Ouray County

Multi-Hazard Mitigation Plan

Comprehensive Update

2019



Prepared by Ouray County with professional planning assistance provided by CDR Maguire

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1. Introduction

1.1. Purpose

Ouray County, including the participating jurisdictions of the City of Ouray, the Town of Ridgway, and Log Hill Mesa Fire Protection District, has prepared this local hazard mitigation plan to guide hazard mitigation planning to better protect the people and property of the County from the effects of hazard events. This plan demonstrates the community's commitment to reducing risks from hazards and serves as a tool to help decision makers direct mitigation activities and resources. The plan is intended to be a living document through ongoing implementation and regular updates every five years. The original plan was developed in 2008 and updated in 2013 and 2019.

This plan was also developed to make Ouray County and participating jurisdictions eligible for certain federal disaster assistance, specifically, the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Assistance (HMA) grant programs, as well as to make the County more disaster resistant.

1.2. Background and Scope

Each year in the United States, disasters take the lives of hundreds of people and injure thousands more. Nationwide, taxpayers pay billions of dollars annually to help communities, organizations, businesses, and individuals recover from disasters. These monies only partially reflect the true cost of disasters, because additional expenses to insurance companies and nongovernmental organizations are not reimbursed by tax dollars. Many disasters are predictable, and much of the damage caused by these events can be alleviated or even eliminated.

Hazard mitigation is defined by FEMA as "any sustained action taken to reduce or eliminate long-term risk to human life and property from a hazard event." Hazard mitigation planning is the process through which hazards that threaten communities are identified, likely impacts of those hazards are determined, mitigation goals are set, and appropriate strategies to lessen impacts are determined, prioritized, and implemented. This plan documents Ouray County's hazard mitigation planning process, identifies relevant hazards and risks, and identifies the strategy the County and participating jurisdictions will use to decrease vulnerability and increase resiliency and sustainability.

The Ouray County Hazard Mitigation Plan is a multi-jurisdictional plan that geographically covers everything within Ouray County's jurisdictional boundaries. Unincorporated Ouray County and the following communities and special districts participated in the planning process:

- Ouray County
- City of Ouray
- Town of Ridgway
- Log Hill Mesa Fire Protection District

This plan was prepared pursuant to the requirements of the Disaster Mitigation Act of 2000 (Public Law 106-390) and the implementing regulations set forth by the Interim Final Rule published in the Federal Register on February 26, 2002 (44 CFR §201.6) and finalized on October 31, 2007. (Hereafter, these requirements and regulations will be referred to collectively as the Disaster Mitigation Act - DMA.) The 2007 amendments also incorporate mitigation planning requirements of the Flood Mitigation Assistance

(FMA) program authorized by the National Flood Insurance Act of 1968. While the DMA emphasized the need for mitigation plans and more coordinated mitigation planning and implementation efforts, the regulations established the requirements that local hazard mitigation plans must meet in order for a local jurisdiction to be eligible for certain federal disaster assistance and hazard mitigation funding under the Robert T. Stafford Disaster Relief and Emergency Act (Public Law 93-288). Because the Ouray County planning area is subject to many kinds of hazards, access to these programs is vital.

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

1.3. Plan Organization

The Ouray County Hazard Mitigation Plan is organized in several chapters and appendices as follows.

- Chapter 1: Introduction
- Chapter 2: Community Profile
- Chapter 3: Planning Process
- Chapter 4: Hazard Identification and Risk Assessment (HIRA)
- Chapter 5: Mitigation Strategy
- Chapter 6: Plan Maintenance, Revision, and Integration
- Appendix A: Meeting Sign-in Sheets and Agendas
- Appendix B: Public Involvement
- Appendix C: HIRA Appendix
- Appendix D: Jurisdictional Plan Adoptions
- Appendix E (for official use only): Critical Facilities and Dam Inundation Appendix

2. Ouray County Community Profile

2.1. Geography and Climate

Located in the mountains of southwest Colorado, Ouray County is known as the "Switzerland of America". The County's terrain ranges from the San Juan Mountains in the south, through the fertile Uncompahgre River Valley, to rolling foothills and mesa lands in the north. It is a land of steep gorges, towering peaks, tumbling waterfalls, high mesas, and green pastures. It is bordered by Montrose County to the north and northwest, San Miguel County to the west, San Juan County to the south, Hinsdale County to the southeast, and Gunnison County to the northeast.

