2016

Alamosa County Hazard Mitigation Plan

Alamosa County
City of Alamosa
Alamosa County Fire Protection District
Town of Hooper
Rio Grande Water Conservation District

Draft: September 30, 2016

Alamosa County Hazard Mitigation Plan

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(Updated from original version prepared and approved in 2010)

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Executive Summary

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

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

Although Alamosa County has been spared serious consequences due to natural hazards over the last five years, several significant natural hazard events have occurred in the San Luis Valley since the last update of this plan, most notably the West Fork Fire Complex in June 2013, a federally-declared fire emergency that cost more than $33 million to contain. Information about that event, as well as other smaller-scale events, is provided in the table below.

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

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

probability and severity of consequences. The Risk Assessment Worksheet in Chapter Four provides additional details on this process.

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

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

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

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

2016 Mitigation Actions			
#	Description/Benefits	Lead Agency	Priority
Alamosa County			
1	Seek updated FEMA digital flood maps (DFIRMs) and explore local Base Flood Elevation (BFE) mapping opportunities	Land Use	High
2	Implement the recommendations of the Rio Grande Headwaters Restoration Project (RGHRP)	Rio Grande Headwaters Restoration Project (RGHRP)	High
3	Increase public awareness of severe weather hazards and identify opportunities for exposing students to mitigation studies, actions and plans	OEM	Medium
4	Increase shelter capacity throughout the county (coordinate with the Red Cross)	OEM	High
5	Revise land use regulations to include flood and wildfire mitigation	Land Use	Medium

6	Improve flood permitting process and regulate floodplain in conformance with NFIP requirements	Land Use	Medium
7	Conduct study and develop a shelter plan for vulnerable populations in unincorporated areas, including the town of Hooper	OEM	High
8	Incorporate student population into mitigation studies, actions, and/or planning	OEM	Medium
9	Improve preparedness for long-term power outages and increase awareness of alternate energy sources	OEM/Land Use	Medium
10	Improve education and awareness of fuels reduction techniques in wildland-urban interface areas	Alamosa Fire Protection District/Colorado State Forest Service	High
11	Work with the State of Colorado and the National Weather Service to identify funding and support for the placement of a Doppler radar tower in the area to improve weather predictions and warnings	OEM	High
12	Investigate opportunities for mitigating health hazards resulting from windstorms that produce particulate matter in excess of health standards	Public Health/Emergency Preparedness and Response	Medium
City of Alamosa			
13	Address issues raised in the US Army Corps of Engineers Study Continuing Eligibility Inspection (CEI) 9/15/2008	Alamosa Public Works	High
14	Improve flood permitting process and regulate floodplain in conformance with NFIP requirements	City of Alamosa Floodplain Administrator	Medium
15	Seek updated FEMA digital flood maps (DFIRMs) and explore local Base Flood Elevation (BFE) mapping opportunities	City of Alamosa Floodplain Administrator	High
16	Develop shelter plan for vulnerable populations within the City of Alamosa	Alamosa FPD	High
17	Increase public awareness of severe weather hazards and identify opportunities for exposing students to mitigation studies, actions and plans	OEM, City of Alamosa	Medium
18	Improve preparedness for long-term power outages and increase awareness of alternate energy sources	Alamosa Public Works	Medium
19	Incorporate goals and principles of the Alamosa County Hazard Mitigation Plan into process of developing new City Comprehensive Plan	City of Alamosa	High
Town of Hooper/Community of Mosca			
20	Develop shelter plan for vulnerable populations within the town of Hooper and neighboring areas of unincorporated Alamosa County	OEM/Town of Hooper	High
21	Increase public awareness of severe weather hazards	OEM/Town of Hooper	Medium
Alamosa County Fire Protection District			
22	Increase public awareness of severe weather hazards	OEM/ACFPD	Medium
Rio Grande Water Conservation District			

23	Establish and maintain a water conservation process for protecting aquifer levels	Rio Grande Water Conservation District	Medium

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

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

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

In addition to Alamosa County, the City of Alamosa, Alamosa County Fire Protection District, Town of Hooper and the Rio Grande Water Conservation District also participated in development of this updated plan. The collaborative effort further demonstrates the ongoing commitment in Alamosa County to reducing risks to people and property posed by natural hazards, in addition to maintaining eligibility for federal funding.

Chapter One
Introduction

1.1 Purpose

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

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

1.2 Participating Jurisdictions

- Alamosa County
- City of Alamosa
- Town of Hooper
- Alamosa County Fire Protection District
- Rio Grande Water Conservation District

1.3 Background and Scope

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

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

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

1.4 Mitigation Planning Requirements

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

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

1.5 Grant Programs Requiring Hazard Mitigation Plans

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

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

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

<u>Disaster-Funded Mitigation Assistance</u>

Hazard Mitigation Grant Program (HMGP)

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

Hazard Mitigation Assistance Programs

Pre-Disaster Mitigation (PDM) Program

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

Flood Mitigation Assistance (FMA) Grant Program

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

1.6 Plan Organization

The Alamosa County Hazard Mitigation Plan is organized as follows:

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

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

Chapter Two
Community Profile

Alamosa County is located in the heart of the San Luis Valley (the Valley) of south central Colorado. Figure 2.1 shows Alamosa County's location within the state. The City of Alamosa and the Town of Hooper are the only incorporated municipalities in Alamosa County. The county seat, the City of Alamosa, is located in the middle of the county, and is the largest city in the San Luis Valley. The Town of Hooper's jurisdictional boundaries are located within both Alamosa and Saguache Counties. The greatest population areas within the Town of Hooper are within Alamosa County, therefore they have chosen to participate in the Alamosa County Plan. Alamosa East is a census-designated place covering 3.6 square miles of unincorporated land. Mosca is an unincorporated town with a post office.

Table 2.1 Alamosa County Facts and Figures

Alamosa County Facts and Figures			
	Alamosa County	**City of Alamosa**	**Town of Hooper**
Latitude	37.654039N	37.4389N	37.74278N
Longitude	-105.87600W	-105.861W	-105.8753W
Land Area (Square Miles)	723.00	5.51	0.25
Elevation (Feet)	7,559	7,543	7,559
Population (2010)	15,455	8,780	103
Population (2014 ACS 5-Year Estimated)	16,111	9,427	79
Population (2015 Estimated)	16,496	9,819	103

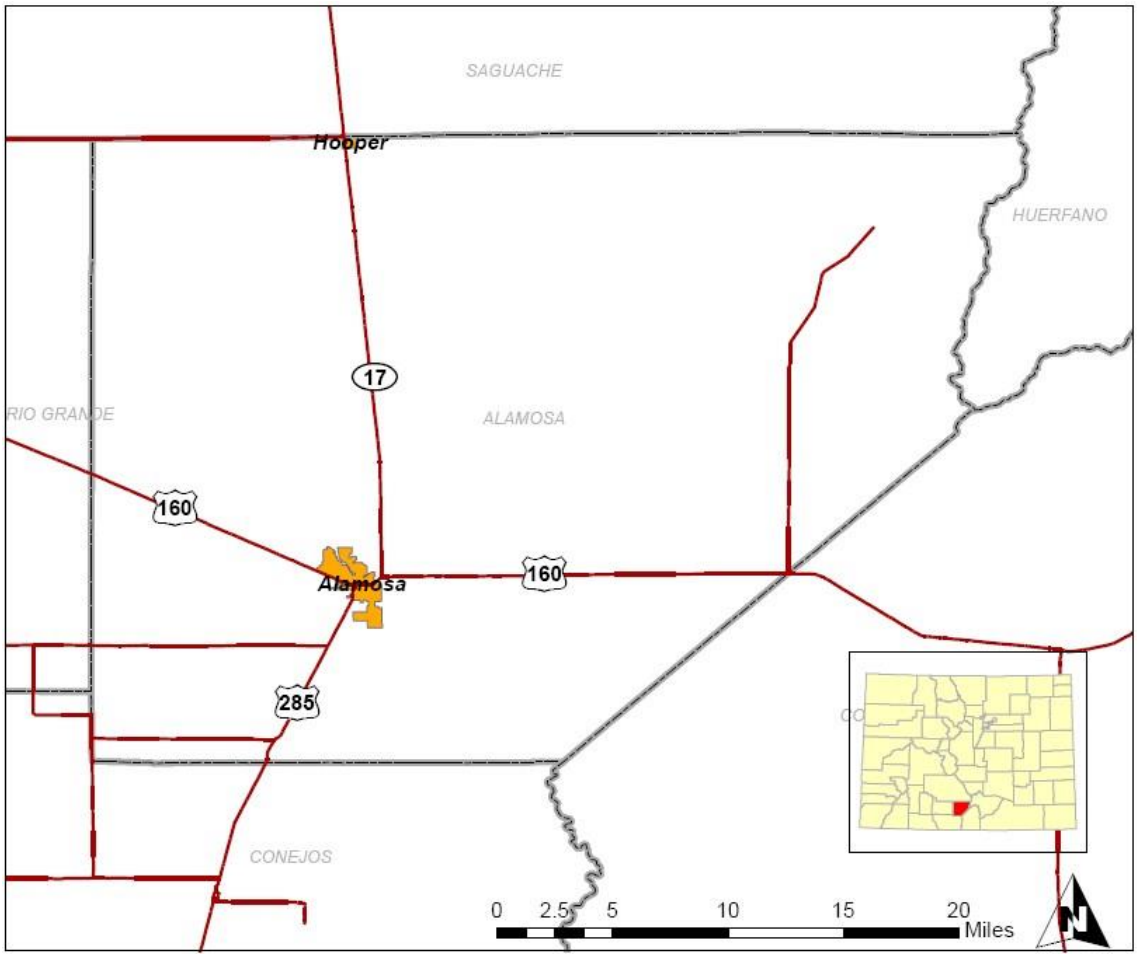
2.1 Geography and Climate

Geography

Spanning 8,000 square miles, the San Luis Valley is the world's largest alpine desert. It is approximately 122 miles long and 74 miles wide, extending from the Continental Divide on the northwest rim into the state of New Mexico on the south. Mountain ranges with peaks reaching elevation over 14,000 feet sit on each of the Valley – the Sangre de Cristo range to the east and the San Juan Mountains to the west.

The San Luis Valley sits atop the Rio Grande Rift, a split in the crust of the Earth where the sides are pulling away from each other. The Valley floor is covered with approximately 30,000 feet of rock, sand, and earth, deposited over millions of years as the rift has separated and the surrounding mountains have eroded. A number of mountain streams flow into the Valley and then sink into the desert sand creating an expansive aquifer under the Valley floor. The only surface water to leave the valley is the Rio Grande River, which runs through the City of Alamosa.

Figure 2.1 Map of Alamosa County



Source: URS Corporation (for planning purposes only)

Climate

The climate of the Valley is marked by moderate summers and cold winters, light precipitation and many days of sunshine each year. 80 percent of the annual precipitation occurs from April to October. Typically, light scattered showers will result from thunderstorms that develop over the mountains and move into the Valley during the afternoon, providing the county with approximately 7.6 inches of rain per year and an average summer temperature of 65 degrees. The county receives approximately 41.7 inches of snow each winter with an average temperature of 14 degrees. Although the winters are cold, Alamosa County experiences approximately 350 days with sunshine per year.

2.2 History

The San Luis Valley was long part of the lands of the Ute Indian Tribes. The Spanish, and later the Mexicans, slowly conquered the area from these tribes during the 17th and 18th centuries. The Valley was the first region of Colorado to be settled by Europeans. The area was administered as part of the Spanish, later Mexican, province of Nuevo Mexico (New Mexico) until the area was purchased by the United States as part of the Treaty of Guadalupe

Hidalgo in 1848. Extensive settlement began in the Valley by Hispanic farmers and ranchers in the 1850s. Today, the Valley has the largest native Hispanic population in Colorado and many families are directly descended from the original Nuevo Mexican settlers. The Valley became part of the Territory of Colorado in 1861. For the remainder of the 19th century, the Valley saw the removal of the Native Americans to reservations elsewhere and the slow migration of farmers and ranchers into the area.

Alamosa County was created by the Colorado legislature on March 8, 1913. The county name is the Spanish word for a grove of cottonwood trees. The City of Alamosa was established in May 1878 by the Denver and Rio Grande Railroad and quickly became an important rail center. The railroad had an extensive construction, repair and shipping facility in Alamosa for many years and headquartered its remaining narrow gauge service here. Alamosa remains the commercial center of the Valley and is now a tourist town with many nearby attractions including the Great Sand Dunes National Park. Alamosa is home to Adams State University and Trinidad Junior College. The Town of Hooper is a primarily farming and ranching town, although nearby points of interest, such as the UFO Watch Tower, bring tourists as well. Three of Colorado's eight National Wildlife Refuges (NWR) are located in the San Luis Valley, including the Alamosa NWR, Baca NWR, and Monte Vista NWR.

2.3 Population

According to the most current U.S Census, between 2010 and 2015 the population of Alamosa County grew at a relatively slow rate (6.7%), the City of Alamosa experienced slow-to-modest growth (11.8%), and the Town of Hooper's population was unchanged. Table 2.2 below describes some of the demographic and social characteristics of Alamosa County's population.

Table 2.2 Demographic and Social Characteristics of Alamosa County

Population Characteristics			
	Alamosa County	**City of Alamosa**	**Town of Hooper**
Population (2010)	15,455	8,780	103
Population (2014 ACS 5-Year Estimated)	16,111	9,427	79
Population (2015 Estimated)	16,496	9,819	103
Median Age	30.8	28.0	57.5
Population 65 Years and Over	1,926	1,019	16
Female Population	8,232	4,990	36
Male Population	7,879	4,437	43
Average Household Size (2010)	2.45	2.37	2.34
Average Family Size (2010)	3.07	3.07	3.14
Percent of Total Population with Disabilities	15.8	15.8	39.2
Residents w/Disabilities less than 18 Years Old	156	120	0
Residents with Disabilities 18-64 Years Old	1,578	946	15
Residents with Disabilities over 65 Years Old	753	377	16
Residents with Health Insurance Coverage	13,665	7,952	75
Percent of Residents with High School Degree	84.6	83.0	91.1
Percent of Residents with Bachelor's Degree	24.1	26.6	14.3

Source: U.S. Census Bureau, American Community Service, 2010-2014 5-Year Population Estimate (except where noted as 2010 Census)

2.4 Economy

Select housing and economic characteristics for Alamosa County, the City of Alamosa and the Town of Hooper are provided in the table below. For the period 2010-2015, the Alamosa County Department of Building Safety issued an average of approximately 50 building permits per year.

Table 2.3 Economic and Housing Characteristics of Alamosa County

Economic and Housing Statistics			
	Alamosa County	**City of Alamosa**	**Town of Hooper**
Median Household Income	31,400	26,057	12,375
Percent of Total Population that is Unemployed	10.7	12.0	0.0
Percent of Families Living below Poverty Level	17.4	20.7	46.7
Percent of People Living below Poverty Level	27.9	33.8	58.2
Total Housing Units	6,627	3,928	63
Vacant Housing Units	634	245	18
Homeowner Vacancy Rate	1.5	1.5	0.0
Rental Vacancy Rate	3.4	3.6	0.0
Net Building Permits (2014-2015)	52	N/A	N/A

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

The total number of employees located in Alamosa County in 2014 was 5,409 and the total number of business establishments was 491. Health Care and Social Assistance was the largest major industry sector (1,659 employees/66 establishments), followed by Retail Trade (1,045 employees/86 establishments), and Accommodation and Food Services (633 employees/45 establishments). Table 2.4 below shows a list of the top 12 major industries in Alamosa County in 2014 (the data does not include most government employees, railroad employees and self-employed individuals).

Table 2.4 Industry Distribution in Alamosa County

Industry	Establishments	Employees
Health Care and Social Assistance	66	1,659
Retail Trade	86	1,045
Accommodation and Food Services	45	633
Finance and Insurance	38	381
Construction	43	255
Wholesale Trade	20	198
Transportation and Warehousing	18	165
Administrative Support/Waste Management	23	165
Professional, Scientific and Technical Services	40	149
Real Estate and Rental/Leasing	18	119
Arts, Entertainment and Recreation	7	41
Other Services (except Public Administration)	48	227
Total (All Industries)	**491**	**5,409**

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

2.5 Government

A Board of County Commissioners governs the County. The County government includes 21 departments and includes Planning and Zoning, Building Safety, Public Health, Emergency Management, Environmental Health, Road and Bridge, and the Sheriff's Office. The County Administrator serves as the chief operating official of the county and is responsible for all county departments. The City of Alamosa is a Home Rule Municipality, and operates under the Council-Manager form of government. Hooper is a Statutory Town with a County Clerk and no regular staff.

