County	over 10 years
64	Fire mitigation, water conservation.		Unincorporated Chaffee County	over 10 years
65	Our weather is changing. I've lived in Chaffee for 20 years. The last 5 have seen some extremes. Really hot summer weather, like over 100 F. Huge wind events. Huge precipitation events. Huge wildfires. To me that reality is the basis for what our planning should look at. What happens if we have a wind burst over 120 mph? What happens if all the beetle kill drought-dry trees north of highway 50 in the Sawatch Range burn, and then flash flood? What if 10" of rain falls on one of the reservoirs (and it's feeder drainages) and it breaches?	Our towns have lots of very old tall spruce trees. The big wind event that WILL happen will blow down many of them. Survey the health of the trees and reach out to homeowners.	City of Salida	over 10 years
66			City of Salida	1-5 years
67	Nothing we humans can fix, or do much about except to	Education education education	County	over 10 years
68			Unincorporated Chaffee County	over 10 years
69	Decker Creek fire..		Unincorporated Chaffee County	over 10 years
70		Improve Broadband Communications	Unincorporated Chaffee County	over 10 years
71	The wind is a huge issue but I don't think you can do anything		Unincorporated Chaffee County	5-10 years
72			Nathrop	1-5 years
73	Wildfire - County-wide: need to remove beetle killed trees &	Fire mitigation. Flood mitigation for properties that are at	Unincorporated Chaffee County	over 10 years

	Nathrop -			
	When 70 was closed and cars were routed to 285 I thought about how congested things could get if we had to evacuate.			
74	Winter Storms/High Wind/Fires- disrupt internet service and phone service Fire Evacuation - Concerns about the amount of traffic and the exit routes  Avalanche - wish that it was easier to know avalanche risk areas in Chaffee County in real-time, make easier to know for the local area, its hard to find this information.	What can we do to improve our forest health to reduce fire risk? Is there a "gold standard" that we can follow? My biggest concern is Fire Risk.	Nathrop	1-5 years
75			Unincorporated Chaffee County	over 10 years
76	Don't know if it applies but high traffic volume on 285 between Buena Vista & Salida.		Unincorporated Chaffee County	over 10 years
77			Unincorporated Chaffee County	over 10 years
78			City of Salida	5-10 years
79			City of Salida	over 10 years
80			City of Salida	5-10 years
81	Dead trees as a fire hazard on Mt. Antero and other national forest areas.	The main hazard I see is fire. More mitigation is needed and roads to evacuate and fight fire when it occurs.	Nathrop	1-5 years
82			City of Salida	over 10 years
83	1) electrical outages due to either lightning strikes or winter storms. 2) wildfire damage to house homes	Consider placing electrical lines underground!	Unincorporated Chaffee County	over 10 years
84			Nathrop	Less than 1 year
85	Wild fire		Unincorporated Chaffee County	5-10 years
86	Wildfire--all parts of the county		Town of Buena Vista	5-10 years
87			Unincorporated Chaffee County	Less than 1 year
88			City of Salida	over 10 years
89	Wildfire mitigation		Unincorporated Chaffee County	1-5 years
90			Unincorporated Chaffee County	over 10 years
91	Un-developed lots in Mesa Antero subdivision in need of serious mitigation!			Less than 1 year
92			Town of Buena Vista	over 10 years
93	Tougher building cods in regards to homes in the urban/wildland interface!	Stricter building codes	Unincorporated Chaffee County	over 10 years
94			City of Salida	1-5 years
95			City of Salida	1-5 years
96			City of Salida	over 10 years
97			Town of Buena Vista	1-5 years
98	I have read with interest the railroad coming back. I moved to Chaffee County in 1997, its last year. The danger of rails moving hazardous materials is of concern, however.	The wind took out towers on Mt. Princeton and left some Mesa Antero neighbors without internet for 5 days. In Chalk Creek Canyon there is underground fiber optic (?) WiFi that is so much faster than any company's service. When will these "lines" be underground?	Nathrop	over 10 years
99		Wildfire	Town of Poncha Springs	1-5 years
100			Unincorporated Chaffee County	over 10 years
101	None.	protect cattle herds from wildfires	Unincorporated Chaffee County	over 10 years
102	Forest management and removal of the beetle kill trees in the mountains around Buena Vista down though Monarch Pass		Nathrop	5-10 years
103			City of Salida	over 10 years
104			Unincorporated Chaffee County	5-10 years
105	n/a	Concentration on wildfire mitigation	City of Salida	Less than 1 year
106			Unincorporated Chaffee County	over 10 years
107			Unincorporated Chaffee County	over 10 years
108			Unincorporated Chaffee County	1-5 years
109			Unincorporated Chaffee County	over 10 years
110		Local resources to respond to Hazardous materials assumed to be passing through county especially when I-70 is limited access or closed	City of Salida	over 10 years
111	n/a	n/a	City of Salida	Less than 1 year
112			Centerville	5-10 years
113			City of Salida	over 10 years
114			Unincorporated Chaffee County	1-5 years
115		No Nestles ..	Nathrop	5-10 years
116			Unincorporated Chaffee County	1-5 years

117	Barbed wire fences along the Arkansas River. These are a hazard and should be banned.		Unincorporated Chaffee County	5-10 years
118			Unincorporated Chaffee County	5-10 years
119			Unincorporated Chaffee County	5-10 years
120		Main concern of late after being a summer resident for 40	Nathrop	over 10 years
121			Unincorporated Chaffee County	Less than 1 year
122	Rail Oil tankers along the river. County	Prevent the restoration of the Tennessee pass railroad restoration through the Browns Canyon Nat Monument and Big Horn Sheep Canyon.	Nathrop	1-5 years
123	More IMPORTANTLY! I would like to see LESS effort spent on wildfires. Massive amounts of resources are targeted toward MAN-MADE DWELLINGS that were built in the foothills/mountains. This is not just a COUNTY issue but a Federal and State issue. As long as the COUNTY keeps approving new building permits in the hills, we will keep having to spend huge amounts of resources on wildfires that should be allowed to burn naturally.	As on previous page, only "Planning/Zoning" can make any real difference.	City of Salida	5-10 years
124			Unincorporated Chaffee County	over 10 years
125	Very concerned about the effect of drought on rain and groundwater/river levels in Chaffee County	We absolutely need to address the state drought mitigation plan and follow guidelines before not after it is mandatory. Groundwater storage and aquifers should not be sold or leased for export in any way. Nestle and similar 1041 permits need to be denied	Unincorporated Chaffee County	5-10 years
126	Na	Na	Unincorporated Chaffee County	Less than 1 year
127	Upstream log blockages or mud slides on Cottonwood Creek,		BV Golf Course	over 10 years
128	Keep our parks and trails safe	Proper warning systems	Unincorporated Chaffee County	1-5 years
129	Re routing of public trails through potential flood zones. Mandatory beacons & buddy system for back country skiers.			over 10 years
130			Unincorporated Chaffee County	5-10 years
131			City of Salida	Less than 1 year
132		Wildland mitigation should be at the forefront, especially after the Decker fire demonstrated the havoc that can ensue	Unincorporated Chaffee County	over 10 years
133	The removal of trees from cottonwood creek actually increases flood risk. The trees created an area that would reduce peak flows and deposit sediment. The trees themselves are too large to transport downstream in the small stream so there is little risk from the trees themselves.	The fluvial hazard mapping protocol from the State should be considered as a communication tool.	Town of Buena Vista	1-5 years
134	High wind causing electric outages, high wind causing internet outage - 5 days, that was this past week. Heavy snow loads on electric lines causing blinks and electric outages in the spring snows. We have no redundancy in our county areas for internet outages and not great service.	Improve 285 and 50. It was a nightmare when I70 got routed through the valley this summer. If this is an indicator of what a forced evacuation for a forest fire and people trying to get out would be like, then we have a problem. The roads aren't in great shape and there are minimal passing lanes. Something needs to be planned for how to get people safely out on these marginal roadways for evacuations.	Unincorporated Chaffee County	over 10 years
135	Better visibility to road conditions on 285		Town of Buena Vista	1-5 years
136	Wildfires--The Four-Mile and Browns Creek BLM dispersed camping growth is quite concerning. Last year's fire ban was ignored by many parties, violations I observed at least once a week in drought inflicted areas with very little observation of enforcement efforts.		Unincorporated Chaffee County	1-5 years
137	No	Covered		5-10 years
138			Town of Buena Vista	1-5 years
139	There is NOT adequate consideration of the need to have TWO WAYS OUT of neighborhoods, commercial areas, new planned subdivisions, etc. Even if the second way out is not a permanent route, it should be a usable route in the event of an emergency. When it comes to medical emergencies or hazard mitigation from Mother Nature, this is an important strategy. It should be a County policy.	It should be the Committee's responsibility to work with the other County organizations, i.e. the Transportation Advisory Board, the Recreation Plan, the Health Department, etc., to coordinate the needs/ideas of these organizations with the Hazard Mitigation Plan. There are overlaps in concern that would help all achieve their goals. At a minimum, review the recently adopted Comprehensive Plan to research common issues.	Unincorporated Chaffee County	over 10 years
140	wildfire danger - exacerbated by extreme drought, high wind events and growing use of public lands by irresponsible recreation users - is a huge problem in Chaffee County. The County has a wildfire plan that maps where to treat the forests. A wildfire's aftereffects would negatively impact out drinking water supplies and fishery, esp. on the Arkansas River.	Communications to encourage residents to be ready to evacuate in a wildfire.	Town of Buena Vista	5-10 years
141			Town of Buena Vista	over 10 years