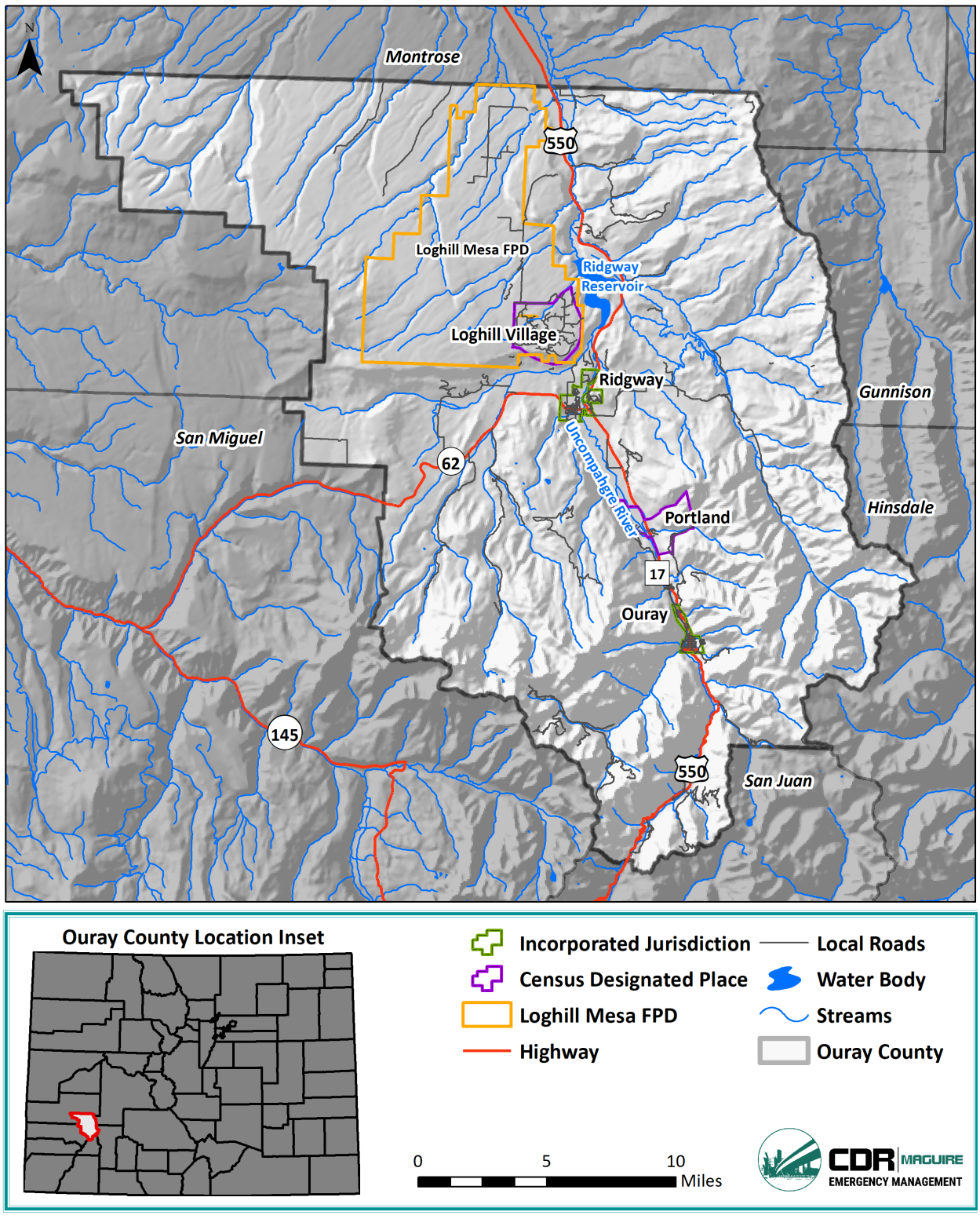
Ouray County encompasses 542 square miles (2 square miles are water), and includes two incorporated municipalities:

- The City of Ouray is located at an elevation of 7,800 feet and has a total area of 0.8 square miles, all of it land.
- The Town of Ridgway is located at an elevation of 7,000 feet and has a total area of 2.0 square miles, all of it land.