Chapter Three
Planning Process

3.1 2016 Plan Update Process

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

Table 3.1 San Luis Valley Hazard Mitigation Steering Committee

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

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

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

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

3.2 Multi-Jurisdictional Participation

Alamosa County invited incorporated towns and cities and special districts within the county to participate in revisions to the multi-jurisdictional plan. In accordance with DMA 2000, each participating jurisdiction must be involved in the planning process and formally adopt the mitigation plan. Participating jurisdictions that adopt this plan remain eligible for FEMA hazard mitigation grant funding. Other jurisdictions participating in the process can also receive FEMA grant funds, but only if the project is consistent with this plan and an eligible local government entity agrees to apply on their behalf.

Table 3.2 Alamosa County Hazard Mitigation Planning Team

Alamosa County Hazard Mitigation Planning Team
Adams State University
Alamosa Fire Department
Alamosa Police Department
Alamosa County Administration
Alamosa County Emergency Management
Alamosa County Human Services
Alamosa County Land Use
Alamosa County Public Health
Alamosa County Road and Bridge
American Red Cross
City of Hooper Town Clerk
Colorado Division of Fire Protection and Control
Colorado Division of Homeland Security and Emergency Management
Colorado Division of Water Resources
Colorado State Forest Service
Colorado State Patrol
Conejos County Emergency Management
Costilla County Emergency Management
DaVita Dialysis
Mineral County Emergency Management
Rio Grande Water Conservation District
Saguache County Emergency Management
San Luis Valley Emergency Preparedness and Response
San Luis Valley Regional Medical Center
San Luis Valley Regional Emergency Trauma Advisory Council

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

3.3 10-Step Planning Process

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

Table 3.3 Plan Development Methodology

FEMA's Four-Phase DMA Process	Modified 10-Step CRS Process
1) Organize Resources	
201.6(c)(1)	1) Organize the Planning Effort
201.6(b)(1)	2) Involve the Public
201.6(b)(2) and (3)	3) Coordinate with Other Departments/Agencies
2) Assess Risks	
201.6(c)(2)(i)	4) Identify the Hazards
201.6(c)(2)(ii)	5) Assess the Risks
3) Develop the Mitigation Plan	
201.6(c)(3)(i)	6) Set Goals
201.6(c)(3)(ii)	7) Review Possible Activities
201.6(c)(3)(iii)	8) Draft an Action Plan
4) Implement Plan/Monitor Progress	
201.6(c)(5)	9) Adopt the Plan
201.6(c)(4)	10) Implement, Evaluate and Revise the Plan

3.4 Phase One: Organize Resources

Step 1: Get Organized -- Building the Planning Team

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

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

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

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

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

Table 3.4 Planning Meetings and Topics

Meeting	Date and Location	Meeting Purpose
Initial SLV Steering Committee Meeting	January 28, 2016 Alamosa County Emergency Operations Center	Discuss future steps and milestones (i.e., establishing County Planning Teams, county-level kickoff meetings, public involvement strategy, stakeholder coordination)
Alamosa County Kickoff Meeting	March 4, 2016 Alamosa County Commissioner's Conference Room	Reconvene County Planning Team, outline DMA 2000 process, identify timelines, review and update hazard assessment, discuss significant events last five years
Meeting with City of Alamosa	July 6, 2016 Alamosa City Hall	Brief City Council, obtain City's commitment to participate, discuss potential mitigation actions
Meeting with Rio Grande Water Conservation District	July 19, 2016 RGWCD Headquarters	Brief Board of Directors, obtain District's commitment to participate, discuss potential mitigation actions
Meeting with Town of Hooper	July 19, 2016 Hooper Town Hall	Brief Town Board, obtain Town's commitment to participate, discuss potential mitigation actions
Mitigation Actions Workshop	August 11, 2016 Alamosa County Commissioner's Conference Room	Review 2010 mitigation actions and identify and prioritize mitigation actions for 2016
Meeting with Town of Hooper	September 20, 2016 Hooper Town Hall	Follow-up meeting with Town Board to finalize mitigation action for 2016

Step 2: Plan for Public Involvement – Engaging the Public

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

- The draft Alamosa County Hazard Mitigation Plan was posted on the following media to provide opportunities for the public to review the document, provide input, and recommend changes
    - Alamosa County Web Page, Emergency Management tab
    - Facebook
- A comment/feedback form was also posted to give citizens with a mechanism for providing written comments and recommendations
- A news release describing the project and announcing the availability of the draft for review was printed in the Valley Courier, the primary newspaper in Alamosa County
- Interviews and presentations by Alamosa County Emergency Management and the planning consultant, including the Alamosa City Council, Hooper Town Board, Rio Grande Water Conservation District, and San Luis Valley Multi-Agency Coordination Group.

Step 3: Coordinate with Other Departments and Agencies

The Alamosa County Office of Emergency Management invited a range of local, state, and federal agencies and other interested parties to participate on the Planning Team and review and comment on draft updates to the plan. A broad range of departments and agencies participated in the process by attending planning meetings, providing needed data, and/or reviewing the final document draft (see Table 3.2, Alamosa County Hazard Mitigation Planning Team).

3.5 Phase Two: Assess Risks

Step 4 – Identify Hazards

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

- Colorado Department of Public Health and Environment (CDPHE)
- Colorado Department of Natural Resources, Office of the State Engineer
- Colorado Geological Survey (CGS)
- Colorado State Forest Service (CSFS)
- Colorado Water Conservation Board (CWCB)
- Federal Emergency Management Agency (FEMA)
- History Colorado
- National Oceanic and Atmospheric Administration (NOAA), National Centers for Environmental Information (formerly the National Climatic Data Center)
- National Weather Service (NWS)
- Rocky Mountain Insurance Information Association (RMIIA)
- University of South Carolina (SHELDUS)
- U.S. Census Bureau
- U.S. Geological Survey (USGS)

Step 5 – Assess Risks

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

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

A profile of each identified hazard was created using available GIS data, online data sources, and existing plans and reports. The profiles included a hazard description, geographic

location, past occurrences, probability of future occurrences, and magnitude/severity (extent) for each hazard. The profiles also describe overall vulnerability of each jurisdiction to each hazard and identify structures and estimate potential losses to structures in identified hazard areas.

3.6 Phase Three: Develop the Mitigation Plan

Step 6 – Set Goals

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

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

Step 7 – Review Possible Activities

The Planning Team discussed a wide range of possible mitigation actions, and employed the STAPLEE methodology endorsed by FEMA to evaluate and prioritize each proposed action. For each recommended action, the planning team developed a project summary that included a description of the action, the department or agency responsible for implementing it, and a timeframe for completion. The results of this collaborative process are captured in Chapter 5, Mitigation Strategy.

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

Step 8 – Draft the Plan

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

3.7 Phase Four: Implement the Plan and Monitor Progress

Step 9 – Adopt the Plan

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

Step 10 – Implement, Evaluate and Revise the Plan

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

Chapter Four
Risk Assessment

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

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

Hazard Assessment Terminology

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

4.1 Hazard Identification

4.1.1 Results and Methodology

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

Table 4.1 Significant Natural Hazards Affecting Alamosa County

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

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

Table 4.2 Alamosa County Risk Assessment 2016, Risk Assessment Worksheet

Hazard	Location	Previous Occurrences (Last 50 Years)	Probability	Magnitude/ Severity	Current Mitigation Actions (2010)
Avalanche	Sangre de Cristo Mtns.	1 fatality in 2008 (Little Bear Peak)	**Occasional**	**Limited**	Public awareness
Drought	Countywide	1976-1977/2000-2003/ 2004/2006/2008	**Likely**	**Critical**	Drought Preparedness Action Guide
Earthquake	Sangre de Cristo Fault	Blanca-Fort Garland Earthquake (12-28-03)	**Unlikely**	**Catastrophic**	Land use regulations
Flood	Rio Grande River	1970/1973/1984/1985-1987/1977/1979	**Likely**	**Catastrophic**	NFIP, mapping, floodplain management, Rio Grande Restoration Plan
Flash Flood	Countywide		**Likely**	**Limited**	Floodplain and storm water management
Hail	Countywide	10 events	**Likely**	**Limited**	Public awareness
Landslide	Sangre de Cristo Mtns.	None on record	**Occasional**	**Limited**	Power line redundancy
Levee Failure	Rio Grande River	None on record	**Occasional**	**Catastrophic**	Address USACOE inspection eligibility study
Lightning	Countywide	1973/1996/1997/2003/ 2007 (1 fatality in 2003)	**Likely**	**Limited**	Public awareness, power line redundancy
Severe Winter Storm	Countywide	12 events (largest: 12-23-1982 blizzard)	**Likely**	**Critical**	Public awareness, public shelters, power line redundancy
Tornado	Countywide	12 events (all F0 or F1)	**Likely**	**Critical Limited**	Public awareness, power line redundancy
Wildfire	Countywide, particularly NE quadrant	1973/2000/2006/2007/ 2010	**Likely**	**Limited**	Evacuation planning, public awareness, power line redundancy
Windstorm	Countywide	24 events	**Highly Likely**	**Limited**	Power line redundancy

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

- Location
  - Geographic extent and participating jurisdictions affected
- Previous Occurrences
  - Known hazard incidents and information related to impacts
- Probability
  - Highly Likely – Annual event or occurs at least once per year (~100% chance)
  - Likely – Recurrence interval of 10 years or less (10-100% chance/year)

  - Occasional – Occurs every 11-100 years (1-10% chance/year)
  - Unlikely – Occurs greater than every 100 years (<1% chance in next 100 years)
- Magnitude/Severity
  - Catastrophic – Multiple deaths; property destroyed and damaged; population displacement; infrastructure damages; service disruptions > 72 hours
  - Critical – Isolated deaths/injuries; major or long-term impacts to property, infrastructure and critical services; service disruptions 24-72 hours
  - Limited – Minor injuries and illnesses; minimal property damage; infrastructure and critical services disruptions of less than 24 hours
  - Negligible – No deaths; few injuries or illnesses; minor quality of life loss; brief service disruptions; but little or no other community impacts

4.1.2 Disaster Declaration History

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

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

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

Year	Declaration Type	Event Type	Disaster Number
1970	Major Disaster (Federal)	Heavy rains and flooding	DR-293
1973	Major Disaster (Federal)	Flooding and landslides	DR-396
2003	Emergency (Federal)	Heavy snowfall	EM-3185
2008	Emergency (State)	Contaminated water supply	N/A

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

Alamosa County has received five USDA Secretarial Disaster declarations for drought since 2003 (2003, 2005-6, 2011, 2012 and 2013).

4.2 Hazard Profiles

Each of the hazards identified as posing a threat in Alamosa County are profiled in subsequent sections. Each profile includes a summary of the overall risk and vulnerability for each

identified hazard for each participating jurisdiction. The sources used to collect information for the hazard profiles include, but are not limited to the following:

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

4.2.1 Hazard Profile Methodology

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

- Hazard Description
    - This subsection provides a general description of the hazard and associated problems and considers the relationship between hazards.
- Geographic Location
    - This subsection identifies the areas within Alamosa County that are vulnerable to each hazard, or whether potential impacts could affect the entire county.
- Previous Occurrences
    - This subsection contains an overview of information on historic incidents, including major incident impacts where known.
- Probability of Future Occurrences
    - This subsection provides a general description of the hazard and associated problems and considers the relationship between hazards. The probability, or chance of occurrence, was calculated based on existing data. The probability was determined by dividing the number of events observed by the number of years and multiplying by 100. This provides the percent chance of the event happening in any given year. For example, three droughts occurring over a 30-year period suggests a 10 percent chance of a drought occurring in any given year.
    - Based on historical data, the probability of future occurrences is categorized as follows: **Highly Likely** (near 100 percent chance of occurrence next year or it happens every year); **Likely** (10-100 percent chance of occurrence next year or it has a recurrence interval of 10 years or less); **Occasional** (1-10 percent chance of occurrence in the next year or it has a recurrence interval of 11 to 100 years; and **Unlikely** (less than 1 percent chance of occurrence in the next 100 years or it has a recurrence interval of greater than every 100 years.
- Magnitude/Severity

- This subsection summarizes the extent or potential extent of a hazard event in terms of deaths, injuries, property damage, and interruption of essential facilities and services. Magnitude/severity is categorized as follows: **Catastrophic** (multiple deaths; property destroyed and severely damaged; and/or interruption of essential facilities and service for more than 72 hours); **Critical** (isolated deaths and/or multiple injuries and illnesses; major or long-term property damage that threatens structural stability; and/or interruption of essential facilities and services for 24-72 hours); **Limited** (minor injuries and illnesses; minimal property damage that does not threaten structural stability; and/or interruption of essential facilities and services for less than 24 hours); and **Negligible** (no or few injuries or illnesses; minor quality of life loss; little or no property damage; and/or brief interruption of essential facilities and services).

- Vulnerability Assessment
  - This subsection describes the county's overall vulnerability to each hazard; identifies existing and future structures, critical facilities, and infrastructure in identified hazard areas; and estimates potential losses to vulnerable structures, where data is available.

4.2.2 Flood

Hazard Description

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

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

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

Stormwater refers to water that collects on the ground surface or is carried in the stormwater system when it rains. In runoff events where the amount of stormwater is too great for the system, or if the channel system is disrupted by vegetation or other debris that blocks inlets or pipes, excess water remains on the surface. This water may pond in low-lying areas, often

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

in street intersections. Stormwater ponding, also known as localized flooding, may result in deep water and pollution. Stormwater can pick up debris, chemicals, dirt, and other pollutants from impervious surfaces.

The potential for flooding is altered by land use changes that change the impervious characteristics of the land surface. A change in environment can create localized flooding problems inside and outside of natural floodplains by altering or confining watersheds or natural drainage channels.

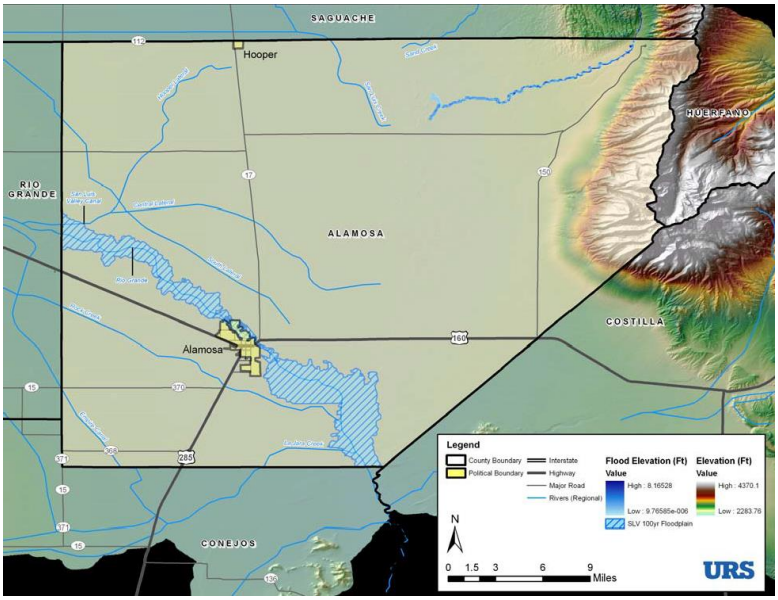
Geographic Location

Alamosa County is located within the Rio Grande River drainage basin in south central Colorado. The Rio Grande River is the greatest source of flood hazards. Alamosa County is particularly vulnerable to flooding related to severe weather events between May and June when snowmelt runoff fills the Rio Grande River to its capacity.

According to the 2013 Colorado Natural Hazards Mitigation Plan, flooding along the Rio Grande River has caused damage in the City of Alamosa for over a century. A particularly destructive flood occurred in June 1927. Caused by snowmelt and heavy rains, the flood destroyed five bridges, halted train service, and contributed to three deaths. Mitigation measures along the river include levees that have reduced, but not eliminated the vulnerability of the City's residents.

Data for riverine flooding in Alamosa County was generated using HAZUS-MH MR3 (HAZUS), FEMA's software program for estimating potential losses from disasters. HAZUS was used to generate a 1 percent annual flood, or 100-year flood, in Alamosa County. The software produces a flood polygon and flood-depth grid that represents the 100-year flood. While not as accurate as Flood Insurance Rate Maps (FIRMs) and Digital Flood Insurance Rate Maps (DFIRMs), these floodplain boundaries are useful for GIS-based loss estimation.

Figure 4.1 HAZUS Map of 100-Year Floodplains in Alamosa County



Source: URS Corporation, based on HAZUS-MH MR3 (2009) data (for planning purposes only)

A number of major flood events have occurred in Alamosa County's recorded history (see Table 4.4 below); however, no significant flood events occurred during the period 2010-2016.