142	Wildfire in Nathrop/Mesa Antero area. Just to our west is national forest land that is heavily used with dispersed camping, in the summer and fall. This area is the Brown's creek area. Last year during our severe drought and while wildfires were happening all over the state, the no-campfire rule was continually broken by dispersed campers. Somehow, this needs to be addressed as we will only see more of this type of drought, and worse as each year passes. We need to look at the summer of 2020 as a probable omen of what is to	More control over national forest use - perhaps by establishing campgrounds and requiring use of the campgrounds. We should not have unlimited use of national forest land for dispersed camping as it is so close to populated areas. It is not only a wildfire risk, but an environmental risk with human and pet feces, trash, and other issues related to uncontrolled use.	Nathrop	Less than 1 year
143		We need a robust smoke (wildfire) mitigation plan. Whether we have wildfires in our county or get smoke from across the United States, our vulnerable populations and whole population in general need tactical plans on mitigating exposure to poor air quality. The county is not given enough funding to work on smoke mitigation.	City of Salida	1-5 years
144		Preparation for potential civil unrest/violence	City of Salida	5-10 years
145	Pine Beetles Mitigation of standing dead trees, especially in Chalk Creek, Cottonwood Pass and Monarch Pass areas. Wildfire preparedness plans given to residents Wildfire safety instructions given to each camper or person who gets a backcountry permit or hunting license More monitoring of campfires from tourists Encouraging land owners to mitigate their own land for wildfire mitigation Keeping better track of people in the backcountry to monitor for fire safety Letting people who shoot firearms on lands know about fire risk	Please mitigate the standing dead trees in Chalk Creek, Cottonwood Pass, and Monarch Pass!!!! I have personally been up there pulling cords and cords and cords and cords of firewood. Much of the area in Chalk Creek is the Mining District and I'm not sure if it is privately or publicly owned, however it seems like there should be Grants available to assure that this part of American history remains in tact and protected. If there are not, someone please get the person who can make this happen on the line! With the wildfires of 2020, we cannot afford to allow any other parts of our Colorado natural and historic heritage to remain at such great risk!!	Unincorporated Chaffee County	5-10 years
146			Town of Buena Vista	Less than 1 year
147	Drought and wildfire in Chaffee County		City of Salida	1-5 years
148		Do not renew Nestle's permit to remove water from the aquifer & truck it to the Front Range.	Unincorporated Chaffee County	over 10 years
149	Please eliminate Nestle in Chaffee County. Thanks		City of Salida	over 10 years
150	Drought. Do not sell off our water.		Unincorporated Chaffee County	1-5 years
151	No		Unincorporated Chaffee County	Less than 1 year
152			Unincorporated Chaffee County	5-10 years
153	N/a	N/a	City of Salida	1-5 years
154	Wildfire, wind, and drought all fit together and affect the County	As many of us are more dependent upon cell and internet service for warnings and communications backup for all these systems are critical	Unincorporated Chaffee County	5-10 years
155	fire mitigation on forest/blm lands		Unincorporated Chaffee County	over 10 years
156	MUD SLIDES ON CR162 IN CHALK CREEK AREA		Unincorporated Chaffee County	over 10 years
157	No Nestle	Have things improved in the Trout Creek valley to the point where devastating flooding seen 100 years ago will not happen again? The soil is very poor and grazing methods could be altered to help regenerate the soil - as opposed to the practices adopted by Jay Wilson and other irresponsible ranchers.	Unincorporated Chaffee County	1-5 years
158			Nathrop	1-5 years
159			Unincorporated Chaffee County	over 10 years
160			Unincorporated Chaffee County	1-5 years
161	Fire, drought, winter storms Reference the state and county plans to mitigate future water shortages.	Keep Nestle from taking our water to sell.	Formerly of Salida with plans to return	1-5 years



162	No	Make the Federal forest service protect our forests.	Unincorporated Chaffee County	over 10 years
163			City of Salida	over 10 years
164	The national forests are over loaded with dead trees, that increases fire danger and flooding after the fire.	Stop building in flood prone areas, fuels mitigation in the forests	Unincorporated Chaffee County	5-10 years
165	Increase of invasive species of meadow vegetation and tree diseases. Damage to natural landscape to to overuse by off-		Unincorporated Chaffee County	5-10 years
166	I live just East of Salida but it may have already been annexed into Salida. The Decker Fire got way to close. Quality of Water concerns as I can't drink my well water any more. This is a real concern as I now have to buy my drinking water which wasn't the case even last year. As I was filling my containers 2 days ago, a woman came up to me and stated her family had the same problem. We can't do anything to further deplete our quality water supplies as the climate continues to change. So much additional development even makes this more concerning.	Although prescribed burns can be beneficial, one was just scheduled for last week when the forecast called for high winds. It wasn't until I saw a F.B. post indicating that day might not be the best for such an action that it was postponed. Something is happening with our consumable water sources and everything should be done to keep the quality water here not being sold off. Water is one of the most valuable resources there are in the world!!! Please keep it here. Access to get away from a hazard is also a critical and life saving factor. If something like the attempt to reopen the Rail Road Line were to happen, what happens if there is a fire and people can't evacuate??? There could even be liability issues if it were allowed. Wish I had more time to better consider and give input on many things.	City of Salida	1-5 years
167			Town of Buena Vista	5-10 years
168	Chaffee County or Poncha Springs: for example, allowing residential development in the hills in the old growth pinon forest south of Hwy. 50 in/near Poncha Springs. I don't know if the development is within the Town of Poncha Springs or not. This is not only of serious concern for wildfire management, but also a wildlife management concern in that it likely is affecting or will affect pinon jay habitat (ref. GARNAs 1/21/22 online presentation re: pinon jays).	Concentrate residential development AWAY from forests and away from flood plains. Has a survey been done throughout the County to identify potential disaster areas because of wildfire, flood, avalanche, mudslides, etc.?	City of Salida	Less than 1 year
169	Fires!		Town of Buena Vista	5-10 years
170	Wildfire coming over the mountains from the San Luis Valley, west of where the Decker fire came in 2019. This would be in Chaffee County between Poncha Springs and Salida.	I have a concern about "patriots", "militia", the gun culture that intimidates by open carry, believing gun rights trump any public safety rights, i.e. the right to be in public without worrying about the open carry by a person you don't know and knowing they could go off at any moment. This group overlaps with those who preach individual rights that are contra to public health (wearing masks being an example). Especially, I am concerned about law enforcement being infiltrated with people more committed to the values of the patriots/militia than public safety.	Unincorporated Chaffee County	5-10 years
171			Unincorporated Chaffee County	over 10 years
172			Town of Buena Vista	5-10 years
173		We were affected by the Decker fire south of Salida. The fire current fire mitigation/fuel reduction effort on the Methodist front is a great first move by the county and supporting governmental and non-governmental agencies. Campaigns to reduce fuels and improve wildlife habitat will make a substantial impact in retuning the forest to a healthier and more sustainable state.	Unincorporated Chaffee County	1-5 years
174	Drought is impacting the local forest areas causing the death of trees and landslides when flash flooding occurs. We need to focus on our forest health. We need to chop and chip dead trees.		Unincorporated Chaffee County	1-5 years
175	Large destructive fires and subsequent mudslides and flooding. Multi jurisdictions.	A well coordinated communications Plan including use of radio channels/frequencies that all agencies know and understand. Hold training sessions and practice. Have a set radio bank that all agencies can go to in an emergency. Dispatch needs to know how best to assign these frequencies. Have trained PIO's	City of Salida	over 10 years
176			Nathrop	1-5 years
177	Fire hazard near houses. People need to mitigate by cleaning our vegetation etc.		Mesa Antero - Nathrop	5-10 years
178				
179	Selling water to corporations when prospects of drought	Do not sell our water	Unincorporated Chaffee County	1-5 years