The Uncompahgre River flows northwesterly through the County. The climate in the river basin, which is not limited to Ouray County, is semiarid, but rainfall and temperatures vary widely with elevation. Average annual precipitation ranges from 13 inches in the Colona-Ridgway area to as much as 40 inches in the mountains. Approximately 30 to 40% of the precipitation is snowfall. The area is also subject to cloudbursts. The frost-free period averages approximately 127 days annually, and varies from 112 days at higher elevations to 148 days in the valleys. Vegetation in the area consists of piñon, juniper, sagebrush, oak brush, and ponderosa pine, with dense spruce/fir forests in the Alpine Zone. A basemap of Ouray County is shown in Figure 2-1.

Figure 2-1 Ouray County Basemap

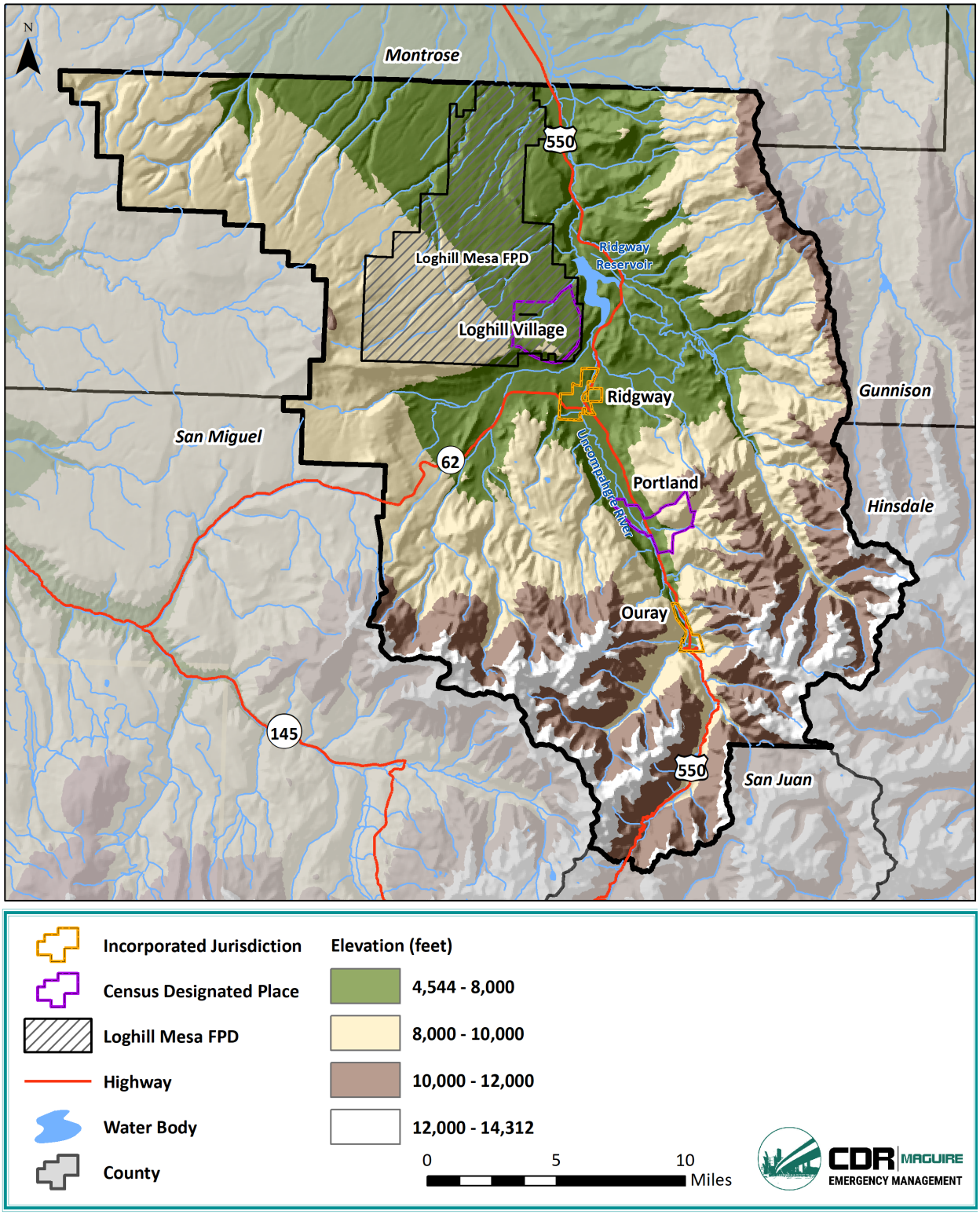
Ouray County Basemap



The elevation of Ouray County is shown in Figure 2-2. The highest elevations are found in the San Juan Mountains in the southern County. Elevations of the jurisdictions are lower than in unincorporated areas, but it is evident the elevation rises quickly outside of the City of Ouray. Ouray County's topography is an important component to the hazards the County experiences.