Table 4.4 Significant Flood Events in Alamosa County

Year	Description	Data Source
1869	Some damage to Alamosa	FEMA Flood Insurance Study (FIS)
1884	Flooding – Rio Grande River; melting of very heavy snow cover, augmented by heavy rains	FEMA FIS
1905	Snowmelt	FEMA FIS
1911	Flooding on upper Rio Grande River caused by heavy rains	FEMA FIS
1927	250-year recurrence level flood caused by melting snow and precipitation	FEMA FIS
1970	Heavy rains and flooding (FEMA Declaration Number 293)	FEMA
1973	Flooding and Landslides (FEMA Declaration Number 396)	FEMA
1977	Flooding and hail	SHELDUS
1979	Severe storms and flooding	SHELDUS
1984	Flooding	SHELDUS
1985-1987	High water period on the Rio Grande River	County Planning Team

Probability of Future Occurrences

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

Although flood events in Alamosa County are rare, severe weather and snowmelt runoff present a threat of serious flooding along the Rio Grande River each year. As a result, the Planning Team has rated the probability of future flood events in Alamosa County as **likely**, with a recurrence interval of 10 years or less (10-100% chance in a given year).

Magnitude/Severity

Flooding presents a risk to life and property, including buildings, their contents, and their use. Floods can also affect lifeline utilities (e.g., water, sewage and power), transportation, the environment, jobs and the local economy. The extent of damage depends on the depth and velocity of floodwaters.

Past flood events in Alamosa County have damaged roads, bridges, private property, businesses, and public facilities. Future events may result in greater damages depending on patterns of growth and land use development. Large areas within the City of Alamosa are protected by a levee system. A failure of the levee would likely result in devastating impacts. The potential severity of flooding is therefore rated **catastrophic** by the Planning Team, meaning that a major flood could result in multiple deaths, property destruction, population displacement, infrastructure damages, and service disruptions of 72 hours are more.

Vulnerability Assessment

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

According to the HAZUS analysis, most of the structures located within the 100-year floodplain in Alamosa County are residential (1,121 of the 1,259 total structures in the floodplain) and a 100-year flood would damage an estimated 223 of these structures.

HAZUS estimates total building damage at approximately $57 million in Alamosa County. HAZUS also estimates that 3,785 residents would be displaced by a 100-year flood event, with 3,063 requiring temporary shelter.

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

Table 4.5 Potential Flood Losses: HAZUS Estimates

Type of Loss	Damage Estimate
Building Damage	$15,041,000
Contents Damage	$15,041,000
Inventory Loss	$25,000,000
Relocation Loss	$511,000
Wages Losses	$1,240,000
Income Loss	$367,000
Rental Income Loss	$241,000
Total Loss	**$57,441,000**

Source: HAZUS-MH MR3 (2009)

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

To identify critical facilities located in the floodplain, GIS data from Alamosa County showing the locations of critical facilities was combined with the 100-year floodplain map. Four critical facilities were identified in the 100-year floodplain: Cottonwood Christian School, Evans Elementary School, the Police Department, and the Alamosa Fire Department and it is estimated that a 100-year event would result in over $1 million in damages to these facilities.

Alamosa County joined the NFIP in 1978. Any structure built in the floodplain has to meet Alamosa County's floodplain regulations. According to FEMA's NFIP Policy and Claims Report (July 31, 2016), there are 23 flood insurance policies in effect in Alamosa County with

$4,918,200 million in total coverage and 30 policies in effect for the City of Alamosa, with $7,486,300 in total coverage. The Town of Hooper does not participate in the NFIP and there are no mapped floodplains, or known flood hazard areas, within the Town of Hooper.

Table 4.6 provides information on the NFIP participation of communities in Alamosa County. Since 1978, there have been 18 total flood insurance claims totaling $10,440.00.

Table 4.6 Alamosa County NFIP Information

Jurisdiction	Date Joined	Effective FIRM Date	Policies in Force	Insurance in Force ($)	Number of Claims	Total Claims ($)
Alamosa County	1978	4-21-99	23	$4,918,200	3	$1,214.98
City of Alamosa	1977	4-21-99	30	$7,486,300	15	$9,225.29

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

New development in the floodplain is controlled through development regulations. The levee protecting properties within the City of Alamosa requires ongoing maintenance to remain an effective mitigation measure.

4.2.3 Wildfire

Hazard Description

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

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

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

Topography, or an area's terrain and land slopes, affects its susceptibility to wildfire spread. Due to the convection of heat, both fire intensity and rate of fire spread increases as slope increases. Weather components such as temperature, relative humidity, wind, and lightning also affect the potential for wildfire. High temperatures and low relative humidity dry out the

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

fuels that feed the wildfire creating a situation where fuel will more readily ignite and burn more intensely. Winds are the most dangerous and unpredictable weather factor that affects fire behavior.

Geographic Location

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

Alamosa County has a diverse range of vegetation types from the dense cottonwoods in the riparian edge of the Rio Grande River to the desert shrubs on the valley floor. Vegetation on the slopes of the Sangre de Cristo Mountains includes high- elevation cold desert shrubs, pinyon-juniper, Ponderosa Pine, Douglas-fir, Aspen, Engelmann Spruce, and Alpine meadows. The Ponderosa Pine and Douglas-fir forests are typically at higher risk for dense fire susceptibility.

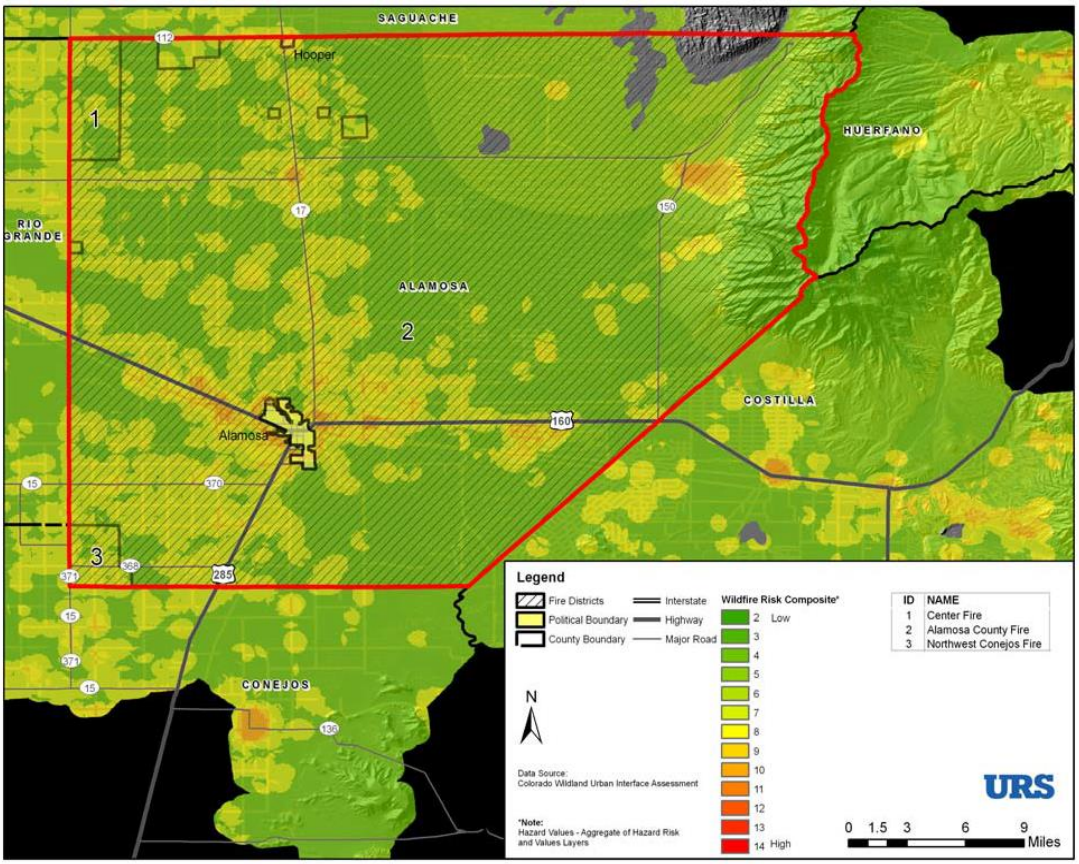
Much of the wildfire risk in the Valley is derived from agricultural ditches and overgrown grasses and weeds in the vicinity of these ditches. A majority of the wildland fires in the Valley occur when controlled burns ignite their immediate surroundings. Spring ditch burning season typically results in escaped wildfires.

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

- Risk – probability of ignition
    - Lightning strike intensity
    - Road buffer (100-meter buffer of roads and railroads)
- Hazard – vegetative and topological features affecting intensity and rate of spread
    - Slope
    - Aspect
    - Fuels
- Values – natural or manmade components of the ecosystem on which a value can be placed
    - Housing density

Figure 4.2 below shows the overall risk composite ranking with fire protection district boundaries.

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



Source: Created by URS

The map indicates that the wildfire hazard in Alamosa County is elevated near the northeastern quadrant of the county, along the foothills of the Sangre de Cristo Mountains. The wildfire risk is predominantly associated with wildland-urban interface areas (areas where development occurs within or immediately adjacent to wildlands, near fire-prone trees, brush, and/or other vegetation).

Previous Occurrences

Grassland and forest fires occur throughout the state, including the San Luis Valley, and every county has some area determined at least a moderate risk. The traditional wildfire season runs from March through August, but wildfires and grassfires can occur any time of the year. In Alamosa County, the greatest vulnerability lies within the unincorporated parts of the county.

Historic occurrences of wildfire by county are not well documented. Table 4.7 identifies known previous wildfires in Alamosa County and the data source.

Table 4.7 Significant Wildfire Events in Alamosa County

Year	Location	Description	Data Source
1973	Mt. Blanca	Lightning-ignited fire burned thousands of acres.	Colorado Natural Hazards Mitigation Plan
2000	18 miles NE of Alamosa	Strong winds from a cold front spread a wildfire from a neighborhood burning pit near Great Sand Dunes National Park and burned 5,000 acres of grassland and juniper.	National Centers for Environmental Information (NCEI)
2006	Alamosa County	Designated primary natural disaster area by USDA due to losses caused by drought, high winds, wildfire and heat.	USDA
2007	Alamosa County	A wildfire caused $500-1,000 in property damages and burned 320 acres.	NCEI; SHELDUS
2010	Great Sand Dunes National Park	A wildfire burned 6,300 acres but did not damage any structures.	NCEI
2011	Alamosa County	A controlled burn escaped and started a small fire that burned 200 acres.	NCEI

Probability of Future Occurrences

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

Chances for wildfires increase with periods of drought, high winds, and extreme heat conditions. Much of the wildfire risk in the San Luis Valley is associated with agricultural ditches and overgrown grasses and weeds (spring ditch burning season) and other controlled burns can ignite their immediate surroundings and result in escaped wildfires.

The Planning Team has rated the probability of future flood events in Alamosa County as **occasional**, with a recurrence interval of once every 11-100 years (1-10% chance in any given year).

Magnitude/Severity

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

Wildfires and grassfires can also impact utilities, watersheds, natural and cultural resources, range and crop lands, and local economies (e.g., fire expenditures/loss of tourism). Smoke and air pollution from wildfires can be a severe health hazard. Other secondary impacts include future flooding and erosion during heavy rains. The severity of the wildfire/grassland

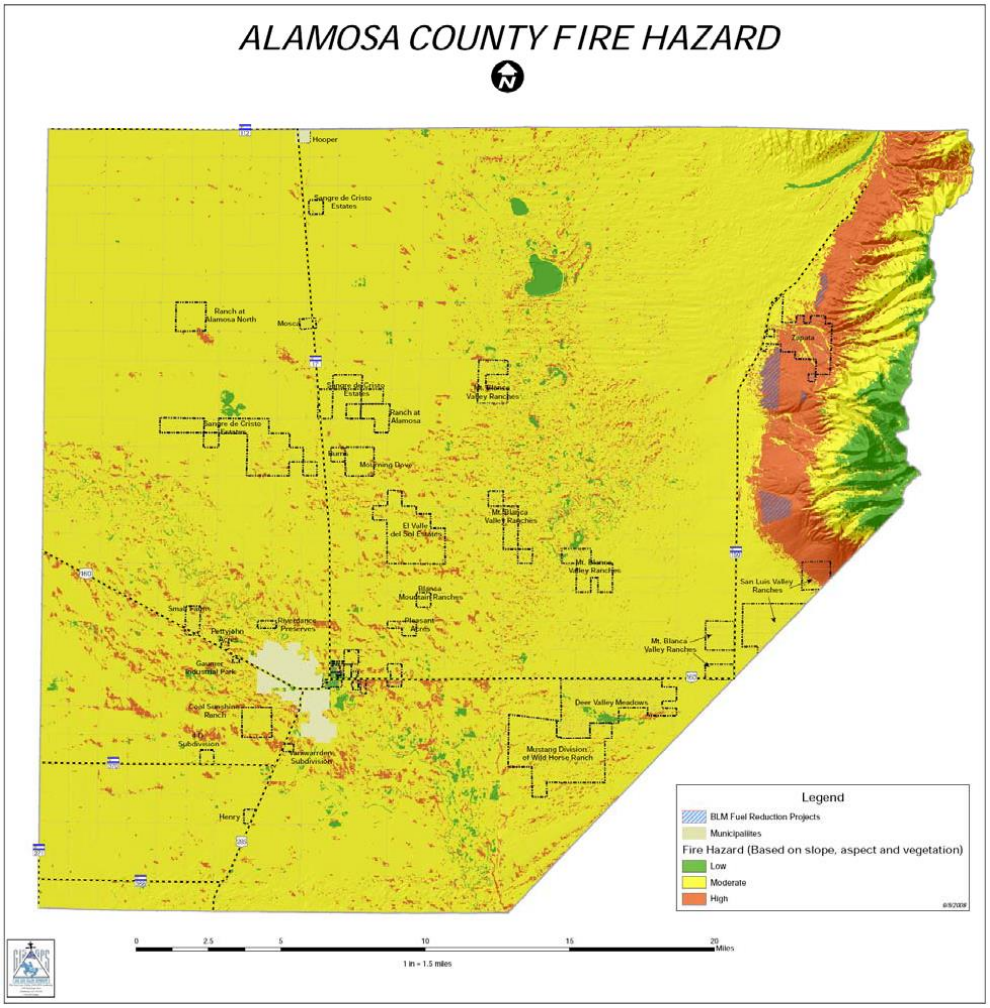
hazard in Alamosa County is rated **limited**, meaning that minor injuries and minor property damages are possible, with minimal disruptions to infrastructure and critical services.

Vulnerability Assessment

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

The Alamosa County Fire Protection District completed a Community Wildfire Protection Plan (CWPP) in May 2009 that identifies 27,854 acres located within wildland-urban interface (WUI) areas. This represents approximately 6.2 percent of the total 448,000 acres within Alamosa County.

Figure 4.3 Alamosa County Fire Hazard based on Slope, Aspect and Vegetation



Source: Alamosa County Fire Protection District Community Wildfire Protection Plan (2009)

The most significant wildfire hazard is in the Zapata subdivision where 61 structures are at a high risk. Since completion of the CWPP in 2009, internal subdivision plans for the Zapata subdivision have also been completed. New development in the WUI and expanding bark beetle infestations may increase the wildfire threat in the future.

4.2.4 Hail

Hazard Description

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

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

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

Table 4.8 Hailstone Measurements

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

Source: Colorado Natural Hazards Mitigation Plan (December 2013)

Geographic Location

Damaging hailstorms can occur anywhere in Alamosa County and pose a risk to all participating jurisdictions.

Previous Occurrences

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

According to the National Centers for Environmental Information (NCEI) and SHELDUS, 13 significant hail events have been recorded in Alamosa County since 1950, four of which had severe hail (one inch or greater). On August 16, 2008, a hailstorm in and around Mosca produced 2.5 inch hailstones (no documented damages). Another storm on August 10, 1993 caused $75,000 in damage to nine aircraft at the Alamosa Airport, even though hailstones were only measured at 0.5 inches. The hail also damaged vehicles in the airport parking lot, as well as destroying barley fields southwest of Alamosa. No deaths or serious injuries were reported as a result of these hail events. The recorded size of hail stones for each event is shown in the table below.