180		Nathrop	1-5 years
181		1. Ensure developments in forest areas have cleared firebreaks around individual homes and that county zoning rules are modified to require fire resistant building materials on all structures located in high fire risk forested areas. 2. Reestablish or retain expansive natural vegetation stream buffers to enable more natural stream fluctuations, reduce bank erosion, and limit downstream flooding events.	Town of Buena Vista Less than 1 year
182	Ongoing drought periods will continue to impact our county/state/region in serious ways. It is essential to preserve and improve the health of our watershed and ensure that water is being used appropriately. Along these lines, the Nestle permit should NOT be renewed. Wildfire mitigation is an important task for our county as well.	Leverage resources to educate and act on climate change! Maintain watershed and aquifer health as a top priority. Pursue and develop renewable energy infrastructure. Allowing real estate developments to continue at the current rate will only make the situation worse...	Town of Poncha Springs 5-10 years
183		Road safety maintenance, investigate Excel ongoing outages, drought and climate change and fire mtigation and protection of our watershed and water supply/aquifers	Unincorporated Chaffee County over 10 years
184		Evacuation Plans for all subdivision in the event of Wildfires.	Unincorporated Chaffee County 5-10 years
185	Dear Sirs, The County has so much to do already. It seem excessive for the public to be taxed for responsibilities that are covered by other entities. This proposal seems to want to take over responsibility of property owners, National and BLM, corporations and SBA and lastly the Insurance industry. County responsibilities like Roads, bridges, parks, water, sewer, schools, policing, permitting, courts, laws, trail upkeep, and so much, much more. Perfect example, is the public info flier you put out. the top picture shows snow taking down limbs and power lines into the road. This is the responsibility of land owners and Sangre De Christo Electric. Fine both parties if needed, that is county business. Proposal also talk about fire mitigation, we have laws that police the upkeep of land and structures, that is the counties responsibility. But as for forest, waterways, and personal property, that falls to forestry, property owner and insurance companies. This proposal is a good start at addressing needs of the county. Maybe we need to enforce the standing laws and work on making laws that hold responsibly parties just that, responsible. Respectfully Frank and Louise Cordova	Lets not “upgrade” for the sake of new is better. It is cost effective to be good stewards of what is in place. Our economy is a mess at the moment. We are not as hard hit as many, but by this summer we as a community will feel the weight of those effected. Let’s work on our public facilities yesterday. Such as Public Restrooms and shower facilities, hand washing areas. Areas or housing for those less fortunate. There will be migrant and homeless overflow from large cities, national parks and BLM lands. That is the long term hazard that needs attention. If this need is ignored our hospitals, clinics, parks and rec, and law enforcement will be overwhelmed.	Nathrop,and Swissvale 5-10 years
186	Threat of wildfire in subdivisions that border the National Forest/BLM.	Developing a list of evacuation centers in the county.	Town of Poncha Springs over 10 years
187	Flooding, debris flow, wildfire threat from camping and lightening and avalanche dangers in Chalk Creek.	Discourage residential development in the back country through zoning and absolve County of providing services to those owners who do build in secluded areas.  Fire Mitigation efforts are paramount to protect many areas in the county, especially Chalk Creek.  All areas of the County will see a significant rise in tourism and recreation as well as naive, recently arrived residents. Educate them on proper methods and etiquette of recreating and living in the area to protect water quality (camping and hygiene), damage to natural resources through use, firewood fuels mitigation and ways to safely use fire in the forest.	Unincorporated Chaffee County over 10 years
188		Nathrop	1-5 years
189	I am specifically concerned about the state of our forests, the risk of wildfire, and the fact that we are not investing in the wetlands and riparian areas that will act as a filter, attenuating floods, and dropping out sediments in the case of post-fire flooding. I think we need to strategically invest in our wetlands and riparian areas including protecting floodplains from development to build our resilience to fire and flooding.	Strategic investment in wetland and riparian area restoration. Protection of floodplains that build resilience.	City of Salida 5-10 years
190		Unincorporated Chaffee County	1-5 years

191		Unincorporated Chaffee County	5-10 years
192	Flood mitigation strategies and discretion within the NFIP to allow common sense building and land use within FEMA floodways and floodplain designations. Please consider using the tools available at the county and town levels to administer the NFIP reasonably to protect property values.	Unincorporated Chaffee County	over 10 years
193	Chaffee County continuing to allow corporations to truck water out of our valley with ongoing drought and climate change is a huge issue to me! Augmentation is not an answer - it does not recharge the aquifer, is not of the same quality water, still causes harm to Colorado river basin, and does not address pollution. Consider climate change in all decisions.	City of Salida	5-10 years
194	Poncha Springs - Wildfire mitigation, snow removal	Town of Poncha Springs	5-10 years
195		City of Salida	over 10 years
196	1. Electric outage due to wind/snow caused line failure- Sangre De Christie Electric 2. No access due to snow on CR 295 - Chaffee Co. & Park Service 3. Avalanche near home - ?? 4. No cell or internet service - HughesNet & Viasat 5. Wild fire near home - Chaffee Co & Nat. Park Service.. 6. Road washout of CR 162 cutting off access - Chaffee county	Thinning and Dead and fallen wood removal in forest (for fire prevention) & in streams for flood safety Getting reliable telecommunications in area (I.e. fiber optic, or microwave relay station with transmitter) Evacuation plan for residents and occupants at dead end of CR 162 near St Elmo for winter and summer conditions FIRE PROTECTION, WARNING, AND FIREFIGHTING	Unincorporated Chaffee County 1-5 years
197	Beatle kill removal	St. Elmo	over 10 years
198	Concern of potential forest fire , evacuation and fire mitigation, Alpine, St Elmo, Hancock and Tin Cup areas have minimal emergency communication and emergency response capability in the event of a fire, flooding or avalanche. Good warning, communication and response system planning, then implementing them appropriately for each area.	St Elmo	over 10 years
199	At. Elmo fire mitigation	Escape routes and tree removal	Unincorporated Chaffee County over 10 years
200		Unincorporated Chaffee County	over 10 years
201		Unincorporated Chaffee County	over 10 years
202	Flooding, winter storms, extreme wind in BV.	Already answered this question.	Town of Buena Vista 5-10 years
203	How about we get back to some personal responsibility and take care of our own properties. Ever other day there is some new organization or nanny committee in this county. Starting to think all of the people migrating here are completely unable to take care fo themselves without someone holding their hand. It is borderline pathetic. Please support: Firefighters EMS Air ambulance Chaffee County Road and bridge Hospital Leave the rest of it alone and disband all these massive wastes of taxpayer dollars. 95% of these committees, panels and boards are nothing short of fraud. Please go get a real job and give the poor taxpayer a break. There aren't that many of us left.	Unincorporated Chaffee County	over 10 years
204	I am much more worried about all the pseudo-hotels being operated in residential areas than I am about any natural disaster. When is this county going to wake up and realize 15 people in a three-bedroom VRBO is destroying the county. It's an assault on our charm not to mention our water quality Gia overwhelmed septic systems. The fake hotels don't pay commercial property tax and hurt the real hotels that do	Town of Buena Vista	5-10 years
205		Town of Buena Vista	5-10 years
206	Wildfire in mountain communities - St. Elmo	Unincorporated Chaffee County	over 10 years