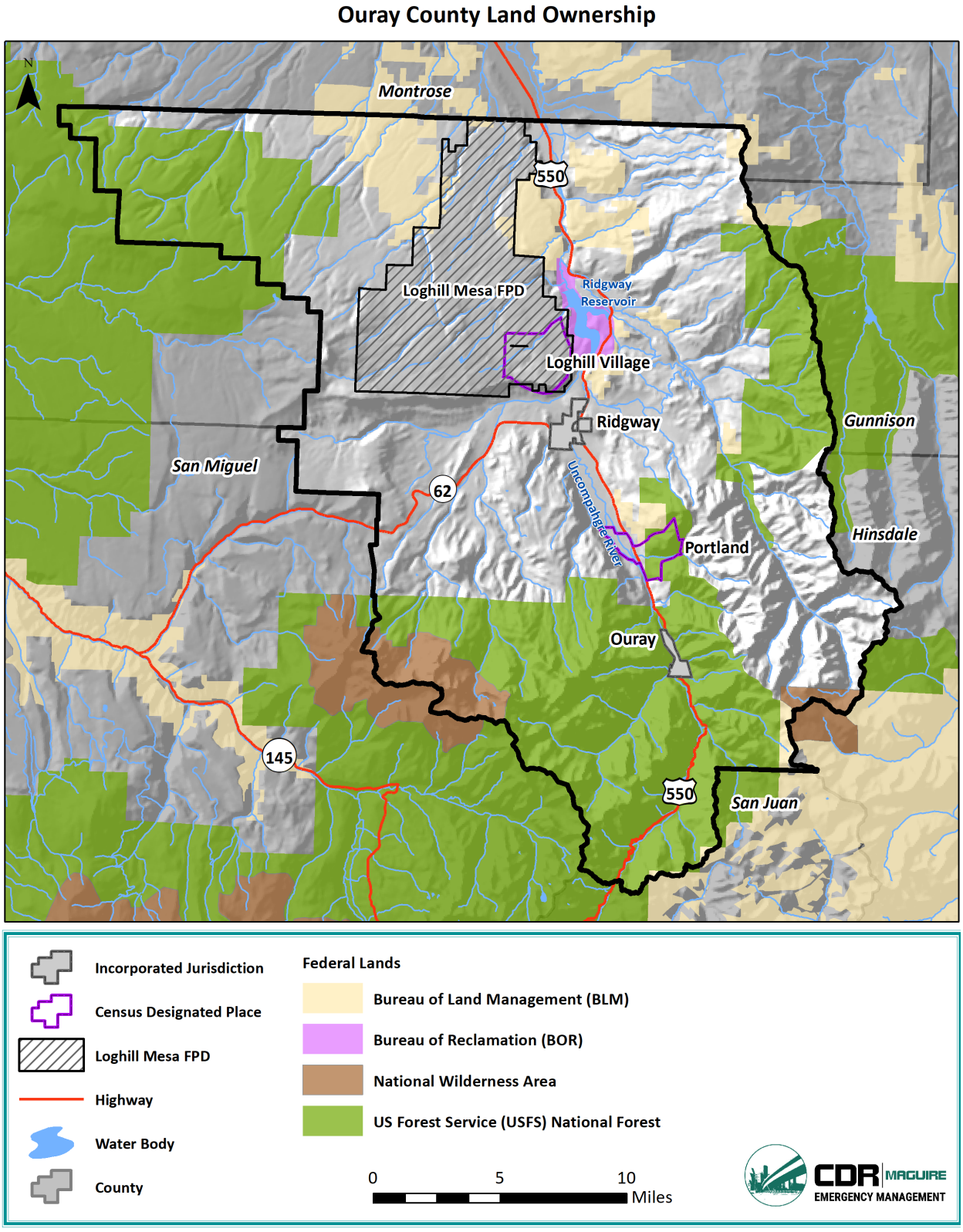
Figure 2-2 Ouray County Elevation

Ouray County Elevation



Additionally, Ouray County has a substantial amount of federally owned public land. Notably, the Uncompahgre National Forest covers large swaths of the southern portions of the County, surrounding the City of Ouray, as well as portions of the northwest and northeast sections of the County. The Mt. Sneffels Wilderness Area is located in the southwest corner of the County, contained in the Uncompahgre National Forest. Bureau of Land Management (BLM) lands can also be found throughout the central and northern portions of the County. Figure 2-3 shows federal lands in Ouray County.

Figure 2-3 Federal Lands in Ouray County



2.1.1. Climate Change

Climate changes have already been observed in Colorado. Statewide, annual average temperatures have increased by 2.0 degrees Fahrenheit over the past 50 years.[1] Notable observed changes in the climate that impact Ouray County include:

- Daily minimum temperatures in Colorado have warmed more than daily maximum temperatures during the past 30 years. Temperatures have increased in all seasons, with the largest trend in summer, followed by fall, spring, and winter.
- Snowpack, as measured by April 1 snow-water equivalent (SWE), has been mainly below-average since 2000 in all of Colorado's river basins, but no long -term (30-year, 50-year) declining trends have been detected.
- The timing of snowmelt and peak runoff has shifted earlier in the spring by 1 to 4 weeks across Colorado's river basins over the past 30 years, due to the combination of lower SWE since 2000, the warming trend in spring temperatures, and enhanced solar absorption from dust-on-snow.
- The Palmer Drought Severity Index (PDSI) shows a trend towards more severe soil-moisture drought conditions in Colorado over the past 30 years, reflecting the combination of the below-average precipitation since 2000 and the warming trend. However, tree-ring records and other paleoclimate indicators for Colorado show multiple droughts prior to 1900 that were more severe and sustained than any in the observed record.