Table 4.9 Alamosa County Hail Events, 1950-2016

Date	Location	Hail Diameter Size (Inches)
June 14, 1961	Alamosa County	0.5
July 8, 1965	Alamosa County	N/A
June 17, 1969	Alamosa County	1.00
July 20, 1977	Alamosa County	N/A
September 7, 1986	Alamosa County	1.00
August 10, 1993	Alamosa County	0.5
July 1, 1995	Alamosa County	1.75
July 18, 1998	Alamosa County	0.75
October 1, 1998	Hooper	0.88
June 27, 2000	Alamosa County	0.75
August 16, 2008	Mosca	2.50
June 6, 2010	Hooper	0.75
September 22, 2013	Hooper	0.88

Source: National Centers for Environmental Information; SHELDUS

Probability of Future Occurrences

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

Magnitude/Severity

The severity of a hailstorm is influenced by a variety of factors, including hail diameter, hail density, fall speed and surface wind speeds. Hail is primarily a risk to property -- vehicles, roofs and landscaping are the property most commonly damaged by hail. However, large hail can also cause death or injury to people caught outside and exposed to the elements. Hailstorms also cause damage to crops and the environment and kill and injure livestock. Hail can also block culverts and drainage ditches, causing flooding. Although large hail events frequently result in high aggregate insured losses, property damages are generally limited, serious injuries are rare, and there is typically little or no impact to critical facilities, which are generally able to operate without disruption to services. As a result, the Planning Team rates the severity of the hail hazard as **limited**.

Vulnerability Assessment

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

4.2.5 Lightning

Hazard Description

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

Cloud-to-ground lightning is the most damaging and dangerous type of lightning, though it is also less common. It frequently strikes away from the rain core, either ahead or behind the thunderstorm and can strike 5-10 miles from the storm in areas that most people do not consider to be a threat. According to the 2013 Colorado Natural Hazards Mitigation Plan, Colorado averages 529,000 cloud-to-ground lightning strikes per year and deaths and injuries due to lightning occur on a regular basis.[6]

Geographic Location

Major lightning events can occur anywhere in Alamosa County and the participating jurisdictions in this planning effort.

Previous Occurrences

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

Table 4.10 Colorado Deaths and Injuries due to Lightning, 2008-2016

Year	Deaths	Injuries
2016	1*	2*
2015	1	13
2014	2	17
2013	0	25
2012	0	2
2011	0	9
2010	1	6

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

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

2009	1	14
2008	4	10

Source: Struckbylightning.org * Through August 2016

According to data from the National Centers for Environmental Information and SHELDUS, several lightning events in Alamosa County have caused injury, property damage, and death. On August 19, 1996, two students from Alamosa High School were struck by lightning and knocked to the ground. One student suffered a minor burn. On September 6, 1997, a mobile home was completely destroyed by a lighting-ignited fire. On August 2, 2003, a man slipped and fell to his death as he hurried down a mountain to avoid several lightning strikes. On July 15, 2007, a lightning strike just west of the Town of Hooper set 14 bales of hay on fire.

Table 4.11 Major Lightning Events in Alamosa County, 1950-2016

Date	Location	Property/Crop Damages	Deaths	Injuries
August 1, 1960	Alamosa County	$161.00	0	0
August 5, 1964	Alamosa County	0	0	0
July 30, 1973	Alamosa County	$2,658.00	0	0
August 19, 1996	Alamosa County	0	0	1
September 6, 1997	Alamosa County	$40,000.00	0	0
August 2, 2003	Alamosa County	0	1	0
July 15, 2007	Hooper	$2,000.00	0	0

Source: National Centers for Environmental Information; SHELDUS

Probability of Future Occurrences

Lightning can occur anywhere there is a thunderstorm. The average number of lightning flashes by month is shown in Table 4.12. Over 4,000 lightning flashes are expected to occur on any given day during the months of July and August. The majority of lightning strikes that result in casualties occur between the hours of noon and 5:00 pm, spiking between 2:00 and 4:00 pm.

Table 4.12 Average Lightning Flashes in Colorado per Day by Month

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

Source: 2013 Colorado Natural Hazards Mitigation Plan

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

Magnitude/Severity

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

Buildings and equipment exposed to lightning strikes may be damaged and power surges can damage electronic equipment. Direct flash strikes near utility infrastructure can disrupt services. Many critical facilities are equipped with grounding systems. Most lightning events result in only personal property damage and do not significantly impact infrastructure or the delivery of critical services. Disruptions of electrical power due to lightning are generally short in duration (less than 24 hours). The severity of the lightning hazard is rated **limited** by the Planning Team, meaning that minor injuries and minor property damages are possible, with minimal disruptions to infrastructure and critical services.

Vulnerability Assessment

The greatest threat that lightning presents to community assets is the risk of death or injury. Colorado is one of the most lightning-prone states in the nation. People attending large outdoor gatherings (i.e., sporting events, concerts, fairs, festivals, etc.) are particularly vulnerable to death and injury from lightning strikes. In light of this vulnerability, prudent mitigation measures (e.g., building standards, grounding systems, preparedness, guidelines for outdoor events, lightning detection/warning systems) should be considered.

The preparation of site-specific emergency procedures for outdoor events by event organizers, response agencies and emergency management can help mitigate the public safety risk, especially when combined with technology that provides adequate early detection, monitoring, and warning of approaching thunderstorms. Communications systems are also at risk. Structure damage is typically limited and covered by insurance.

4.2.6 Windstorm

Hazard Description

According to the 2013 Colorado Natural Hazards Mitigation Plan, windstorms are one of Colorado's costliest hazards. Over the last 60 years, wind events have caused a reported $367 million in property and crop damage. Deaths and injuries are also a result of wind events in the state with 21 and 406 respectively between 1950 and 2010.[7]

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

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

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

Geographic Location

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

Previous Occurrences

High winds can occur as part of a seasonal climate pattern or in relation to other severe weather events such as thunderstorms. The table below identifies significant high wind events that have occurred in Alamosa County since 1980. Damage amounts are not adjusted for inflation.

Table 4.13 High Wind Events in Alamosa County, 1980-2016

Date	Magnitude (Knots)	Property and Crop Damages
May 23, 1984	50	N/A
September 24, 1986	N/A	$7,937.00
May 2, 1988	N/A	$16,667.00
May 6, 1988	N/A	$15,873.00
February 1, 1989	N/A	$794.00
May 2, 1991	N/A	$1,923.00
April 18, 1996	53	N/A
January 26, 1999	N/A	$3,750.00
February 10, 1999	N/A	$10,000.00
April 8, 1999	90	$33,000.00
April 9, 1999	77	N/A
April 18, 2000	63	$10,000.00
May 17, 2000	N/A	$1,667.00
September 8, 2000	58	N/A
April 18, 2004	59	N/A
May 11, 2004	62	N/A
July 17, 2006	51	N/A
October 5, 2007	52	N/A

Source: National Centers for Environmental Information; SHELDUS

Probability of Future Occurrences

According to the record, as indicated above, windstorms occur regularly in Alamosa County and are considered **highly likely** to occur in the future (annual event or occurs at least once per year, i.e., 100% chance).

Magnitude/Severity

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

Windstorms in Alamosa County are rarely life threatening, but do disrupt agriculture and cause damage to buildings. Impacts of strong, straight line winds can be erosion, dryland farming seed loss, windblown weeds, and building damage. The severity of the hazard in Alamosa County is rated as **limited**, meaning that minor injuries and minor property damages are possible, with minimal disruptions to infrastructure and critical services.

Vulnerability Assessment

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

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

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

4.2.7 Tornado

Hazard Description

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

According to the 2013 Colorado Natural Hazards Mitigation Plan, tornadoes in Colorado are more likely to occur in the spring and early summer months when warm, moist air from the Gulf of Mexico collides with cold air from the Polar Regions to generate severe

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

thunderstorms. "These thunderstorms often produce the violently rotating columns of wind known as funnel clouds. Colorado lies at the western edge of the nation's primary tornado belt, which extends from Texas and Oklahoma through Kansas and Nebraska. In Colorado, the primary threat of tornado is east of the Continental Divide along the Front Range and across the Eastern Plains, although they have occurred statewide. Three counties, Adams, Weld, and Washington, have over 100 reported tornadoes reported between 1950 and 2013."[9]

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

Table 4.14 Enhanced Fujita Scale

EF Scale	Wind Estimates (mph)	Types and Intensity of Damage
EF0	65-85	Light damage: peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over.
EF1	86-110	Moderate damage: roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
EF2	111-135	Considerable damage: roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
EF3	136-165	Severe damage: entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.
EF4	166-200	Devastating damage: well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.
EF5	Over 200	Incredible damage: strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 m (109 yds.); high-rise buildings have significant structural deformation; incredible phenomena will occur.

Source: National Oceanic and Atmospheric Administration

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

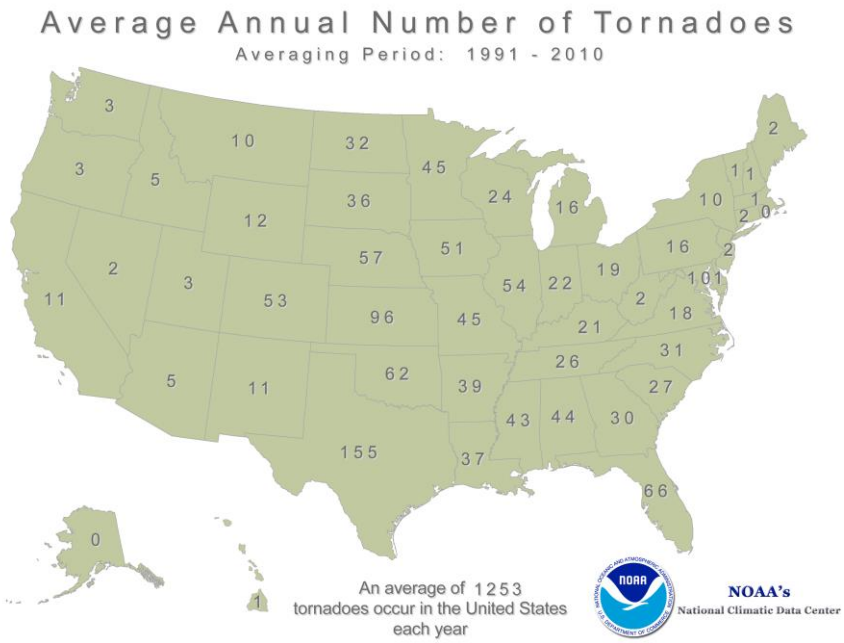
Geographic Location

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

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

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

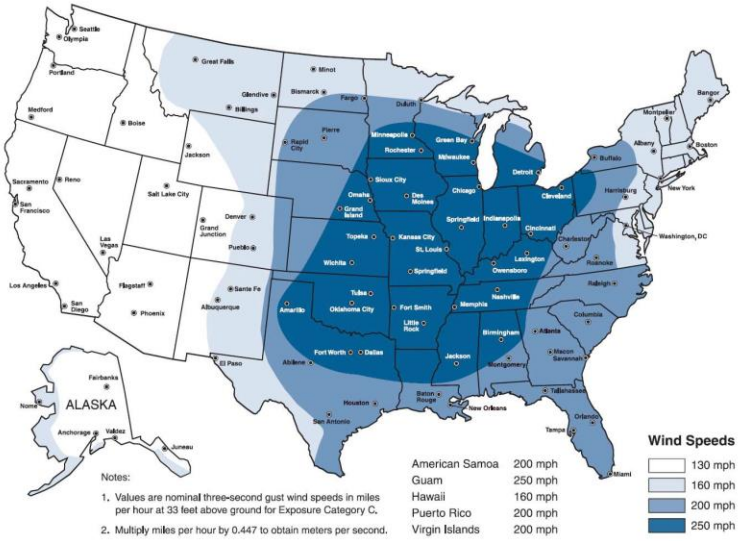
Figure 4.4 Average Annual Number of Tornadoes, 1991-2010



Source: National Centers for Environmental Information

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

Figure 4.5 Tornado Safe Room Design Wind Speed Map



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

Previous Occurrences

According to the National Centers for Environmental Information and SHELDUS, there have been 17 recorded tornadoes since 1950 in Alamosa County. No deaths have been attributed to these events. The magnitude of these tornadoes ranged from F0 to F2. An F1 tornado on March 19, 1995 caused $11,000 in property damage at a farm two miles south of Alamosa in Alamosa County. A large tractor shed was detached from its concrete foundation and windshields of vehicles and fences were damaged as well. On August 16, 2008, an EF1 tornado destroyed a mobile home, resulting in an estimated $8,000.00 in losses.

Table 4.15 Tornado Events in Alamosa County, 1950-2016

Location	Date	Magnitude
Alamosa County	July 10, 1955	F2
Alamosa County	June 25, 1956	F1
Alamosa County	July 18, 1958	F0
Alamosa County	March 23, 1974	F0
Alamosa County	June 19, 1982	F1
Alamosa County	June 22, 1983	F1
Alamosa County	March 19, 1995	F1
Alamosa County	June 27, 1995	F0
Mosca	August 5, 1997	F0
Alamosa County	May 25, 1998	F0
Alamosa County	August 10, 2003	F0
Alamosa County	July 15, 2004	F0
Alamosa County	June 26, 2006	F0
Alamosa County	July 9, 2006	F0
Mosca	August 16, 2008	EF1
Alamosa County	May 20, 2013	EF0
Alamosa County	May 22, 2014	EF0

Source: National Centers for Environmental Information and SHELDUS

Probability of Future Occurrences

The climatic conditions that lead to the formation of tornadoes in and around the San Luis Valley will continue to occur or possibly even increase if the current warming trend continues. According to the data above, tornadoes are reported in Alamosa County about once every four years and the Planning Team has rated the probability of future events as **likely**, with a recurrence interval of 10 years or less (10-100% chance in a given year).

Magnitude/Severity

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

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

- broken, chipped or cracked windows

Tornadoes develop quickly and change direction rapidly, making response difficult, but most occur over open country and cause minimal damages. The severity of the tornado hazard is rated **limited** by the Planning Team, meaning that minor injuries and minor property damages are possible, with minimal disruptions to infrastructure and critical services.

Vulnerability Assessment

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

4.2.8 Severe Winter Storm

Hazard Description

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

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

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

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

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

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

Geographic Location

Severe winter storms occur throughout the entire county at approximately the same frequency and all of Alamosa County is subject to blizzard, heavy snowfall and ice storm conditions. The size of events varies and may range from isolated (impacting only a portion of the area) to statewide. Most severe winter storms are widespread events, impacting multiple counties simultaneously and for extended time periods.

Previous Occurrences

According to the National Centers for Environmental Information (NCEI), there have been 204 winter storm events and 6 blizzard events in Alamosa County from January 1, 1950 to May 31, 2016. Notable winter storm events are identified in the table below.

Table 4.16 Significant Winter Storms in Alamosa County, 1950-2016

Year	Description of Impacts
1961	Early snow (September 2) caused approximately $20,000 (ADJ 2014) in property and crop damages.
1975	Heavy snow and wind produced by November storm front results in considerable damages throughout the county.
1982	Blizzard on December 23, 1982 caused more than $800,000 damages (ADJ 2014)
1989	February storm with heavy snow caused approximately $75,000 (ADJ 2014) in damages.
1996	Spring storm produced heavy snow and caused approximately $75,000 (ADJ 2014) in damages
2003	Heavy snowfall and blizzard conditions resulted in a Presidential Emergency declaration for snow in Alamosa County.

Source: SHELDUS; National Centers for Environmental Information

Other notable winter weather events for which there are no documented damage costs include:

- Extreme wind chill in December 1996 brought temperatures to 20 to 40 below zero
- A strong storm on November 27, 1997 produced 10-20 inches of snowfall accumulation
- A strong spring storm in April 2004 produced 12-18 inches of heavy, wet snow
- Heavy snow and blizzard conditions resulted in 16-19 inches of accumulation.

Probability of Future Occurrences

Atmospheric activity that produces winter weather conditions such as ice, snow, extreme cold, and high winds will continue to occur and several winter storm events can be expected

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

to occur each year in the San Luis Valley. The probability of future events is therefore rated **likely**, with a recurrence interval of 10 years or less (10-100% chance in a given year).

Magnitude/Severity

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

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

Extremely cold temperatures pose a risk to public safety and disrupt farm and ranch operations. The table below shows the average minimum and extreme minimum temperatures for Alamosa County for the four coldest winter months.

Table 4.17 Average Minimum Temperatures/Extreme Minimum Temperatures for Alamosa County, 1996-2008

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

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

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

Vulnerability Assessment

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

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

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

4.2.9 Drought

Hazard Description

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

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

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

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

- drought mitigation planning identifies temporary responses to potential water supply shortages, such as mandatory restrictions on certain water uses, water allocation or the temporary use of an alternative water supply. These measures are intended to be temporary responses to water supply shortages
- water conservation planning involves long-term improvements in water use efficiency, such as managing landscape irrigation, implementing conservation water rate structures, and replacing or retrofitting water fixtures.