207			Town of Buena Vista	5-10 years
208	The dead trees throughout st Elmo that could potentially lead to wildfires		St Elmo	1-5 years
209			Alpine community, Nathrop	over 10 years
210	nope	none	Town of Poncha Springs	1-5 years
211	Smoke is a natural hazard not identified in the previous list, that has been problematic in Chaffee County and is likely to be more frequent with climate change. The wildfire need not originate in Chaffee County to cause impacts, and information, such as pm2.5 measures, is lacking.	I think that having a robust communication plan for during disasters is essential. During disasters some forms of communications may be disabled or impractical. The public needs to know where information will be available and how to access this information before the disaster to facilitate the emergency management process.	City of Salida	1-5 years
212			Town of Poncha Springs	Less than 1 year
213			Unincorporated Chaffee County	Less than 1 year
214	County Rd 162 is highly trafficked all year. It is a narrow and dangerous box canyon. Wildfire concerns include fallen trees blocking the road. The railroad right-of-way purchased by the county in the late 1920s is 200 feet in most places (High Lonesome is an exception). Clearing the right-of-way of dead and live trees is essential to a potential evacuation of the thousands of visitors as well as locals who travel up Chalk Creek Canyon.	During high fire danger months, campers in upper Chalk Creek Canyon, including Tin Cup and Hancock Passes, make fire rings in restricted areas. In summer and fall 2020 when campfires were not allowed, locals not only took it upon themselves to put out campfires and tell the campers they were banned, but also to break down more than 25 illegal fire rings. A Forest Service Ranger assigned specifically to Upper Chalk Creek Canyon could stop a fire before it became a disaster. In addition, many tourists camped illegally alongside the road in the pull-outs and side roads where they would make a campfire.	St Elmo	over 10 years
215	Wildfire is the greatest concern. Continued drought and extreme fire danger, coupled with the dry high winds, and increasing in-flux of tourists/recreationalists who often have an air of entitlement to enjoy campfires is a scary combination. The WUI throughout the county feels increasingly vulnerable to catastrophic burns.	Public warning systems, reliable well-leveraged communications platforms, greater fire ban education and enforcement.	Unincorporated Chaffee County	5-10 years
216			City of Salida	1-5 years

**From:** Chaffee OEM  
**To:** Adam Moore; Amber Van Luken; Carr, Amy; Amy Titterington; Becky Gray; Ben Scanga; Bill McCormick; Brandon Hawkins; Brenda Mosby; Brenda Wasielewski; Brislaw, Jeff P.; Caillee Hamm; Chris McGinnis; Chris Naccarato; Christie Barton; Christy Doon; Cindy Williams; Dale Johnson; Damon Lange; Dan Osborn; Dan Swallow; Daniel Tom; David Blackburn; Dean Russell; Dick Eustis; Duff Lacy; Emily Anderson; Erik Rasmussen; Gene Stanley; Glenn Cottone; Greg Heavener; Higgins, Dan W.; Jake Rishavy; Jeffery Graf; Jenny Davis; Jim Pitts; Jimmy Jenkins; John Markalunas; Jon Roorda; Joseph Teipel; Joshua Schwenzeier; JT Shaver; Kathy Rohrich; Kenneth Quintana; Kent Maxwell; Kim Marquis; Kurt Jones; Lisa Yates; Chambers, Mack; Marc Quintana; Marjo Curgus; Mark Boley; Mark Perry; Mark Rowland; Mark Stacy; Mark Thompson; Marshall Schwarz; Matt Arsenaull; Michael Yerman; Miki Hodge; Mykel Kroll; Nora Bland; Richard H. Atkins; Field, Scott; Scott Morrill; Spencer Blades; Tony Stromer; Tyler Carlson - CDOT; Valdez, Ashley R; Wendell Pryor; William Plackner  
**Subject:** Fwd: Socials outreach re: Chaffee Hazard Mitigation Plan review  
**Date:** Friday, July 23, 2021 2:03:27 PM  
**Attachments:** image016.png  
image017.png  
image018.png  
image019.png  
image020.png  
image004.png  
image006.png  
image008.png  
image010.png  
image021.png  
image022.png  
2021-07-23 Haz Mitigation Plan Input 2021.png

**CAUTION:** External email. Please do not click on links/attachments unless you know the content is genuine and safe.

All,

The draft of our Chaffee County HMP Update is now out for public review until August 6th and is on the Chaffee County Emergency Management homepage and on numerous social media sites. See information attached and below. Please share on your social media channels. Please let me know if you do share it, so we can capture it for our grant requirements for whole community involvement. Thanks for all of your assistance on this project. Sorry for any duplication of this message.

Rich

**Richard H. Atkins, CO-CEM**

Chaffee County Emergency Management

P.O. Box 699 / 16550 Highway 285

Salida, CO 81201

(719) 539-6856 (w) | (719) 207-2730 (m)

[ChaffeeOEM@gmail.com](mailto:ChaffeeOEM@gmail.com) | [chaffeecounty.org](http://chaffeecounty.org)

----- Forwarded message -----

**From:** Beth Helmke <[bhelmke@chaffeecounty.org](mailto:bhelmke@chaffeecounty.org)>  
**Date:** Fri, Jul 23, 2021 at 7:41 AM  
**Subject:** Socials outreach re: Chaffee Hazard Mitigation Plan review  
**To:** <[ChaffeePublicAffairs@gmail.com](mailto:ChaffeePublicAffairs@gmail.com)>, <[chaffeeoem@gmail.com](mailto:chaffeeoem@gmail.com)>, <[upperarkvalley.epr@gmail.com](mailto:upperarkvalley.epr@gmail.com)>, Greg Felt <[gfelt@chaffeecounty.org](mailto:gfelt@chaffeecounty.org)>, Keith Baker <[kbaker@chaffeecounty.org](mailto:kbaker@chaffeecounty.org)>, Russell Granzella <[rgranzella@chaffeecounty.org](mailto:rgranzella@chaffeecounty.org)>, <[bvadmin@buenavistaco.gov](mailto:bvadmin@buenavistaco.gov)>, Dean Morgan <[dmorgan@buenavistaco.gov](mailto:dmorgan@buenavistaco.gov)>, <[rbertram@chaffeecountyfire.org](mailto:rbertram@chaffeecountyfire.org)>, <[jspezz@chaffeesheriff.org](mailto:jspezz@chaffeesheriff.org)>, <[arrohrich@chaffeesheriff.org](mailto:arrohrich@chaffeesheriff.org)>, <[astolba@chaffeesheriff.org](mailto:astolba@chaffeesheriff.org)>, <[drew.nelson@cityofsalida.com](mailto:drew.nelson@cityofsalida.com)>, <[pt.wood@salidaelect.com](mailto:pt.wood@salidaelect.com)>, <[doug.bess@cityofsalida.com](mailto:doug.bess@cityofsalida.com)>, <[manager@ponchasprings.us](mailto:manager@ponchasprings.us)>, <[acarlstrom@chaffeecounty.org](mailto:acarlstrom@chaffeecounty.org)>, <[jhadley@chaffeecounty.org](mailto:jhadley@chaffeecounty.org)>, <[rjohnson@salidapolice.com](mailto:rjohnson@salidapolice.com)>, <[bvpwdir@buenavistaco.gov](mailto:bvpwdir@buenavistaco.gov)>, <[wurbonas@chaffeecounty.org](mailto:wurbonas@chaffeecounty.org)>  
**Cc:** <[jeff.brislaw@woodplc.com](mailto:jeff.brislaw@woodplc.com)>, Robert Christiansen <[bchristiansen@chaffeecounty.org](mailto:bchristiansen@chaffeecounty.org)>, <[dshort@chaffeecounty.org](mailto:dshort@chaffeecounty.org)>

Good morning,

In follow-up, please post/[share](#) through your platforms to promote public awareness & solicit feedback:

The updated 2021-2026 Chaffee County Multi-Jurisdictional Hazard Mitigation Plan is available for public review and comment. The full draft plan is accessible at <https://bit.ly/ChaffeeHazardPlan>.

Share your feedback through August 6, 2021 at <https://bit.ly/HazPlanComments>.

The Multi-Jurisdictional Hazard Mitigation Plan analyzes the County's vulnerabilities to natural hazards and identifies mitigation actions the jurisdictions can take to minimize property damage and reduce the loss of life by lessening the impacts of disasters.

# Chaffee Hazard Mitigation Plan

2021 plan update now available for  
public review & comment

<https://bit.ly/ChaffeeHazardPlan>



The Hazard Mitigation Plan establishes the joint efforts of the County and jurisdictions to comprehensively assess and plan for natural hazards' mitigation, response, and recovery efforts on multiple natural hazard topics and incident types, ranging from avalanches to wildfires.