Notably, Ouray County relies on winter snowpack and spring runoff for tourism, water supply, and to reduce drought conditions. The impacts of these climate changes on each hazard is described in the individual hazard profiles where applicable.

2.2. History

Before the gold rush of the mid-1800s brought settlers to Ouray County, Colorado's western slope was home to the Ute Indians. The valley of the Uncompahgre River, which runs through the County, was the traditional homeland of the Uncompahgre Band of Utes. Established by the Colorado State Legislature in January 1877, Ouray County was actually named for the Ute chief who opened the San Juan Mountains to white settlers in 1874 with the signing of the Brunot Treaty.

The history of Ouray County is diverse. Colona, in the north, was settled in 1874 and became a supply point and old stage stop. The City of Ouray was born the next year following the discovery of gold in surrounding areas. What began as a mining camp grew into a town, which was incorporated in October 1876, the same year that Colorado became a state. By the turn of the century, all the major mining areas in the County had been developed. Ridgway was officially established as a railroad and ranching center in 1890, with the incorporation of the Rio Grande Southern Railroad Company to connect the Denver and Rio Grande Railroad's Ouray and Durango branches.

Much of the County's historic past is still evident today. The entire City of Ouray is registered as a National Historic District, with most of the buildings dating back to the late nineteenth century.

[1] Lukas, J., Barsugli, J., Doesken, N., Rangwala, I., and Wolter, K. (2014). Climate Change in Colorado: A Synthesis to Support Water Resources Management and Adaptation.

2.3. Population

The estimated 2017 county population in Ouray County was 4,783 people. The 2017 estimated population for the City of Ouray was 1,034, the Town of Ridgway 1,003, and unincorporated County 2,746.[2] All jurisdictions have experienced an increase in population since the last Ouray County Hazard Mitigation Plan. Table 2-1 shows population information from 2000 to 2017 for Ouray County.