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

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

Geographic Location

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

Previous Occurrences

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

Table 4.18 Historic Dry and Wet Periods in Colorado

Date	Dry	Wet	Duration (Years)
1893-1905	x		12
1905-1931		x	26
1931-1941	x		10
1941-1951		x	10
1951-1957	x		6
1957-1959		x	2
1963-1965	x		2
1965-1975		x	10
1975-1978	x		3
1979-1999		x	20
2000-2006	x		6
2007-2010		x	3
2010-2012	x		2

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

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

Since 2003, Alamosa County has received five USDA Secretarial declarations for drought:

1. 2003 (S1843)
2. 2005-2006 (S2327)
3. 2011 (S3133)
4. 2012 (S3260)
5. 2013 (S3518)

Probability of Future Occurrences

Drought is a frequent occurrence in the San Luis Valley, where a prolonged drought develops approximately every 15-20 years. According to projections in the Colorado Natural Hazards

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

Mitigation Plan (2013), drought is expected to persist or intensify throughout most of Colorado, including the San Luis Valley region. The drought hazard is a **likely** event as rated by the Planning Team, with an expected recurrence interval of 10 years or less (10-100% chance in a given year).

Magnitude/Severity

Periods of drought are common occurrences in Colorado and can cause significant economic and environmental impacts. The severity of a drought depends on the degree of moisture deficiency, duration, and size of the affected area. Drought is a common natural phenomenon in Colorado, requiring continuous monitoring and foresight to lessen the drought-related impacts to agricultural and municipal users. The objective of drought mitigation planning is to identify actions for responding to a supply shortage before an actual water supply emergency occurs. The State Water Availability Task Force (WATF) monitors conditions that affect Colorado's water supply (i.e., snowpack, precipitation, reservoir storage, streamflow and weather forecasts) and determines when there is a need to activate the Colorado Drought Mitigation and Response Plan to address physical, social and economic impacts due to drought. The WATF is comprised of Colorado's water supply specialists, emergency management professionals, federal land managers, scientists and experts in climatology and weather forecasting.[15]

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

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

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

Vulnerability Assessment

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

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

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

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

4.2.10 Levee Failure

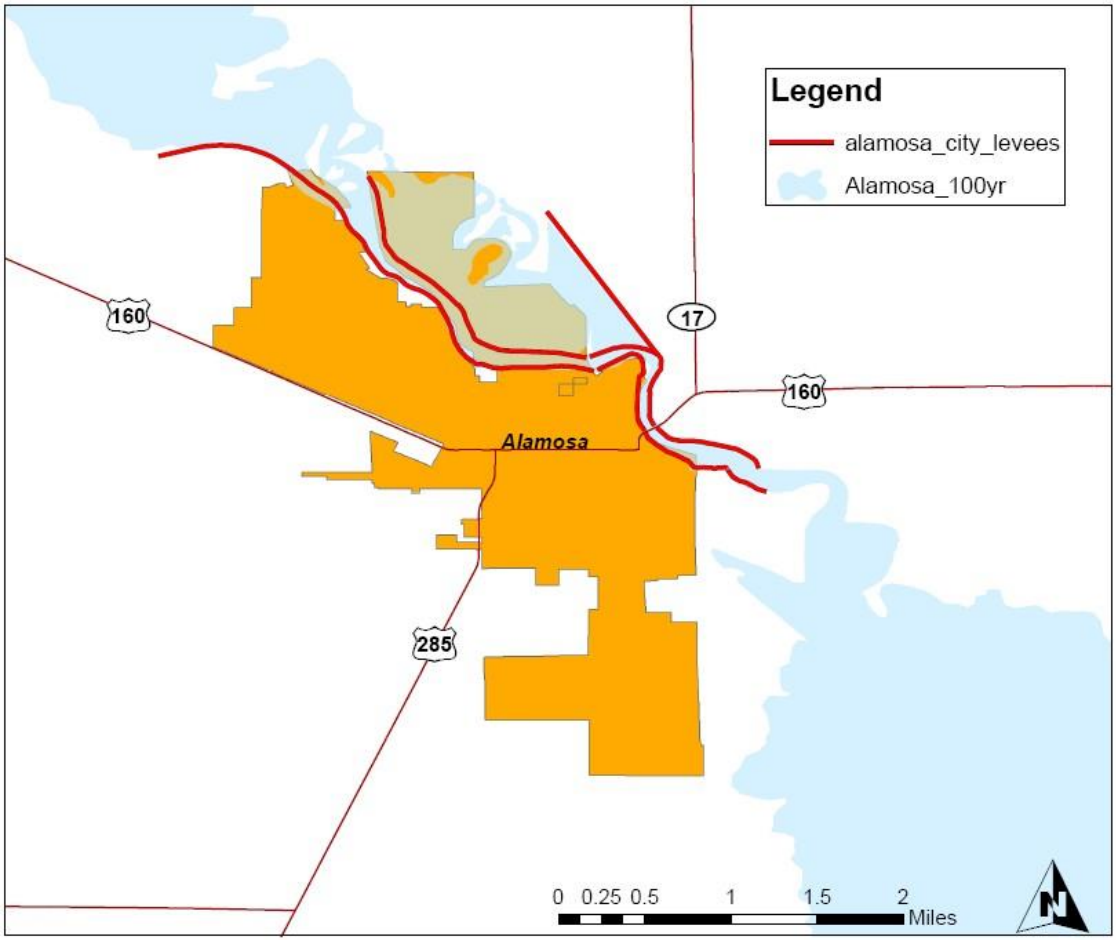
Hazard Description

Levees are embankments (typically earthen) designed to contain, control, or divert the flow of water to provide some level of protection from flooding. Some levee systems were built for agricultural purposes and provide flood protection and flood loss reduction for farm fields and other land used for agricultural purposes. Urban levee systems are built to provide flood protection and flood loss reduction for population centers and the industrial, commercial, and residential facilities within them. Urban levee systems, because they are designed to protect urban areas, have typically been built to higher standards. No levee system provides full protection from all flooding events to the people and structures located behind it. Some level of flood risk exists in these levee-impacted areas.

Geographic Location

There are no dams located within Alamosa County, but a substantial levee system provides flood protection for parts of the City of Alamosa and unincorporated Alamosa County. The Alamosa levee, which parallels approximately four miles of the Rio Grande River, does not comply with current U.S. Army Corps of Engineers (USACE) regulations. The levee, built in 1997, is laden with cottonwood and willow trees which are viewed by the USACE as potential weakening factors in the overall levee stability.

Figure 4.6 Alamosa County Levee System



Source: Created by URS with data from San Luis Valley GIS/GPS Authority (intended for planning purposes only)

Previous Occurrences

There are no recorded levee failure incidents in Alamosa County.

Probability of Future Occurrences

The Alamosa levees were rated "unacceptable" following inspection by the USACE. Since the level of maintenance required to bring the system into compliance with USACE standards is beyond local capability, the Planning Team determined that the potential for a future breach of the levee during a major storm event cannot be ruled out and rated the probability as **occasional** (occurs every 11-100 years, or a 1-10% chance per year).

Magnitude/Severity

The consequences of a levee failure can range from localized street flooding with minor property damage to the need to evacuate populations to assure life safety. Homes, businesses, roads, structures and other infrastructure are potentially vulnerable to flood damages during an event.

Should a major breach of the Alamosa levee occur, hundreds of structures would be inundated, mostly in the City of Alamosa, and thousands of people would be displaced.

The severity of a possible levee failure is rated **catastrophic** by the Planning Team, meaning that a major breach could result in multiple deaths, property destruction, population displacement, infrastructure damages, and service disruptions of 72 hours are more.

Vulnerability Assessment

The Alamosa levee provides flood protection to the City of Alamosa and parts of unincorporated Alamosa County. Compliance and maintenance issues with USACE are being evaluated by the USACE and the City of Alamosa. Without certification of the levee, the USACE has placed the project on the inactive status for the rehabilitation inspection program.

The existence of the levee removes structures from the floodplain. However, if the levee is at risk for failure, the structures that are relying on it are at risk as well. HAZUS does not allow an analysis of structures that are protected by the levee. Without certification of the levee, the FIRM and DFIRM maps will not view the levee as protection from a 100-year flood event.

Short of USACE certification, FEMA will not recognize the levees as protection against a 100-year flood event. Parcels within the inundation area will be susceptible to further regulation as far as floodplain permitting is concerned. Any development within these Flood Hazard Areas must adhere to NFIP rules and local land use regulations.

4.2.11 Avalanche

Hazard Description

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

Deep snow deposits often become susceptible to avalanche based on the slope stability and the structure of the snow deposits through multiple storms. An avalanche occurs when the deposit reaches its breaking point, whether triggered naturally or by human intervention. Avalanches can be naturally-triggered (by wind, snow, rain, etc.) or human-triggered (skiers, snowboarders, snowmobilers, climbers, etc.). There are more avalanche-related deaths in Colorado than any other state.

Slab avalanches are the most dangerous type of avalanche. They form when stronger snow overlies weaker snow. Often, human triggered slab avalanches are one to two feet deep, have an area about half the size of a football field, and can reach speeds over 20 mph within seconds.[17]

Geographic Location

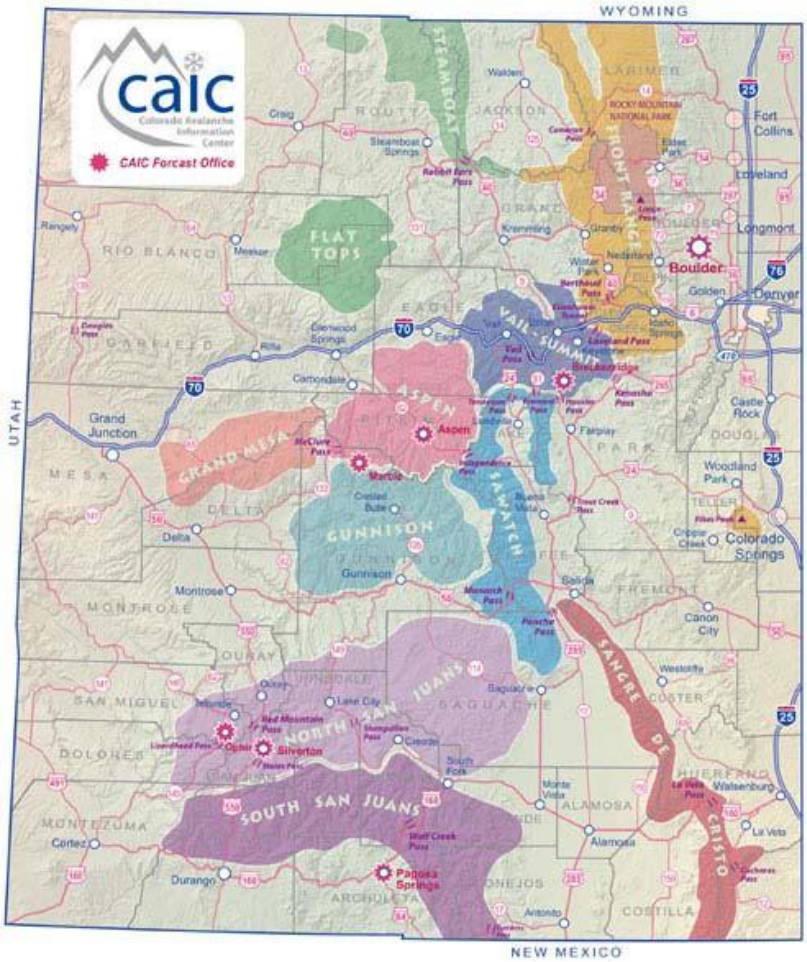
The Colorado Geological Survey (CGS) and the Colorado Avalanche Information Center (CAIC) have mapped the State's areas susceptible to avalanche activity. The CAIC forecasts

[17] Colorado Department of Transportation, www.codot.gov

backcountry avalanche and mountain weather conditions for 10 Zones in the mountains of Colorado.

Slopes in the Sangre de Cristo Mountains on the eastern edge of Alamosa County are susceptible to avalanche.

Figure 4.7 Colorado Avalanche Zones



Source: Colorado Avalanche Information Center

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

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

Previous Occurrences

According to the Colorado Avalanche Information Center (CAIC), there was one death attributed to avalanche from the period 1950 to 2007. A 20-year old woman died in an

avalanche while climbing Little Bear Peak on January 11, 2008. Little Bear Peak, one of Colorado's 14,000-foot peaks, straddles Alamosa and Costilla Counties in the Sangre de Cristo mountains.

Probability of Future Occurrences

According to the 2013 Colorado Natural Hazards Mitigation Plan, it is difficult to determine the number of persons at risk from avalanche, but a half dozen can be expected every year in Colorado. "There is no way to determine the number of people caught or buried in avalanches each year, because non-fatal avalanche incidents are increasingly under reported. The American Institute for Avalanche Research and Education reports that 90 percent of avalanche victims die in slides triggered by themselves or a member of their group. Obtaining a better understanding of outdoor recreation in avalanche-prone areas may lead toward a better understanding of future probability for this hazard."[18]

The likelihood of an avalanche increases with heavy accumulation of snow. The probability of future occurrence will depend on weather patterns and levels of recreational activity within known avalanche zones. The probability of avalanches in Alamosa County in the future is **occasional** (occurs every 11-100 years, or a 1-10% chance per year).

Magnitude/Severity

In an avalanche, the impact forces of the rapidly moving snow and debris and the burial of areas in the run out zone can result in the destruction of structures and anything else in its path. Areas prone to avalanche hazards in and around the San Luis Valley are generally not heavily populated. Avalanches causing death or injury are usually human-triggered in the backcountry and therefore can result in isolated injuries or fatalities. On rare occasions, roads, highways and railroads may be damaged and blocked by snow and debris, resulting in travel delays and costly efforts to clear and repair transportation routes. Otherwise, impacts to critical facilities and interruption of essential services are not expected.

Alamosa County's avalanche area is not heavily populated. Recorded avalanche events are often human-triggered, and frequently result in injuries or fatalities (loss of structures or other facilities is not expected). The Planning Team has rated the severity of the avalanche hazard in Alamosa County **limited**, meaning that minor injuries and minor property damages are possible, with minimal disruptions to infrastructure and critical services.

Vulnerability Assessment

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

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

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

According to the 2013 Colorado Natural Hazards Mitigation Plan, the avalanche hazard is localized in mountain regions: "Avalanche-prone areas are well known; avalanche chutes identify where they will likely occur again…the complex interaction of weather and terrain factors contributes to the location, size, and timing of avalanches. In the absence of detailed scientific observation, any accumulation of snow on a slope steeper than 20 degrees should be considered a potential avalanche hazard."[19]

4.2.12 Landslide

Hazard Description

The 2013 Colorado Natural Hazards Mitigation Plan defines landslides as the "downward and outward movement of slopes composed of natural rock, soils, artificial fills, or combinations thereof." Landslides can damage infrastructure, destroy or destabilize structures, and cover rail and roadways, resulting in extended closures and temporary disruptions of utility services. Damage to oil and natural gas pipelines and electrical conduits may result in an interruption of services both in the affected areas and those further down the pipelines from affected areas. Landslides are most common in areas with steep slopes and grading, but may occur anywhere that natural or artificial materials may shift or slide.[20]

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

Geographic Location

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

Most of Alamosa County consists of flat desert and is not susceptible to landslide. The only potential risk for landslides is in eastern Alamosa County in the Sangre de Cristo Mountains. There is a fair amount of steep terrain in this area, particularly near the boundaries with Costilla and Huerfano Counties.

Previous Occurrences

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

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

During the 1980s and 1990s, landslide activity intensified due to an extended period of higher than normal annual precipitation levels, but there are no documented landslide events in Alamosa County history.

Probability of Future Occurrences

The Colorado Geological Survey (CGS) has not identified any vulnerable communities, areas, or facilities in Alamosa County and landslides do not present an immediate risk to populated areas, transportation systems, public infrastructure or the economy. Geologic studies can determine the location of historic landslide paths and deposits and instruments can measure activity to determine whether movement is occurring. The Planning Team has rated the probability of future landslide occurrences **occasional** (occurs every 11-100 years, or a 1-10% chance per year).

Magnitude/Severity

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

As noted in the 2013 Colorado Natural Hazards Mitigation Plan, the potential for property and infrastructure damages is considerable: "Landslides occur commonly throughout Colorado, and the annual damage is estimated to exceed $3 million dollars to buildings alone."[21] Transportation infrastructure is typically the most impacted resource from landslides in Colorado although residential structures have also been impacted.

Figure 4.8 West Salt Creek Landslide

Source: Colorado Geological Survey

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

Although rare, deaths and injuries occur from landslides. On May 25, 2014 the longest landslide in the state's history occurred in Mesa County, six miles southeast of the town of Collbran, resulting in the deaths of three local men. The landslide was 2.8 miles long and dropped approximately 2,100 feet in elevation, moving at speeds of up to 85 miles per hour. The landslide covered almost a square mile of West Salt Creek valley, stopping just short of active gas-production wellheads and irrigation ditches and ponds used by local farmers and ranchers.[22]

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

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

Vulnerability Assessment

In and around the San Luis Valley, most areas susceptible to landslides are publicly owned lands and there is a relatively low risk for injury, loss of life, or damage to property. The most significant risk is likely along the highways. Ongoing pressures for residential and business growth in areas highly impacted by landslides will continue as available land for development decreases in mountain communities.