*Share your input:*

<https://bit.ly/HazPlanComments>



Happy Friday,

--Beth



**Beth Helmke, MNM**

Public Affairs Officer

Chaffee County Government

Office: 719.530.5612 | Cell: 719.221.1579

[bhelmke@chaffeecounty.org](mailto:bhelmke@chaffeecounty.org)

[ChaffeePublicAffairs@gmail.com](mailto:ChaffeePublicAffairs@gmail.com)



Sign up for our [mailing list here](#)



---

**From:** Beth Helmke <[bhelmke@chaffeecounty.org](mailto:bhelmke@chaffeecounty.org)>  
**Sent:** Thursday, July 22, 2021 4:23 PM  
**To:** 'ChaffeePublicAffairs@gmail.com' <[ChaffeePublicAffairs@gmail.com](mailto:ChaffeePublicAffairs@gmail.com)>  
**Subject:** MEDIA RELEASE: Office of Emergency Management Welcomes Public Input on the Updated Hazard Mitigation Plan

Good afternoon –

Please see [release](#) requesting review and comment on the County's updated multi-jurisdictional [Hazards Mitigation Plan](#) and circulate within your organizations, as appropriate.

~~~~

**CONTACT:**  
Beth Helmke, Public Affairs Officer  
[bhelmke@chaffeecounty.org](mailto:bhelmke@chaffeecounty.org)  
719.221.1579

**MEDIA RELEASE:** July 21, 2021

**Office of Emergency Management Welcomes Public Input on the Updated Hazard Mitigation Plan**  
*Feedback form is open through August 6th*

**SALIDA, COLO** - The Chaffee County Office of Emergency Management is sharing the updated 2021-2026 Chaffee County Multi-Jurisdictional Hazard Mitigation Plan and welcoming public review and comment. The full draft plan is accessible at <https://bit.ly/ChaffeeHazardPlan>.

Comments can be submitted at <https://forms.office.com/r/GdTvfYdJC5> through August 6, 2021.

The Multi-Jurisdictional Hazard Mitigation Plan analyzes the County's vulnerabilities to natural hazards and identifies mitigation actions the jurisdictions can take to minimize property damage and reduce the loss of life by lessening the impacts of disasters.

The current plan is an update to the 2016 Multi-Hazard Mitigation Plan. Plan updates are required each five years by the Federal Emergency Management Agency (FEMA) to maintain compliance with the Federal Disaster Mitigation Act of 2000. This update is a prerequisite to enable the County and participating jurisdictions to remain eligible to use federal pre- and post-disaster financial assistance from FEMA. This is important during incidents like the 2019 Decker fire.

A print out of the updated plan draft is available upon request by calling 719.539.2218 or emailing [chaffeeadmin@chaffeecounty.org](mailto:chaffeeadmin@chaffeecounty.org).

The Hazard Mitigation Plan establishes the joint efforts of the County, City of Salida, Town of Buena Vista, and the Town of Poncha Springs to comprehensively assess and plan for natural hazards' mitigation, response, and recovery efforts. It brings together local municipalities for pre-disaster planning on multiple natural hazard topics and incident types, ranging from avalanches to wildfires.

###

Thank you,

--Beth

**Beth Helmke, MNM**

# Chaffee Hazard Mitigation Plan

2021 plan update now available for  
public review & comment

<https://bit.ly/ChaffeeHazardPlan>



The Hazard Mitigation Plan establishes the joint efforts of the County and jurisdictions to comprehensively assess and plan for natural hazards' mitigation, response, and recovery efforts on multiple natural hazard topics and incident types, ranging from avalanches to wildfires.

*Share your input:*

<https://bit.ly/HazPlanComments>





Federal Emergency  
Management Agency  
(FEMA)

ReadyColorado

Ready.gov

Sign Up for Emergency  
Notifications

Stream Gauges

Weather Forecast

Fire Restrictions

## DEPARTMENT CONTACT

16550 Highway 285  
Salida, Colorado 81201

(719) 539-6856

## DEPARTMENT HOURS

Monday - Friday  
8 am - 4 pm

## Review Now Open for the 2021 Multi-Jurisdictional Hazards Mitigation Plan

### Chaffee Hazard Mitigation Plan

2021 plan update now available for  
public review & comment

<https://bit.ly/ChaffeeHazardPlan>



The Hazard Mitigation Plan establishes the joint efforts of the County and jurisdictions to comprehensively assess and plan for natural hazards' mitigation, response, and recovery efforts on multiple natural hazard topics and incident types, ranging from avalanches to wildfires.

*Share your input:*

<https://bit.ly/HazPlanComments>



The updated 2021-2026 Chaffee County Multi-Jurisdictional Hazard Mitigation Plan is now available for public review and comment.

Read the full draft plan at <https://bit.ly/ChaffeeHazardPlan>

The Office of Emergency Management welcomes the public's feedback on the plan. Comments can be submitted at <https://forms.office.com/r/GdTvYdJCS>.

Please provide comments by August 6, 2021

A print out of the plan is available upon request by calling 719.539.2218.

The current plan is an update to the 2016 Multi-Hazard Mitigation Plan per the five year update cycle required by FEMA and in compliance with the Federal Disaster Mitigation Act of 2000. This update is a prerequisite to enable the County and participating jurisdictions to remain eligible to use federal pre- and post-disaster financial assistance.

The Multi-Jurisdictional Hazard Mitigation Plan analyzes the County's vulnerabilities to natural hazards and identifies mitigation actions the jurisdictions in Chaffee County can take to minimize property damage and reduce the loss of life by lessening the impacts of disasters.

The Hazard Mitigation Plan establishes the joint efforts of the County, City of Salida, Town of Buena Vista, and the Town of Poncha Springs to comprehensively assess and plan for natural hazards' mitigation, response, and recovery efforts. It brings together local municipalities for pre-disaster planning on multiple natural hazard topics and incident types, ranging from avalanches to wildfires. It also ensures the County and their municipalities remain eligible for federal and state grant funding for hazards mitigation.

Office

Salida Fire Department

Salida Police Department

South Arkansas Fire  
Protection District



The updated 2021-2026 Chaffee County Multi-Jurisdictional Hazard Mitigation Plan is available for public review and comment. The full draft plan is accessible at <https://bit.ly/ChaffeeHazardPlan>.

Share your feedback through August 6, 2021 at <https://bit.ly/HazPlanComments>.

The Multi-Jurisdictional Hazard Mitigation Plan analyzes the County's vulnerabilities to natural hazards and identifies mitigation actions the jurisdictions can take to minimize property damage and reduce the loss of life by lessening the impacts of disasters.

## Chaffee Hazard Mitigation Plan

2021 plan update now available for public review & comment

<https://bit.ly/ChaffeeHazardPlan>



The Hazard Mitigation Plan establishes the joint efforts of the County and jurisdictions to comprehensively assess and plan for natural hazards' mitigation, response, and recovery efforts on multiple natural hazard topics and incident types, ranging from avalanches to wildfires.

*Share your input:*

<https://bit.ly/HazPlanComments>







Chaffee County Sheriff's Office

Published by Annette Stolba · Just now ·



The Office of Emergency Management is requesting Chaffee County Citizen's input.

Thank you

# Chaffee Hazard Mitigation Plan

2021 plan update now available for  
public review & comment

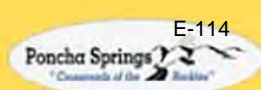
<https://bit.ly/ChaffeeHazardPlan>



The Hazard Mitigation Plan establishes the joint efforts of the County and jurisdictions to comprehensively assess and plan for natural hazards' mitigation, response, and recovery efforts on multiple natural hazard topics and incident types, ranging from avalanches to wildfires.

*Share your input:*

<https://bit.ly/HazPlanComments>



E-114



**From:** [Chaffee OEM](#)  
**To:** [Carr, Amy](#)  
**Subject:** Fwd: Socials outreach re: Chaffee Hazard Mitigation Plan review  
**Date:** Wednesday, July 28, 2021 9:41:02 AM  
**Attachments:** [image001.png](#)  
[image002.png](#)  
[image003.png](#)  
[image004.png](#)  
[image005.png](#)  
[image006.png](#)  
[image007.png](#)  
[image008.png](#)  
[image009.png](#)

---

**CAUTION:** External email. Please do not click on links/attachments unless you know the content is genuine and safe.

**Richard H. Atkins**, CO-CEM

Chaffee County Emergency Management

P.O. Box 699 / 16550 Highway 285

Salida, CO 81201

(719) 539-6856 (w) | (719) 207-2730 (m)

[ChaffeeOEM@gmail.com](mailto:ChaffeeOEM@gmail.com) | [chaffeecounty.org](http://chaffeecounty.org)

----- Forwarded message -----

**From:** <[bgray@chaffeecounty.org](mailto:bgray@chaffeecounty.org)>  
**Date:** Mon, Jul 26, 2021 at 8:10 AM  
**Subject:** RE: Socials outreach re: Chaffee Hazard Mitigation Plan review  
**To:** Chaffee OEM <[chaffeeoem@gmail.com](mailto:chaffeeoem@gmail.com)>  
**Cc:** Beth Helmke <[bhelmke@chaffeecounty.org](mailto:bhelmke@chaffeecounty.org)>

Good morning!

I shared the FB post through the Housing Policy Advisory Committee's FB page, which has 475 page followers, and typically reaches about 100 people.

Thanks!

Becky

---

**From:** Chaffee OEM <[chaffeeoem@gmail.com](mailto:chaffeeoem@gmail.com)>  
**Sent:** Friday, July 23, 2021 2:03 PM  
**To:** Adam Moore <[adam.moore@colostate.edu](mailto:adam.moore@colostate.edu)>; Amber Van Luken <[avanleuken@ark-valley.org](mailto:avanleuken@ark-valley.org)>; Amy Carr <[amy.carr@woodplc.com](mailto:amy.carr@woodplc.com)>; Amy Titterington <[amy.j.titterington@usda.gov](mailto:amy.j.titterington@usda.gov)>; Becky Gray <[bgray@chaffeecounty.org](mailto:bgray@chaffeecounty.org)>; Ben Scanga <[rbscanga@scangameat.com](mailto:rbscanga@scangameat.com)>; Bill McCormick <[bill.mccormick@state.co.us](mailto:bill.mccormick@state.co.us)>; Brandon Hawkins <[bhawkins@salidaschools.org](mailto:bhawkins@salidaschools.org)>; Brenda Mosby <[bmosby@chaffeecounty.org](mailto:bmosby@chaffeecounty.org)>; Brenda Wasielewski <[Brenda.Wasielewski@state.co.us](mailto:Brenda.Wasielewski@state.co.us)>; Brislawn, Jeff P <[jeff.brislawn@woodplc.com](mailto:jeff.brislawn@woodplc.com)>; Cailee Hamm <[lakecountyoem@gmail.com](mailto:lakecountyoem@gmail.com)>; Chris McGinnis <[mcginnis@myelectric.coop](mailto:mcginnis@myelectric.coop)>; Chris Naccarato <[cnaccarato@fs.fed.us](mailto:cnaccarato@fs.fed.us)>; Christie Barton <[cbarton@chaffeecounty.org](mailto:cbarton@chaffeecounty.org)>; Christy Doon <[christy.doon@state.co.us](mailto:christy.doon@state.co.us)>; Cindy Williams <[cindy@envisionchaffeecounty.org](mailto:cindy@envisionchaffeecounty.org)>; Dale Johnson <[Dale.Johnson@xcelenergy.com](mailto:Dale.Johnson@xcelenergy.com)>; Damon Lange <[dlange@lamar.colostate.edu](mailto:dlange@lamar.colostate.edu)>; Dan Osborn <[community.development@cityofsalida.com](mailto:community.development@cityofsalida.com)>; Dan Swallow <[dswallow@chaffeecounty.org](mailto:dswallow@chaffeecounty.org)>; Daniel Tom <[dtom@chaffeecounty.org](mailto:dtom@chaffeecounty.org)>; David Blackburn <[dblackburn@salidaschools.org](mailto:dblackburn@salidaschools.org)>; Dean Russell <[deancca@hotmail.com](mailto:deancca@hotmail.com)>; Dick Eustis <[dickeustis@gmail.com](mailto:dickeustis@gmail.com)>; Duff Lacy <[mayorlacy@buenavistaco.gov](mailto:mayorlacy@buenavistaco.gov)>; Emily Anderson <[eanderson@chaffeecounty.org](mailto:eanderson@chaffeecounty.org)>; Erik Rasmussen <[erik.ryan.rasmussen@gmail.com](mailto:erik.ryan.rasmussen@gmail.com)>; Gene Stanley <[GStanley@parkco.us](mailto:GStanley@parkco.us)>; Glenn Cottone <[glenn.cottone@state.co.us](mailto:glenn.cottone@state.co.us)>; Greg Heavener <[greg.heavener@noaa.gov](mailto:greg.heavener@noaa.gov)>; Higgins, Dan W <[Daniel.Higgins@atmosenergy.com](mailto:Daniel.Higgins@atmosenergy.com)>; Jake Rishavy <[Jake@chaffeecountyedc.com](mailto:Jake@chaffeecountyedc.com)>; Jeffery Graf <[jgraf@chaffeecounty.org](mailto:jgraf@chaffeecounty.org)>; Jenny Davis <[jdavis@chaffeecounty.org](mailto:jdavis@chaffeecounty.org)>; Jim Pitts <[james.pitts@usda.gov](mailto:james.pitts@usda.gov)>; Jimmy Jenkins <[jimmy.jenkins@redcross.org](mailto:jimmy.jenkins@redcross.org)>; John Markalunas <[jmarkalunas@blm.gov](mailto:jmarkalunas@blm.gov)>; Jon Roorda <[jroorda@chaffeecounty.org](mailto:jroorda@chaffeecounty.org)>; Joseph Teipel <[joseph@chaffeecommunity.org](mailto:joseph@chaffeecommunity.org)>; Joshua Schwenzfeier <[josh.schwenzfeier@gmail.com](mailto:josh.schwenzfeier@gmail.com)>; JT Shaver <[j.t.shaver@colostate.edu](mailto:j.t.shaver@colostate.edu)>; Kathy Rohrich <[kathy.rohrich@cityofsalida.com](mailto:kathy.rohrich@cityofsalida.com)>; Kenneth Quintana <[kenneth.quintana@state.co.us](mailto:kenneth.quintana@state.co.us)>; Kent Maxwell <[kmaxwell@coloradofirecamp.com](mailto:kmaxwell@coloradofirecamp.com)>; Kim Marquis <[kim.marquis@me.com](mailto:kim.marquis@me.com)>; Kurt Jones <[kurt.jones@colostate.edu](mailto:kurt.jones@colostate.edu)>; Lisa Yates <[lyates@bvschools.org](mailto:lyates@bvschools.org)>; Mack Chambers <[mack.chambers@woodplc.com](mailto:mack.chambers@woodplc.com)>; Marc Quintana <[marc.quintana@state.co.us](mailto:marc.quintana@state.co.us)>; Marjo Curgus <[delcorazonconsulting@gmail.com](mailto:delcorazonconsulting@gmail.com)>; Mark Boley <[mark.bolely@state.co.us](mailto:mark.bolely@state.co.us)>; Mark Perry <[mark.perry@state.co.us](mailto:mark.perry@state.co.us)>; Mark Rowland <[mark.rowland@hrrmc.net](mailto:mark.rowland@hrrmc.net)>; Mark Stacy <[mstacy@chaffeecounty.org](mailto:mstacy@chaffeecounty.org)>; Mark Thompson <[markw.thompson@state.co.us](mailto:markw.thompson@state.co.us)>; Marshall Schwarz





# Chaffee Hazard Mitigation Plan

2021 plan update now available for public review & comment

<https://bit.ly/ChaffeeHazardPlan>



The Hazard Mitigation Plan establishes the joint efforts of the County and jurisdictions to comprehensively assess and plan for natural hazards' mitigation, response, and recovery efforts on multiple natural hazard topics and incident types, ranging from avalanches to wildfires.

*Share your input:*

<https://bit.ly/HazPlanComments>



Chaffee County Office of Emergency Management

July 23 at 7:17 AM · 🌐

The updated 2021-2026 Chaffee County Multi-Jurisdictional Hazard Mitigation Plan is available for public review and comment. The full draft plan is accessible a... See More

Respondent

<

1

Anonymous

>

4103:50

Time to complete

Affiliation

1. Select affiliation (select one): \*

- ☐ Member of the Public
- ☐ Private industry
- ☐ Nonprofit
- ☒ Government-Local
- ☐ Government-State
- ☐ Government-Federal

Comments

2. Please provide comments regarding the Draft Update of the Chaffee County  
here:

1.1 first sentence is missing a word. Jurisdictions of the ??? County perhaps?

Respondent



2

Anonymous



55:46



Time to complete

## Affiliation

1. Select affiliation (select one): \*

- ☒ Member of the Public
- ☐ Private industry
- ☐ Nonprofit
- ☐ Government-Local
- ☐ Government-State
- ☐ Government-Federal

## Comments

2. Please provide comments regarding the Draft Update of the Chaffee County Hazard Mitigation Plan here:

1. This is a very extensive inventory of Chaffee conditions and documentation of hazards. It should take a lot more than 5 minutes to read and digest it ! The fact that most growth has occurred in unincorporated parts of county makes it imperative to consider rural transport and utility systems for protection from flood and wildfire events. 2. Many rural roads were never engineered to meet hazards seen today. I agree with the need for better drainage on county roads, especially CR 371. There needs to be a capital fund set up for drainage improvements. CR 371 also has significant risk of landslide or mud flow on north part with steep slopes above road. We must recognize that roads like CR 371 have an access problem: at the south are the tunnels- subject to collapse and on the north there is significant risk of mud/rock/debris slides covering the road. Events at the north, south. or both ends or both could block access for emergency services - and evacuation if needed. Harvard Valley has

E-118

one access via a bridge across the river. A bridge failure would cut off the entire subdivision to evacuation and emergency access. 3. When considering special use permits, look at the event and number of people proposed to gather in terms of a wildfire, flood or other disaster: Would there be resources to protect the local population and property if an event occurred when the gathering is proposed? Is this proposed at a time when resources are stretched thin? We need to look at worst-case scenarios- because extremes of weather and natural disaster are becoming the norm.

---

---



Respondent



3

Anonymous



04:56

Time to complete



## Affiliation

1. Select affiliation (select one): \*

- ☒ Member of the Public
- ☐ Private industry
- ☐ Nonprofit
- ☐ Government-Local
- ☐ Government-State
- ☐ Government-Federal

## Comments

2. Please provide comments regarding the Draft Update of the Chaffee County Hazard Mitigation Plan here:

The plan should address creating citizen volunteer opportunities in response to disaster events. A medical reserve corps should also be established in Chaffee County.

## Contact Information

---

## **APPENDIX F: PLAN ADOPTIONS AND APPROVAL**



# APPENDIX F: PLAN ADOPTION AND APPROVAL

---

Note: The records of adoption will be incorporated as an electronic appendix. When the plan is adopted in 2021, the jurisdictions and adoption date will be noted here, but scanned versions of all adoption resolutions will be kept on file with Chaffee County Emergency Management. A sample adoption resolution is provided here. The final FEMA approval packet will be included for future reference regarding the five year expiration date and suggestions for improvements in the next update.

---

Multi-Jurisdictional Mitigation Plan Adoption Sample Resolution

Resolution # \_\_\_\_\_

**Adopting the Chaffee County  
Multi-Jurisdictional Hazard Mitigation Plan 2021**

**Whereas,** (name of county or community) recognizes the threat that natural hazards pose to people and property within our community; and

**Whereas,** undertaking hazard mitigation actions will reduce the potential for harm to people and property from future hazard occurrences; and

**Whereas,** an adopted Multi-Jurisdictional Hazard Mitigation Plan is required as a condition of future funding for mitigation projects under multiple FEMA pre- and post-disaster mitigation grant programs; and

**Whereas,** (name of county or community) resides within the Planning Area, and fully participated in the mitigation planning process to prepare this Multi-Jurisdictional Hazard Mitigation Plan; and

**Whereas,** the Colorado Division of Homeland Security and Emergency Management and Federal Emergency Management Agency, Region VIII officials have reviewed the Chaffee County Multi-Jurisdictional Hazard Mitigation Plan and approved it contingent upon this official adoption of the participating governing body; and

**Now, therefore, be it resolved,** that the (name of board or council), hereby adopts the Chaffee County Multi-Jurisdictional Hazard Mitigation Plan, as an official plan; and

**Be it further resolved,** Chaffee County Emergency Management will submit this Adoption Resolution to the Colorado Division of Homeland Security and Emergency Management and Federal Emergency Management Agency, Region VIII officials to enable the Plan's final approval.

Passed:     (date)    

\_\_\_\_\_

Certifying Official

---

## **APPENDIX G: EXAMPLE ANNUAL MEETING AGENDA AND PROGRESS REPORT TEMPLATE**

# **APPENDIX G: EXAMPLE PROGRESS MEETING AGENDA AND REPORT**

---

## **Chaffee County Multi-Jurisdictional Hazard Mitigation Plan Annual Progress Meeting Agenda**

- 1. Discussion on hazard events and impacts that occurred during the performance period**
- 2. Review of progress on mitigation action implementation**
- 3. Discussion on success stories**
- 4. Recommendations for new actions/projects**
- 5. Review of funding options and grant opportunities**
- 6. Review of changes in plan maintenance or implementation**
- 7. Review of continuing public involvement**

# APPENDIX G: EXAMPLE PROGRESS MEETING AGENDA AND REPORT

---