The conditions resulting in a landslide are site-specific. A major landslide could potentially destroy anything in its path. The vulnerability of individual structures could be assessed through detailed studies of buildings and infrastructure located within known landslide areas. Future development in areas where landslide potential exists should undergo geotechnical studies to determine slope stability.

4.2.13 Earthquake

Hazard Description

An earthquake is caused by a sudden slip on a fault. Stresses in the earth's outer layer push the sides of the fault together. Stress builds up and the rocks slip suddenly, releasing energy in waves that travel through the earth's crust and cause the shaking that is felt during an earthquake. "Sudden movement on faults is responsible for earthquakes. An earthquake is simply the vibrations caused by the blocks of rock on either side of a fault rubbing against each other as they move in opposite directions. The bigger the movement, the bigger the earthquake. Because the mountains are still rising in Colorado, earthquakes will continue to accompany the faulting that enables them to grow."[23]

Earthquake research in Colorado focuses on the thousands of faults in the state to determine whether they have moved in the recent geologic past and whether they are capable of moving again in the near future. Magnitude and intensity are used to describe seismic activity:

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[22] Colorado Geological Survey, coloradogeologicalsurvey.org
[23] Colorado Geological Survey, dnrwebcomapg.state.co.us/CGSOnline

magnitude is a measure of the total energy released (each earthquake has one magnitude) and intensity describes the effects of the earthquake at a particular place (intensity differs throughout the area). The Richter Scale is commonly used to measure magnitude and the Modified Mercalli Scale is used for intensity.

Table 4.19 Richter Scale

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

Source: Colorado Geological Survey

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

Table 4.20 Modified Mercalli Intensity (MMI) Scale

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

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

Source: Federal Emergency Management Agency

Geographic Location

Colorado is considered a region of relatively minor earthquake activity. Geologic studies indicate there are more than 90 potentially active faults in Colorado with documented movement within the last 1.6 million years. Potentially active faults present the greatest earthquake hazard (those that have ruptured to the ground surface during the Holocene period, or about the last 15,000 years). The Sangre de Cristo fault runs along the eastern edge of the valley in the Sangre de Cristo Mountains. One of the three USGS operated permanent seismic stations in Colorado is located in northeastern Alamosa County.

Previous Occurrences

One earthquake was noted in the Colorado State Earthquake Report (2009). The Blanca-Fort Garland earthquake occurred on December 28, 2003.

Table 4.21 Colorado's Largest Earthquakes

Date	Location	Magnitude	Maximum Intensity
1870 (Dec 4)	Pueblo/Ft. Reynolds	N/A	VI
1871 (Oct)	Lily Park, Moffat County	N/A	VI
1880 (Sep 17)	Aspen	N/A	VI
1882 (Nov 7)	North Central Colorado	6.6	VII
1891 (Dec 1)	Axial Basin (Maybell)	N/A	VI
1901 (Nov 15)	Buena Vista	N/A	VI
1913 (Nov11)	Ridgway Area	N/A	VI
1944 (Sep 9)	Montrose/Basalt	N/A	VI
1955 (Aug 3)	Lake City	N/A	VI
1960 (Oct 11)	Montrose/Ridgway	5.5	V
1966 (Jan 5)	NE of Denver	5.0	V
1966 (Jan 23)	CO-NM border near Dulce, NM	5.5	VII
1967 (Aug 9)	NE of Denver	5.3	VII
1967 (Nov 27)	NE of Denver	5.2	VI
2011 (Aug 22)	Trinidad (Cokedale)	5.3	VII

Source: Colorado Geological Survey

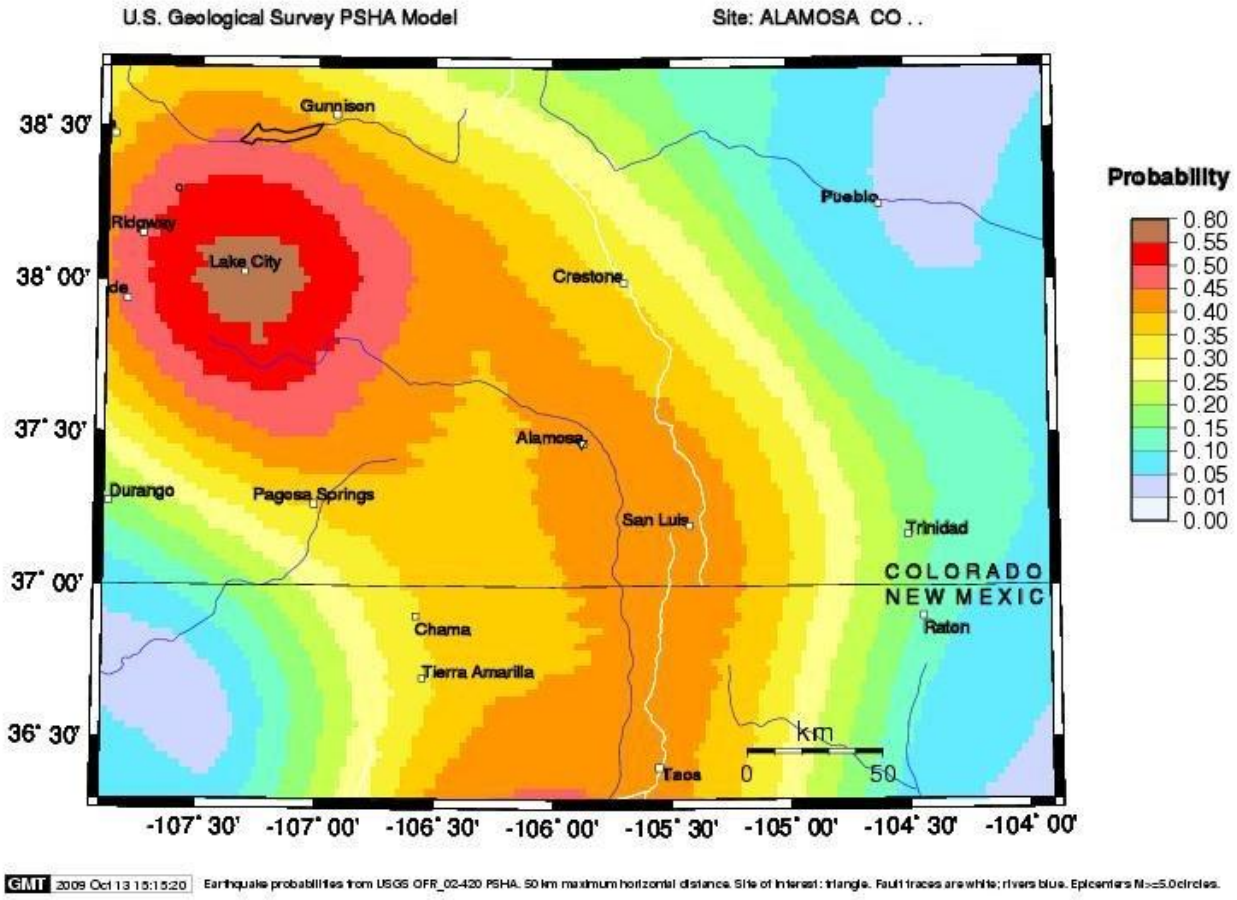
Probability of Future Occurrences

There have been no past damaging seismic events in Alamosa County. The occurrence of earthquakes is relatively infrequent in Colorado, and the historical earthquake record is short

(only about 130 years). Given the short history of recorded events, it is impossible to accurately estimate the timing or location of future strong earthquakes in Colorado. "Relative to other western states, Colorado's earthquake hazard is higher than Kansas or Oklahoma, but lower than Utah and certainly much lower than Nevada and California. Even though the seismic hazard in Colorado is low to moderate, it is likely that future damaging earthquakes will occur. Based on the historical earthquake record and geologic studies in Colorado, an event of magnitude 6.5 to 7.5 could occur somewhere in the state."[24]

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

Figure 4.9 Probability of a 5.0 or Greater Magnitude Earthquake in next 150 years



Source: U.S. Geological Survey

The Planning Team has rated the probability of future earthquake events **unlikely** (occurs greater than every 100 years or <1% chance in the next 100 years).

[24] Colorado Geological Survey, coloradogeologicalsurvey.org/geologic-hazards/earthquakes-2/

Magnitude/Severity

According to the 2013 Colorado Natural Hazards Mitigation Plan, the seismic hazard in Colorado is rated low-to-moderate, but the risk may have been underestimated. "Colorado's earthquake hazard and risk has historically been rated lower than most knowledgeable scientists in the state consider justified. As a result, local emergency managers are generally unaware of the size and consequences of an earthquake that could occur in the state. HAZUS 99 gave a probabilistic Annualized Earthquake Loss (AEL) of $5.8 million which ranked Colorado 30th in the nation. In early 2013, the Colorado Geological Survey ran a series of deterministic scenarios for selected faults around the state using HAZUS MH. The earthquake magnitudes used for each fault were the "Maximum Credible Earthquake" taken from the USGS Quaternary Fault and Fold Database or from the USGS National Earthquake Hazard Map. The results demonstrate that the probabilistic AEL value of $5.8 million does not begin to convey the size of the loss that would occur in the event of a strong earthquake on any of these faults."[25]

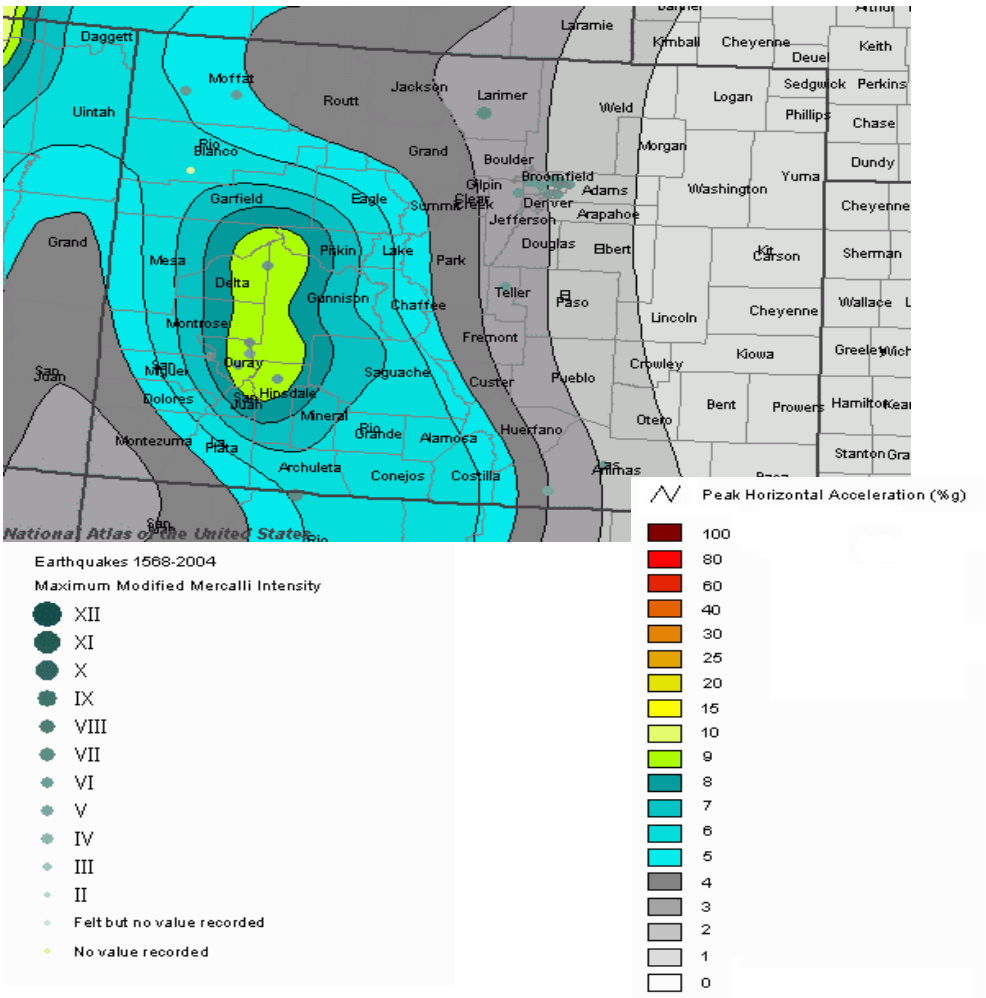
Earthquakes can cause structural damage, injury, and loss of life, as well as damage to public safety, health care and infrastructure facilities (e.g., water, wastewater, power, communication, and transportation). Seismic shaking is typically the greatest cause of losses to structures during earthquakes.

As shown on the map below, in Alamosa County the shaking level, with a 10 percent chance of being exceeded over a period of 50 years, is in the range of 5 to 6 percent peak acceleration. Significant earthquake damage typically does not occur until peak accelerations are greater than 30 percent. Secondary impacts of earthquakes may include landslides, seiches, liquefaction, fires, and dam failure.

The severity of the seismic hazard in Alamosa County is rated **catastrophic** by the Planning Team, meaning that a major earthquake could result in multiple deaths, property destruction, population displacement, infrastructure damages, and service disruptions of 72 hours are more.

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

Figure 4.10 Colorado Seismic Hazard Map – 10% Probability of Exceedance in 50 Years



Source: U.S. Geological Survey

Vulnerability Assessment

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

The greatest losses to Alamosa County would likely result from a magnitude 7.5 earthquake or greater on the Sangre de Cristo fault, which would likely result in fatalities, injuries and hundreds of millions in economic losses.

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

4.3 Vulnerability Assessment

4.3.1 Vulnerability Assessment Methodology

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

According to the 2013 Colorado Natural Hazards Mitigation Plan, "Coloradans become vulnerable to hazards when they live, work, or visit an area where these events occur. Individuals and communities that prepare for the occurrence of a hazard are less vulnerable to its consequences than those that do not. The vulnerability of Colorado's population is rooted in a relationship between the occurrence of hazard events, the proximity of people and property to these occurrences, and the degree that a community and its members are committed and prepared to cope with these occurrences and mitigate their effects."[26]

4.3.2 Community Asset Inventory

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

HAZUS was used to estimate the exposure of people and buildings in Alamosa County. HAZUS estimates exposure to 17,760 individuals (2007 total population), 7,493 structures (2000), and the assessed value of these structures ($1,105,000,000). Building counts and values (including building contents) were taken from HAZUS census block-level data. Land values were purposely excluded because land remains following Colorado disasters, and subsequent market devaluations are frequently short term and difficult to quantify. Additionally, state and federal disaster assistance programs generally do not address loss of land or its associated value.

Critical Facilities, Infrastructure, and Other Important Community Assets

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

Table 4.22 Critical Facilities in Alamosa County

Facility Type	Facility Name	Facility Address	Estimated Replacement Value
Hospital	San Luis Valley Regional Medical Center	106 Blanca Ave.	$6,790,000

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

Fire Station	Alamosa Fire Department Station #1	425 4th St.	$582,000
Fire Station	Alamosa Fire Department Station #2	2827 Vigil Way	N/A
Police Station	Alamosa Police Department	425 4th St.	$1,358,000
Sheriff's Office	Alamosa County Sheriff	1315 17th St.	$1,358,000
Airport	San Luis Valley Regional Airport	2500 State Ave.	N/A
EOC	SLV Emergency Operations Center	8900-A Independence Way	N/A
Dispatch Center	Alamosa Regional Communications Center/CSP Dispatch	3110 1st St.	N/A
Medical Services	DaVita Dialysis	612 Del Sol Dr.	N/A
School	Trinity Lutheran School	P.O. Box 787	$485,000
School	Boyd Elementary School	11th/Hunt Ave.	$485,000
School	Evans Elementary School	108 La Veta Ave.	$485,000
School	Ortega Middle School	401 Victoria Ave.	$485,000
School	Alamosa Open School	216 Victoria St.	$485,000
School	Cottonwood Christian School	408 Victoria St.	$485,000
School	Alamosa Christian School	7160 Brush Ln.	$485,000
School	Alamosa High School	805 Craft Dr.	$485,000
School	Polston Elementary School	6935 CO 17	$485,000

Source: HAZUS-MH MR3 (2009)

Three critical facilities are located in the Town of Hooper:

1. Sangre de Cristo Elementary School
2. Mosca/Hooper Fire Department
3. Hooper Town Hall/Community Room.

Natural, Historic and Cultural Resources

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

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

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

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

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

Endangered, threatened, and candidate species located in Alamosa County are listed in Table 4.23 below.