## Chaffee County Multi-Jurisdictional Hazard Mitigation Plan Annual Progress Report Template

### Reporting Period:

**Background:** Chaffee County and participating cities and towns in the county developed a hazard mitigation plan to reduce risk from all hazards by identifying resources, information, and strategies for risk reduction. The federal Disaster Mitigation Act of 2000 requires state and local governments to develop hazard mitigation plans as a condition for federal disaster grant assistance. To prepare the plan, the participating partners organized resources, assessed risks from natural hazards within the county, developed planning goals and objectives, reviewed mitigation alternatives, and developed an action plan to address probable impacts from natural hazards. By completing this process, these jurisdictions-maintained compliance with the Disaster Mitigation Act, achieving eligibility for mitigation grant funding opportunities afforded under the Robert T. Stafford Act. The plan can be viewed on-line at:

**Summary Overview of the Plan's Progress:** The performance period for the Hazard Mitigation Plan became effective on \_\_\_, 2021, with the final approval of the plan by FEMA. The initial performance period for this plan will be 5 years, with an anticipated update to the plan to occur before \_\_\_, 2026. The *Chaffee County Multi-jurisdictional Hazard Mitigation Plan* has targeted 41 hazard mitigation initiatives to be pursued during the 5-year performance period. As of the reporting period, the following overall progress can be reported:

\_\_ out of \_\_ initiatives (\_\_%) reported ongoing action toward completion.

\_\_ out of \_\_ initiatives (\_\_%) were reported as being complete.

\_\_ out of \_\_ initiatives (\_\_%) reported no action taken.

**Purpose:** The purpose of this report is to provide an annual update on the implementation of the action plan identified in the *Chaffee County Hazard Mitigation Plan*. The objective is to ensure that there is a continuing and responsive planning process that will keep the hazard mitigation plan dynamic and responsive to the needs and capabilities of the partner jurisdictions. This report discusses the following:

- Natural hazard events that have occurred within the last year
- Changes in risk exposure within the planning area (all of Chaffee County)
- Mitigation success stories
- Review of the action plan
- Changes in capabilities that could impact plan implementation
- Recommendations for changes/enhancement

**The Hazard Mitigation Planning Committee:** The Hazard Mitigation Planning Committee, made up of planning partners and stakeholders within the planning area, reviewed and

approved this progress report at its annual meeting held on \_\_\_\_, 202\_. It was determined through the plan's development process that the HMPC would remain in service to oversee maintenance of the plan. At a minimum, the HMPC will provide technical review and oversight on the development of the annual progress report. It is anticipated that there will be turnover in the membership annually, which will be documented in the progress reports. For this reporting period, the HMPC membership present at the meeting is as indicated in Table 1.

| TABLE 1.<br>HMPC COMMITTEE MEMBERS PRESENT |       |                     |
|--------------------------------------------|-------|---------------------|
| Name                                       | Title | Jurisdiction/Agency |
|                                            |       |                     |
|                                            |       |                     |
|                                            |       |                     |
|                                            |       |                     |
|                                            |       |                     |
|                                            |       |                     |
|                                            |       |                     |
|                                            |       |                     |
|                                            |       |                     |
|                                            |       |                     |
|                                            |       |                     |
|                                            |       |                     |

**Natural Hazard Events within the Planning Area:** During the reporting period, there were \_\_\_\_\_ natural hazard events in the planning area that had a measurable impact on people or property. A summary of these events is as follows:

---



---



---

**Changes in Risk Exposure in the Planning Area:** *(Insert brief overview of any natural hazard event in the planning area that changed the probability of occurrence or ranking of risk for the hazards addressed in the hazard mitigation plan)*

**Mitigation Success Stories:** *(Insert brief overview of mitigation accomplishments during the reporting period)*

**Review of the Action Plan:** Table 2 reviews the action plan, reporting the status of each initiative. Reviewers of this report should refer to the *Chaffee County Hazard Mitigation Plan* for more detailed descriptions of each initiative and the prioritization process.

*Address the following in the "status" column of the following table:*

*Was any element of the initiative carried out during the reporting period?*



*If no action was completed, why?*

*Is the timeline for implementation for the initiative still appropriate?*

*If the initiative was completed, does it need to be changed or removed from the action plan?*

**TABLE 2.**  
**ACTION PLAN MATRIX**

| Action No.            | Title                                                                                                                                                       | Action Taken? (Yes or No) | Timeline | Priority | Status | Status (✓, O, X) |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|----------|----------|--------|------------------|
| <b>CHAFFEE COUNTY</b> |                                                                                                                                                             |                           |          |          |        |                  |
| 1                     | Encourage Water Saving Measures                                                                                                                             |                           |          |          |        |                  |
| 2                     | Promote Xeriscape Landscaping and Drought-tolerant Plants                                                                                                   |                           |          |          |        |                  |
| 3                     | Build New Drains and Increase Culverts Around County                                                                                                        |                           |          |          |        |                  |
| 4                     | Avalanche Danger Warning Signage                                                                                                                            |                           |          |          |        |                  |
| 5                     | Build Living Snow Fences                                                                                                                                    |                           |          |          |        |                  |
| 6                     | Wildfire Mitigation Measures                                                                                                                                |                           |          |          |        |                  |
| 7                     | Strengthen Public Education Programs                                                                                                                        |                           |          |          |        |                  |
| 8                     | Strengthen Partnership Between Code-enforcing Firefighters, Planners, and Law Enforcement Authorities                                                       |                           |          |          |        |                  |
| 9                     | Partner with FEMA to Update and Improve Accuracy of Flood Hazard Area Boundaries                                                                            |                           |          |          |        |                  |
| 10                    | Incorporate GIS Layer for Land- Ownership Parcels into Emergency- Response Procedures                                                                       |                           |          |          |        |                  |
| 11                    | Western Area Power Administration Powerline ROW Fuels Reduction Project                                                                                     |                           |          |          |        |                  |
| 12                    | Tri-State Generation & Transmission Powerline ROW Fuels Reduction Project                                                                                   |                           |          |          |        |                  |
| 13                    | Wildfire Risk Assessment and Mapping Program                                                                                                                |                           |          |          |        |                  |
| 14                    | Flood Warning - Decker Burn Scar                                                                                                                            |                           |          |          |        |                  |
| 15                    | County-Wide Evacuation Plan                                                                                                                                 |                           |          |          |        |                  |
| 16                    | County-Wide Evacuation Zones Development                                                                                                                    |                           |          |          |        |                  |
| 17                    | Increase Wildfire Risk Awareness, Develop and present education and outreach programs to target citizens, businesses, developers, landscapers, and insurers |                           |          |          |        |                  |
| 18                    | Increase Hazard Education and Risk Awareness                                                                                                                |                           |          |          |        |                  |

**TABLE 2.**  
**ACTION PLAN MATRIX**

| Action No.                 | Title                                                                                          | Action Taken? (Yes or No) | Timeline | Priority | Status | Status (✓, O, X) |
|----------------------------|------------------------------------------------------------------------------------------------|---------------------------|----------|----------|--------|------------------|
| <b>CITY OF SALIDA</b>      |                                                                                                |                           |          |          |        |                  |
| 1                          | Wildfire Risk Reduction                                                                        |                           |          |          |        |                  |
| 2                          | Encourage HOA's to Join Firewise Communities/USA                                               |                           |          |          |        |                  |
| 3                          | Educate Public of Severe Weather Impacts                                                       |                           |          |          |        |                  |
| 4                          | Identifying Functional and Access Needs Population                                             |                           |          |          |        |                  |
| 5                          | Securing Propane Tanks                                                                         |                           |          |          |        |                  |
| 6                          | Flood Response Plan                                                                            |                           |          |          |        |                  |
| 7                          | Update Building Codes                                                                          |                           |          |          |        |                  |
| 8                          |                                                                                                |                           |          |          |        |                  |
| <b>TOWN OF BUENA VISTA</b> |                                                                                                |                           |          |          |        |                  |
| 1                          | Back-up Water Supply                                                                           |                           |          |          |        |                  |
| 2                          | Residential and Commercial Watering Restrictions                                               |                           |          |          |        |                  |
| 3                          | Encourage Wildfire Fuel Reductions                                                             |                           |          |          |        |                  |
| 4                          | Wildfire Evacuation Plan                                                                       |                           |          |          |        |                  |
| 5                          | Danger Warning Signage                                                                         |                           |          |          |        |                  |
| 6                          | Public Education of Natural Hazard                                                             |                           |          |          |        |                  |
| 7                          | Security for municipal water infiltration treatment plant                                      |                           |          |          |        |                  |
| 8                          | Stormwater Management Standards for New Development                                            |                           |          |          |        |                  |
| 9                          | Stormwater Hazard Mitigation. Based on 2014 Stormwater and Drainage Master Plan Implementation |                           |          |          |        |                  |
| 10                         | Highway 24 Intersection Improvements to mitigate hazardous materials spills                    |                           |          |          |        |                  |

**TABLE 2.**  
**ACTION PLAN MATRIX**

| Action No.                                                                                                                 | Title                                                                                                                                                   | Action Taken? (Yes or No) | Timeline | Priority | Status | Status (✓, O, X) |
|----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|----------|----------|--------|------------------|
| 11                                                                                                                         | Replace older bridges/culverts in Town over Cottonwood Creek at James St, N Pleasant Ave, Cottonwood Ave, West Main (at McPhelemy) to reduce flood risk |                           |          |          |        |                  |
| <b>TOWN OF PONCHA SPRINGS</b>                                                                                              |                                                                                                                                                         |                           |          |          |        |                  |
| 1                                                                                                                          | Public Awareness Campaigns with Erosion, Flood, Landslide, Mud, Debris Flow, Rockfall                                                                   |                           |          |          |        |                  |
| 2                                                                                                                          | Encourage Living Fences                                                                                                                                 |                           |          |          |        |                  |
| 3                                                                                                                          | Educate Homeowners on Natural Hazards                                                                                                                   |                           |          |          |        |                  |
| 4                                                                                                                          | Identify Future Flood Protection Measures                                                                                                               |                           |          |          |        |                  |
| 5                                                                                                                          | Reduction of Wildfire Fuels                                                                                                                             |                           |          |          |        |                  |
| 6                                                                                                                          | Winter Storm Preparedness                                                                                                                               |                           |          |          |        |                  |
| 7                                                                                                                          | Hazardous Material Preparedness                                                                                                                         |                           |          |          |        |                  |
| Completion status legend:<br>✓ = Project Completed<br>O = Action ongoing toward completion<br>X = No progress at this time |                                                                                                                                                         |                           |          |          |        |                  |

**Changes That May Impact Implementation of the Plan:** *(Insert brief overview of any significant changes in the planning area that would have a profound impact on the implementation of the plan. Specify any changes in technical, regulatory and financial capabilities identified during the plan's development)*

**Recommendations for Changes or Enhancements:** Based on the review of this report by the Hazard Mitigation Planning Committee, the following recommendations will be noted for future updates or revisions to the plan:

---

---

---

---

---

**Public review notice:** *The contents of this report are considered to be public knowledge and have been prepared for total public disclosure. Copies of the report have been provided to the governing boards of all planning partners and to local media outlets and the report is posted on the Chaffee County Hazard Mitigation Plan website. Any questions or comments regarding the contents of this report should be directed to:*

*Insert Contact Info Here*