Table 4.23 Rare Species in Alamosa County

Common Name	Scientific Name	Type of Species	Status
Black-footed Ferret	Mustela nigripes	Mammal	Endangered
Canada Lynx	Lynx canadensis	Mammal	Threatened
Gunnison Sage Grouse	Centrocerus minimus	Bird	Threatened
Mexican Spotted Owl	Strix occidentalis lucida	Bird	Threatened
Southwestern Willow Flycatcher	Empidonax taillii extimus	Bird	Endangered
Yellow-billed Cuckoo	Coccyzus americanus	Bird	Threatened

Source: U.S. Fish and Wildlife Service

Alamosa County is home to two of only eight National Wildlife Refuges in the State of Colorado: the Alamosa National Wildlife Refuge and the Baca National Wildlife Refuge. These riparian habitats support songbirds, water birds, raptors, mule deer, beaver and coyotes.

National and state historic inventories were reviewed to identify historic and cultural assets in Alamosa County. The National Register of Historic Places is the nation's official list of cultural resources worthy of preservation. The Colorado State Register of Historic Properties is a listing of the state's significant cultural resources worthy of preservation for the future education and enjoyment of Colorado's residents and visitors. Table 4.24 below lists the properties in Alamosa County that are on the Colorado State Register of Historic Properties. Those properties that are also on the National Register of Historic Places are indicated with an asterisk.

Table 4.24 Historic Properties and Districts on State and National Registers

Property Name	City/Town	Location	Date Listed
Alamosa County Courthouse*	Alamosa	702 Fourth Street	9/29/1995
Alamosa Masonic Hall	Alamosa	514 San Juan	5/14/1997
American National Bank Bldg.*	Alamosa	500 State Ave.	4/15/1999

Bain's Department Store	Alamosa	510 Main St. & 509 Hunt Ave.	9/13/1995
Denver-Rio Grande Railroad Depot*	Alamosa	610 State St.	2/11/1993
Denver-Rio Grande Railroad Locomotive #169	Alamosa	Cole Park	8/9/2000
First Baptist Church*	Alamosa	408 State Ave.	5/22/2005
Husung Hardware*	Alamosa	625 Main St.	1/28/2000
Mt. Pleasant School*	Alamosa	Junction of County Rd 3S and Rd. 103S	5/3/2006
Sacred Heart Catholic Church*	Alamosa	727 4th St	3/13/1996
St. Thomas Episcopal Church*	Alamosa	607 Fourth St.	3/4/2003
Hooper Store (Town Hall)*	Hooper	8681 Main St.	2/1/2006
Medano Ranch Headquarters*	Mosca	Approximately 9 mi. NE of Mosca	2/4/2004
Superintendent's Residence, Great Sand Dunes NP	Mosca	Colo. Highway 150, southwest of Mosca	11/2/1989
Trujillo Homestead*	Mosca	Approximately 4 miles north of 6N Lane	2/4/2004
Zapata Ranch Headquarters*	Mosca	5303 Colo. Hwy. 150	4/5/1993

Asterisk indicates properties on both the State and National Registers
Source: Directory of Colorado State Register Properties

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

Economic Assets

In addition to direct impacts and damages to critical facilities, major disasters can result in large amounts of debris, business interruptions, increased emergency response times and costs, loss of income for businesses and residents, increased demands for health services, and the need to replace roads, bridges and public buildings. After a disaster, economic recovery is the highest recovery priority, next to public health and safety. When major employers are unable to return to normal operations, long-term impacts may be felt throughout the community. Table 4.25 lists the top employers in Alamosa County by number of employees.

Table 4.25 Top Employers in Alamosa County

Employer Name	Location (City/Town)
250-500 Employees	
Adams State University	Alamosa
San Luis Valley Regional Medical Center	Alamosa
Rakra Mushroom Farm Corporation	Alamosa
100-250 Employees	
Alamosa County Government	Alamosa
Blue Peaks Developmental Services	Alamosa
City Market	Alamosa
Colorado Department of Transportation	Alamosa
San Luis Valley BOCES	Alamosa

Town and Country Ford	Alamosa

Source: Colorado Department of Labor and Employment

Social Vulnerability

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

Table 4.26 Social Vulnerability Indicators from U.S. Census, 2010-2014

Jurisdiction	Total Population	Housing Units	% Female	% 18 Yrs. and Under	% 65 and Over	% Non-English at Home	Individuals Below Poverty Level (%)
Alamosa County	16,111	6,627	51.1	24.3	12.0	22.9	27.9
City of Alamosa	9,427	3,928	52.9	23.3	9.2	23.3	33.8
Town of Hooper	79	63	45.6	29.1	20.0	4.1	58.2

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

4.3.3 Growth and Development Trends

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

According to the State Demography Office (SDO), the population of Alamosa County is expected to grow slowly at about a 1 to 2% growth rate. Within the City of Alamosa, primary growth areas have been to the west and southwest. The Town of Hooper expects no growth or limited growth rather than new development.

Table 4.27 Population Growth in Alamosa County, 2010-2015

Jurisdiction	**2010**	**2015 (Estimated)**	**Percent Change**
Alamosa County	15,455	16,496	6.74
City of Alamosa	8,780	9,819	11.8
Town of Hooper	103	103	0.00

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

Between 2010 and 2015, Alamosa County issued an average of 50 building permits per year.

Table 4.28 below shows the rate of growth in housing units for Alamosa County, the City of Alamosa and the Town of Hooper between 2010-2014.

Table 4.28 Growth in Housing Units in Alamosa County, 2010-2014

Jurisdiction	2010	2014	Percent Change (%)
Alamosa County	6,554	6,627	1.11
City of Alamosa	3,671	3,928	7.00
Town of Hooper	62	63	1.61

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

According to the State Demography Office, the county is expected to grow at an annual growth rate of approximately 1.5 percent between 2000 and 2050.

Table 4.29 Projected Population Growth in Alamosa County, 2000-2050

	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
Pop.	15,097	15,395	15,474	15,989	16,898	17,967	19,070	20,149	21,149	22,145	23,203
Percent Change		0.4	0.1	0.7	1.1	1.2	1.2	1.1	1.0	0.9	0.9

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

4.4 Capability Assessment

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

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

Regulatory Mitigation Capabilities

The political jurisdictions within Alamosa County enforce a range of regulations that support mitigation goals and principles by restricting development in areas prone to natural hazards. In most jurisdictions, the local comprehensive plan, zoning ordinance, floodplain ordinance and building code are the primary tools utilized to regulate development in hazard-prone areas. The existing regulatory tools and planning mechanisms for Alamosa County and other jurisdictions are summarized in Table 4.30 below.

Table 4.30 Regulatory Mitigation Capabilities

Regulatory Capability	Alamosa County	City of Alamosa	Town of Hooper

Comprehensive or Master Plan	Yes (2009)	Yes	No
Emergency Operations Plan	Yes	No	No
Economic Development Plan	Yes (2013)	No	No
Capital Improvements Plan	No	Yes	Yes
Community Wildfire Protection Plan	Yes (2009)	Yes (2009)	Yes (2009)
Building Code	Yes	Yes	
Building Code Year	2016		
Floodplain Ordinance	Yes (2014)	Yes	Yes
Zoning Ordinance	Yes (2009)	Yes	Yes
Subdivision Ordinance	Yes (2009)	Yes	Yes
Stormwater Ordinance	No	Yes	Yes
Site Plan Review Requirements	Yes (2009)	Yes	Yes
National Flood Insurance Program Participant	Yes	Yes	No
Community Rating System (CRS) Participant	No	No	No

The Alamosa County Master Plan identifies broad-based development goals and develops a coordinated program of public and private actions necessary to achieve those goals. The Master Plan is intended to guide development by evaluating physical elements such as housing, transportation, open space and recreation, infrastructure, and community facilities, along with socio-economic development based on input from county residents. A number of the goals and policies in the Master Plan address mitigation of natural hazards, including flood hazard mitigation and fuels reduction in the wildland interface.

The Town of Hooper amended their zoning code in 2009. The zoning code was developed to promote coordinated and sound development, and to protect the health, safety, welfare, and morals of current and future inhabitants of the Town. The Code includes language related to promoting fire safety and hazard awareness.

Administrative and Technical Mitigation Capabilities

Table 4.31 below identifies the personnel responsible for activities related to mitigation and loss prevention in Alamosa County and other jurisdictions. A dedicated floodplain administrator enforces the local floodplain ordinance and ensures conformance with National Flood Insurance Program (NFIP) requirements.

Table 4.31 Administrative and Technical Capabilities

Administrative and Technical Resources	**Alamosa County**	**City of Alamosa**	**Town of Hooper**
Planner/Engineer (with knowledge of land development practices)	Yes	Yes	No
Engineer/Professional (trained in construction practices related to buildings/infrastructure)	Yes	Yes	No
Planner/Engineer/Scientist (with understanding of natural hazards)	Yes	Yes	No
GIS Capabilities	Yes	Yes	No
Full-Time Building Official	Yes	Yes	No
Floodplain Administrator	Yes	Yes	No

Emergency Manager	Yes	No	No
Grant Writer	Yes	No	No
Warning Systems/Services	Yes	Yes	Yes

Fiscal Mitigation Capabilities

The financial resources available to Alamosa County and other participating jurisdictions are identified in Table 4.32 below.

Table 4.32 Fiscal Mitigation Capabilities

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

Chapter Five
Mitigation Strategy

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

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

5.1 Plan Goals

At the second planning meeting on August 11, 2016, the Planning Team validated the goals for the 2016 plan update, based on: (1) an updated analysis of significant hazards, (2) an updated vulnerability assessment that estimates the potential impacts of the hazards identified, (3) an updated capability assessment that identifies efforts currently in place to reduce potential hazard impacts, and (4) a mitigation strategy and action plan intended to reduce risks in the future. For the 2016 update, the Planning Team reaffirmed the goals established in the previous plan:

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

5.2 Incorporation of 2010 Plan into Other Planning Mechanisms

The 2010 Alamosa County Hazard Mitigation Plan encouraged the incorporation of recommended mitigation actions into other local government planning mechanisms, such as master or comprehensive land-use plans, when appropriate. Due to the broad scope and general nature of many of the recommended actions, the initiatives outlined in the 2010 plan were not completely incorporated; however, progress with integration into other planning mechanisms has been made, as described in the 2016 Mitigation Actions section of this chapter.

As indicated in the Capability Assessment (Section 4.4), Alamosa County and the other jurisdictions participating in the mitigation planning effort enforce a range of regulations that support mitigation goals and principles by restricting development in areas prone to natural hazards. The primary local planning mechanisms that support hazard mitigation include comprehensive plans, building codes, zoning ordinances, subdivision regulations, and regulations related to floodplain and stormwater management.

The 2016 update of this plan provides additional opportunities for improving integration with other local plans and programs. Multiple disciplines are reflected in Planning Team

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

5.3 Identification of Mitigation Action Alternatives

At the second planning team meeting on August 11, 2016, the Planning Team reviewed the types and categories of mitigation actions, as identified in the table below.

Table 5.1 Types of Mitigation Actions

Mitigation Type	Description	Examples
Local Plans and Regulations	These actions include government authorities, policies, or codes that influence the way land and buildings are developed and built.	·Comprehensive plans ·Land use ordinances ·Subdivision regulations ·Development review ·Building codes/enforcement ·NFIP Community Rating System ·Capital improvement programs ·Open space preservation ·Stormwater management plans and regulations
Structure and Infrastructure Protection	These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.	·Acquisition/removal of structures in hazard-prone areas ·Utility undergrounding ·Structural retrofits ·Floodwalls and retaining walls ·Detention/retention structures ·Culverts ·Safe rooms
Natural Systems Protection	These are actions that minimize damage and losses and also preserve or restore the functions of natural systems.	·Sediment and erosion control ·Stream corridor restoration ·Forest management ·Conservation easements ·Wetland restoration and preservation
Education and Awareness Programs	These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them.	·Radio or television spots ·Websites with maps and information ·Real estate disclosure

	These actions may also include participation in national programs, such as *StormReady* or *Firewise* Communities. Although this type of mitigation reduces risk less directly than structural projects or regulation, it is an important foundation. A greater understanding and awareness of hazards and risk among local officials, stakeholders, and the public is more likely to lead to direct actions.	·Presentations to school groups or neighborhood organizations ·Mailings to residents in hazard-prone areas ·StormReady Communities ·Firewise Communities

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

Two jurisdictions -- Alamosa County and the City of Alamosa -- currently participate in the National Flood Insurance Program (NFIP). The Town of Hooper does not have any known floodplains and does not participate in the NFIP. Alamosa County and the City of Alamosa will continue participation in and compliance with the NFIP. Specific activities that the jurisdictions will undertake to continue compliance include the following:

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

5.4 Prioritization of Mitigation Actions

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

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

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

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

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

5.5 Status of 2010 Mitigation Actions

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

Table 5.2 Status of 2010 Mitigation Actions

2010 Mitigation Actions			
#	**Description/Benefits**	**Lead Agency**	**Status**
Alamosa County			
1	Update floodplain regulations throughout county	Land Use	Complete (March 2014)
2	Seek updated FEMA digital flood maps (DFIRMs)	Land Use	Incomplete
3	Implement the recommendations of the Rio Grande Headwaters Restoration Plan (RGHRP)	Rio Grande Headwaters Restoration Project (RGHRP)	Complete: Lower Rio Grande Study (2015); In process: Del Norte Riverfront Project
4	Facilitate construction of power line redundancy	Land Use	Incomplete (project determined to be beyond local government control/capability)
5	Increase public awareness for severe weather hazards	OEM	OEM instituted Weather Spotter program (combined w/#18 for 2016 update)

6	Increase shelter capacity throughout the county (coordinate with the Red Cross)	OEM	Ongoing (combine w#12 for 2016 update)
7	Prepare a Drought Preparedness Action Guide	OEM	Incomplete
8	Revise land use regulations to include earthquake and wildfire mitigation	Land Use	Ongoing: for 2016 update, replace earthquake with flood
9	Develop accessibility/evacuation routes for Zapata subdivision (planning phase)	OEM	Complete: CWPP (2009) and internal subdivision plans completed
10	Continue to improve involvement in the NFIP and improve classification rating for the Community Rating System (CRS)	Land Use	Ongoing
11	Study Base Flood Elevation (BFE) mapping opportunities	OEM	Ongoing
12	Conduct study and develop plan for shelters and vulnerable populations (esp. Hooper)	OEM	Ongoing (combine w#6 for 2016 update)
13	Incorporate student population into mitigation studies, actions, and/or planning	OEM	Incomplete
City of Alamosa			
14	Address issues raised in the US Army Corps of Engineers Study Continuing Eligibility Inspection (CEI) 9/15/2008	Public Works	Ongoing
15	Continue to improve involvement in the NFIP and improve classification rating for the Community Rating System (CRS)	Land Use Administrator/City of Alamosa	Ongoing
16	Study Base Flood Elevation (BFE) mapping opportunities	OEM, City of Alamosa	Ongoing
17	Conduct study and develop plan for shelters and vulnerable populations (esp. Hooper)	OEM, City of Alamosa	Ongoing
18	Incorporate student population into mitigation studies, actions, and/or planning	OEM, City of Alamosa	Incomplete (combine w/#5 for 2016 update)
19	Revise land use regulations to include earthquake and wildfire mitigation	Land Use Administrator/City of Alamosa	Incomplete
20	Facilitate construction of power line redundancy	Land Use Administrator/City of Alamosa	Incomplete (project determined to be beyond local government control/capability)
21	Increase public awareness for severe weather	OEM, City of Alamosa	Ongoing
Town of Hooper			

22	Conduct study and develop plan for shelters and vulnerable populations (esp. Hooper)	OEM/Town of Hooper	Incomplete
23	Increase public awareness for severe weather	OEM/Town of Hooper	Ongoing
Alamosa County Fire Protection District			
24	Develop accessibility/evacuation routes for Zapata subdivision (planning phase)	OEM/ACFPD	Complete: CWPP (2009) and internal subdivision plans completed
25	Increase public awareness for severe weather	OEM/ACFPD	Ongoing
Rio Grande Water Conservation District			
26	Implement the Rio Grande Restoration Plan	SLV WCD/RGWCD	Complete: Lower Rio Grande Study (2015); In process: Del Norte Riverfront Project
27	Prepare a Drought Preparedness Action Guide	SLV WCD/RGWCD	Incomplete

5.6 2016 Mitigation Actions

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

Table 5.3 2016 Mitigation Action Matrix

2016 Mitigation Actions			
#	**Description/Benefits**	**Lead Agency**	**Priority**
Alamosa County			
1	Seek updated FEMA digital flood maps (DFIRMs) and explore local Base Flood Elevation (BFE) mapping opportunities	Land Use	High
2	Implement the recommendations of the Rio Grande Headwaters Restoration Project (RGHRP)	Rio Grande Headwaters Restoration Project (RGHRP)	High
3	Increase public awareness of severe weather hazards and identify opportunities for exposing students to mitigation studies, actions and plans	OEM	Medium
4	Increase shelter capacity throughout the county (coordinate with the Red Cross)	OEM	High
5	Revise land use regulations to include flood and wildfire mitigation	Land Use	Medium
6	Improve flood permitting process and regulate floodplain in conformance with NFIP requirements	Land Use	Medium
7	Conduct study and develop a shelter plan for vulnerable populations in unincorporated areas, including the town of Hooper	OEM	High

8	Incorporate student population into mitigation studies, actions, and/or planning	OEM	Medium
9	Improve preparedness for long-term power outages and increase awareness of alternate energy sources	OEM/Land Use	Medium
10	Improve education and awareness of fuels reduction techniques in wildland-urban interface areas	Alamosa Fire Protection District/Colorado State Forest Service	High
11	Work with the State of Colorado and the National Weather Service to identify funding and support for the placement of a Doppler radar tower in the area to improve weather predictions and warnings	OEM	High
12	Investigate opportunities for mitigating health hazards resulting from windstorms that produce particulate matter in excess of health standards	Public Health/Emergency Preparedness and Response	Medium
City of Alamosa			
13	Address issues raised in the US Army Corps of Engineers Study Continuing Eligibility Inspection (CEI) 9/15/2008	Alamosa Public Works	High
14	Improve flood permitting process and regulate floodplain in conformance with NFIP requirements	City of Alamosa Floodplain Administrator	Medium
15	Seek updated FEMA digital flood maps (DFIRMs) and explore local Base Flood Elevation (BFE) mapping opportunities	City of Alamosa Floodplain Administrator	High
16	Develop shelter plan for vulnerable populations within the City of Alamosa	Alamosa FPD	High
17	Increase public awareness of severe weather hazards and identify opportunities for exposing students to mitigation studies, actions and plans	OEM, City of Alamosa	Medium
18	Improve preparedness for long-term power outages and increase awareness of alternate energy sources	Alamosa Public Works	Medium
19	Incorporate goals and principles of the Alamosa County Hazard Mitigation Plan into process of developing new City Comprehensive Plan	City of Alamosa	High
Town of Hooper/Community of Mosca			
20	Develop shelter plan for vulnerable populations within the town of Hooper and neighboring areas of unincorporated Alamosa County	OEM/Town of Hooper	High
21	Increase public awareness of severe weather hazards	OEM/Town of Hooper	Medium
Alamosa County Fire Protection District			
22	Increase public awareness of severe weather hazards	OEM/ACFPD	Medium
Rio Grande Water Conservation District			
23	Establish and maintain a water conservation process for protecting aquifer levels	Rio Grande Water Conservation District	Medium

5.7 Mitigation Funding Sources

The Colorado Division of Homeland Security and Emergency Management (DHSEM) Mitigation Team is the primary state entity responsible for coordinating and facilitating technical

assistance for local hazard mitigation planning. The mission of the Mitigation Team is to promote community resiliency and sustainability for the people of Colorado by fostering partnerships and maximizing the availability of mitigation and recovery resources.

Federal Programs

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

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

State Programs

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

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

Chapter 6
Plan Adoption, Maintenance and Evaluation

6.1 Formal Plan Adoption

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

6.2 Plan Maintenance and Evaluation

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

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

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

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

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

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

6.3 Mitigation Actions and Other Plans and Programs

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

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

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

- Alamosa County Master Plan
- Alamosa County Emergency Operations Plan
- Master plans of the other participating jurisdictions
- Zoning, subdivision, and floodplain ordinances
- Capital improvement plans and county and municipal budgets
- Other plans and policies outlined in the capability assessment

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

6.4 Continued Public Involvement

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

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

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

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

Chapter 7
Regional Coordination

7.1 Tradition of Regional Cooperation

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

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

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

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

7.2 Regional Hazard Events Since 2010

Several significant natural hazard events have occurred since the last update of this plan, most notably the West Fork Fire Complex in June 2013, a federally-declared fire emergency that cost more than $33 million to contain. The West Fork Fire Complex burned 109,615 acres, making it the second largest wildfire in modern Colorado history. The fire demonstrated extreme behavior as a result of dead fuels, primarily pine- and spruce-beetle killed trees, high winds and drought conditions. Although the fire threatened a number of neighborhoods and caused the evacuation of the Town of South Fork for several days, there were no fatalities as a result of the event and no structures were lost. Information about that event, as well as other smaller-scale events, is provided in the table below.

Table 7.1 Significant Regional Events, 2010-2016

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

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

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

7.3 Regional Mitigation Actions

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

<u>Regional Mitigation Action #1 – Improve Wildfire Awareness and Public Compliance with Burn Restrictions</u>

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

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

Regional Mitigation Action #2 – Improve Doppler Radar for Region

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

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

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

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

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

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

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

West Fork Fire Complex, Mineral County, June 2013

Appendices

A. Acronyms

B. Plan Participants

C. References and Resources

D. Documentation of the Planning Process

E. Disaster Mitigation Act of 2000 (DMA 2000) Summary

F. FEMA Plan Review Tool (Pending)

G. Record of Adoption (Pending)

Appendix A
Acronyms

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

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

Appendix B
Plan Participants
Alamosa County Planning Team

Participant	Position	Jurisdiction/ Department	Email Address
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Appendix C
References and Resources

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Identifying and Prioritizing Mitigation Actions

Letters of Intent (Under Separate Cover)

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

2016 Alamosa County Hazard Mitigation Plan Update
Kickoff Meeting
March 4, 2016
3:00-5:30
Alamosa County Commissioners Conference Room

Meeting Summary

The initial planning meeting to update the Alamosa County Hazard Mitigation Plan was conducted on March 4, 2016, 3:30-5:30, at the Alamosa County Commissioners Conference Room. Twenty attendees representing 14 local, regional and state agencies participated in the kickoff meeting, including representatives from Adams State University and the American Red Cross. The meeting agenda included an overview of the plan update process, a discussion of potential mitigation projects and funding sources, and an evaluation of risks associated with natural hazards in Alamosa County.

Project Overview

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

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

Project Team

- Project Manager: Francis Song, Emergency Manager
- Alamosa County Planning Team
- Consultant: Robert “Bob” Wold

Technical Planning Assistance

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

Hazard Mitigation Overview

Patricia Gavelda provided an overview of hazard mitigation concepts, benefits, projects, and the requirements for local participation as per the Disaster Mitigation Act of 2000 (DMA 2000). Ms. Gavelda reviewed the types of projects that are eligible for grant-funding and that have been funded to address flood, wildfire, geologic and other natural hazards in Colorado. During the period 2011-present, 105 projects totaling $85,473,423 were approved for funding in Colorado for a range of flood reduction, wildfire mitigation, landslide stabilization, planning grants and other types of projects.

Hazard Mitigation Plan Update Process

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

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

Risk Assessment

Meeting participants discussed the 12 natural hazards profiled in the previous 2010 plan in terms of probability and potential consequences. Based on this discussion and comments provided after the meeting, hazard ratings related to probability and magnitude/severity were revised for a number of hazards (concurrence on hazard ratings will be finalized at the mid-project review).

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

Hazard Assessment Terminology

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

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

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

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

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

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

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

In order to ensure consistency with the most recent Threat and Hazard Identification and Risk Assessment (THIRA), participants agreed to attempt to identify opportunities for dovetailing THIRA priorities – specifically wildfires, mass-casualty incidents and large-scale electrical service disruptions – with goals and potential mitigation actions identified in the updated mitigation plan.

Plan Development Timeline

PRIMARY TASKS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1. Conduct Initial Plan Development Strategy Meeting									
2. Form/Reconvene County Planning Team									
3. Conduct Kickoff Meeting									
4. Develop Public Involvement Strategy									
5. Document Planning Process									
6. Conduct Risk Assessment Research/Complete HIRA									
7. Conduct Vulnerability Assessment									
8. Conduct Capability Assessment									
9. Identify 2016 Mitigation Goals and Objectives									
10. Develop a Mitigation Strategy (Mitigation Actions)									
11. Prepare a Final Draft Plan									
12. Submit Final Draft to State/FEMA for Approval									

Future Planning Team Meetings/Next Steps

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

Information Collection Tool
Alamosa County

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

1. Demographic Information

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

2. Vulnerability Assessment

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

3. Capability Assessment

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

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

4. Status of 2010 Mitigation Actions

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

Note: There are 17 local government entities in Alamosa County (1 county, 2 municipal, 12 special purpose districts, 2 school districts)

Progress Report
SLV Hazard Mitigation Plan Updates
June 29, 2016

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

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

Research

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

Tasks

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

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

Document Preparation

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

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

2016 _____ County Hazard Mitigation Plan Update

Public Involvement Comment Form

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

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

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

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

Emergency Manager: Name
Address:
Phone:
Email:

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

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

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

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

THANK YOU FOR YOUR PARTICIPATION!

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

Name:

_____

Address:

_____

_____

Phone:

_____

E-mail:

_____

Mitigation Actions Workshop
Alamosa County
August 11, 2016

Agenda

Welcome and Introductions
Hazard Mitigation Plan Development
- Project Background and Purpose
- Progress Report/Next Steps
- Primary References and Information Sources

Risk Assessment
- Confirm Natural Hazard Ratings
- Priority Hazards for Mitigation

2016 Mitigation Strategy
- Hazard Mitigation Plan Goals
- Hazard Mitigation Actions (Categories/Techniques)
- 2010 Mitigation Actions
- Potential Mitigation Opportunities and Actions
- Priority Mitigation Actions (STAPLEE Method)
- FEMA Grant Application Requirements
- Mitigation Action Implementation Worksheet

Public Involvement Strategy
- Post Final Plan Draft on Web/Public Comment Form
- Open Public Meeting (October)

Questions/Discussion
Adjourn

2016 Risk Assessment
Probability and Severity of Natural Hazards in Alamosa County

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

2016 Risk Assessment - Alamosa County

Hazard	Location	Previous Occurrences (Last 50 Years)	Probability	Magnitude/ Severity	Current Mitigation Actions (2010)
Avalanche	Sangre de Cristo Mtns.	1 fatality in 2008 (Little Bear Peak)	Occasional	Limited	Public awareness
Drought	Countywide	1976-1977/2000-2003/ 2004/2006/2008	Likely	Critical	Drought Preparedness Action Guide
Earthquake	Sangre de Cristo Fault	Blanca-Fort Garland Earthquake (12-28-03)	Unlikely	Catastrophic	Land use regulations
Flood	Rio Grande River	1970/1973/1984/1985-1987/1977/1979	Likely	Catastrophic	NFIP, mapping, floodplain management, Rio Grande Restoration Plan
Flash Flood	Countywide		Likely	Limited	Floodplain and storm water management
Hail	Countywide	10 events	Likely	Limited	Public awareness
Landslide	Sangre de Cristo Mtns.	None on record	Occasional	Limited	Power line redundancy
Levee Failure	Rio Grande River	None on record	Occasional	Catastrophic	Address USACOE inspection eligibility study
Lightning	Countywide	1973/1996/1997/2003/ 2007 (1 fatality in 2003)	Likely	Limited	Public awareness, power line redundancy
Severe Winter Storm	Countywide	12 events (largest: 12-23-1982 blizzard)	Likely	Critical	Public awareness, public shelters, power line redundancy
Tornado	Countywide	12 events (all F0 or F1)	Likely	Critical Limited	Public awareness, power line redundancy
Wildfire	Countywide, particularly NE quadrant	1973/2000/2006/2007/ 2010	Likely	Limited	Evacuation planning, public awareness, power line redundancy
Windstorm	Countywide	24 events	Highly Likely	Limited	Power line redundancy

Hazard Rating Guide

Location — Geographic extent and participating jurisdictions affected

Previous Occurrences — Known hazard incidents and information related to impacts

Probability — **Highly Likely** – Annual event or occurs at least once per year (~100% chance)
Likely – Recurrence interval of 10 years or less (10-100% chance/year)
Occasional – Occurs every 11-100 years (1-10% chance/year)
Unlikely – Occurs greater than every 100 years (<1% chance in next 100 years)

Magnitude/Severity

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

Mitigation Categories

Mitigation Type	Description	Examples
Local Plans and Regulations	These actions include government authorities, policies, or codes that influence the way land and buildings are developed and built.	·Comprehensive plans ·Land use ordinances ·Subdivision regulations ·Development review ·Building codes/enforcement ·NFIP Community Rating System ·Capital improvement programs ·Open space preservation ·Stormwater management plans and regulations
Structure and Infrastructure Protection	These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.	·Acquisition/removal of structures in hazard-prone areas ·Utility undergrounding ·Structural retrofits ·Floodwalls and retaining walls ·Detention/retention structures ·Culverts ·Safe rooms
Natural Systems Protection	These are actions that minimize damage and losses and also preserve or restore the functions of natural systems.	·Sediment and erosion control ·Stream corridor restoration ·Forest management ·Conservation easements ·Wetland restoration and preservation
Education and Awareness Programs	These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as *StormReady* or *Firewise* Communities. Although this type of mitigation reduces risk less directly	·Radio or television spots ·Websites with maps and information ·Real estate disclosure ·Presentations to school groups or neighborhood organizations ·Mailings to residents in hazard-prone areas ·StormReady Communities

	than structural projects or regulation, it is an important foundation. A greater understanding and awareness of hazards and risk among local officials, stakeholders, and the public is more likely to lead to direct actions.	·Firewise Communities

STAPLEE Method for Evaluating and Prioritizing Mitigation Actions

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

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

2010 Mitigation Actions and Responsible Agencies

#	Description/Benefits	Lead Agency	Status	Priority
Alamosa County				
1	Update floodplain regulations throughout county	Land Use		
2	Update/Adopt County DFIRMs	Land Use		
3	Implement the Rio Grande Restoration Plan	SLV WCD		
4	Facilitate construction of power line redundancy	Land Use		
5	Increase public awareness for severe weather	OEM		
6	Increase shelter capacity throughout the county (coordinate with the Red Cross)	American Red Cross		
7	Prepare a Drought Preparedness Action Guide	OEM		
8	Revise land use regulations to include earthquake and wildfire mitigation	Land Use		
9	Develop accessibility/evacuation routes for Zapata subdivision (planning phase)	OEM		

10	Continue to improve involvement in the NFIP and improve classification rating for the Community Rating System (CRS)	Land Use		
11	Study Base Flood Elevation (BFE) mapping opportunities	OEM		
12	Conduct study and develop plan for shelters and vulnerable populations (esp. Hooper)	OEM		
13	Incorporate student population into mitigation studies, actions, and/or planning	OEM		
City of Alamosa				
14	Address issues raised in the US Army Corps of Engineers Study Continuing Eligibility Inspection (CEI) 9/15/2008	Public Works		
15	Continue to improve involvement in the NFIP and improve classification rating for the Community Rating System (CRS)	Land Use Administrator/City of Alamosa		
16	Study Base Flood Elevation (BFE) mapping opportunities	OEM, City of Alamosa		
17	Conduct study and develop plan for shelters and vulnerable populations (esp. Hooper)	OEM, City of Alamosa		
18	Incorporate student population into mitigation studies, actions, and/or planning	OEM, City of Alamosa		
19	Revise land use regulations to include earthquake and wildfire mitigation	Land Use Administrator/City of Alamosa		
20	Facilitate construction of power line redundancy	Land Use Administrator/City of Alamosa		
21	Increase public awareness for severe weather	OEM, City of Alamosa		
Town of Hooper				
22	Conduct study and develop plan for shelters and vulnerable populations (esp. Hooper)	OEM/Town of Hooper		
23	Increase public awareness for severe weather	OEM/Town of Hooper		
Alamosa County Fire Protection District				
24	Develop accessibility/evacuation routes for Zapata subdivision (planning phase)	OEM/ACFPD		
25	Increase public awareness for severe weather	OEM/ACFPD		
Rio Grande Water Conservation District				
26	Implement the Rio Grande Restoration Plan	SLV WCD/RGWCD		
27	Prepare a Drought Preparedness Action Guide	SLV WCD/RGWCD		

Identifying and Prioritizing Potential Mitigation Actions

I. Types of Mitigation Actions

Local Plans and Regulations

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

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

Structure and Infrastructure Projects

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

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

Natural Systems Protection

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

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

Emergency Services

These are actions that improve public health and safety.

- Warning systems

- Critical facilities protection

Education and Awareness Programs

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

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

II. STAPLEE Method

Social
Technical
Administrative
Political
Legal
Economic
Environmental

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

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

Appendix E
Disaster Mitigation Act of 2000 (DMA 2000) Summary

SUMMARY

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

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

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

Authorizes the President to establish the National Predisaster Mitigation Fund.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Appendix F
FEMA Plan Review Tool

(Pending)

Appendix G
Record of Adoption

(Pending)