Table 2-1 Ouray County Population

Jurisdiction	2000*	2010*	2017**	% Change 2010 to 2017	% Change 2000 to 2017
City of Ouray	813	1,000	1,034	3%	27%
Town of Ridgway	713	924	1,003	9%	41%
Unincorporated County	2,216	2,512	2,746	9%	24%
Total	**3,742**	**4,436**	**4,783**	**8%**	**28%**

*U.S. Census Bureau

**Colorado Demography Office, 2017 population estimates

Select demographic information for Ouray County is shown in Table 2-2.[3] Certain demographic characteristics such as age, disability, living in a mobile home, and language spoken can increase a population's vulnerability to the impacts of hazard events. Some notable takeaways are that the City of Ouray has a higher percent of individuals 65 years and older than the rest of the County. Additionally, the City of Ouray has a higher percent of individuals living in mobile homes. The relation to vulnerability is discussed more thoroughly in each hazard profile's vulnerability assessment. It should be noted that in populations as small as Ouray County, Census data is less precise, and these statistics are to be used as general trends.

Table 2-2 Ouray County Select Demographic Characteristics

Characteristic	Ouray County	City of Ouray	Town of Ridgway
Gender/Age			
Male (%)	50.7	48.1	46.5
Female (%)	49.3	51.9	53.5
Under 5 years (%)	3.7	3.3	3
65 years and over (%)	26.1	32	18
Race/Ethnicity			

[2] Colorado Department of Local Affairs, State Demography Office

[3] U.S. Census Bureau, 2017 ACS

Characteristic	Ouray County	City of Ouray	Town of Ridgway
White (%)	96.2	96.9	95
American Indian/Alaska Native (%)	0.9	0	1.4
Asian (%)	0.7	3.1	0
Black or African American (%)	0.1	0	0
Native Hawaiian or other Pacific Islander (%)	0.2	0	0.4
Hispanic or Latino (of any race) (%)	6.2	5.4	8.1
Two or more races (%)	1.9	0	3.2
Education			
High school graduate or higher (%)	98	96	99.5
Disability			
Total civilian noninstitutionalized population (%)	11.8	8.3	7
Mobile Homes			
Mobile Homes (%)	8.6	9.8	0.5
Language			
Speaks English less than “very well” (%)	0.7	0	2

2.4. Government

The Board of Commissioners is the governing body for Ouray County. Each of the three members serves a four-year term. They are elected from each of three districts, but by the County electorate as a whole. County government has very limited legislative power per state statute.

The City of Ouray is a home rule city and the county seat of Ouray. The City may govern its own affairs within certain limits, but authority to exercise powers is derived from state statutes. It is governed by the City Council, which consists of five elected officials: four representatives and the mayor are elected at large.

The Town of Ridgway is a home rule municipality. The Town Council consists of seven members, including the mayor and the mayor pro tem, who are elected for two-year terms.

2.5. Economy

Agriculture and mining were traditionally the most important economic activities in Ouray County, but in the last few decades, recreation and tourism have taken the lead. According to the Colorado Demography Office 2017 data, the industries that employed the most people in Ouray County were

accommodation and food services (18%), government (14%), and construction (11%). In 2017, agriculture employed 7% of the County population and mining just 1%.

Tourism is a vital part of the Ouray County economy, particularly for the City of Ouray. According to the Ouray Chamber Resort Association 2017 Annual Report, visitors spent $27.2 million in 2016 in the County. Visitors are largely concentrated in the spring through fall months, and the most visitors come in the summer months. This trend is likely to continue with marketing efforts in the County, as well as through social media use. This large influx of visitors, particularly during the summer months, creates unique challenges for emergency management in the County since the year-round population does not reflect the swell in population from tourism. Additionally, a major hazard event that reduces access to County businesses that rely on tourism could have detrimental impacts to the economy. These factors are taken into consideration throughout this Plan.

Table 2-3 shows select economic characteristics of the County based on the 2017 U.S. Census ACS.

Table 2-3 Ouray County Select Economic Characteristics

Characteristic	Ouray County	City of Ouray	Town of Ridgway
Persons below Poverty Level (%)	7.7	11.2	18.9
Median Home Value ($)	420,600	356,100	372,200
Median Household Income ($)	61,333	63,558	43,438
Population in Labor Force (%)	60.6	61.2	68.7
Unemployment (%)	5.9	1.9	3.1

2.6. Loghill Mesa Fire Protection District (FPD)

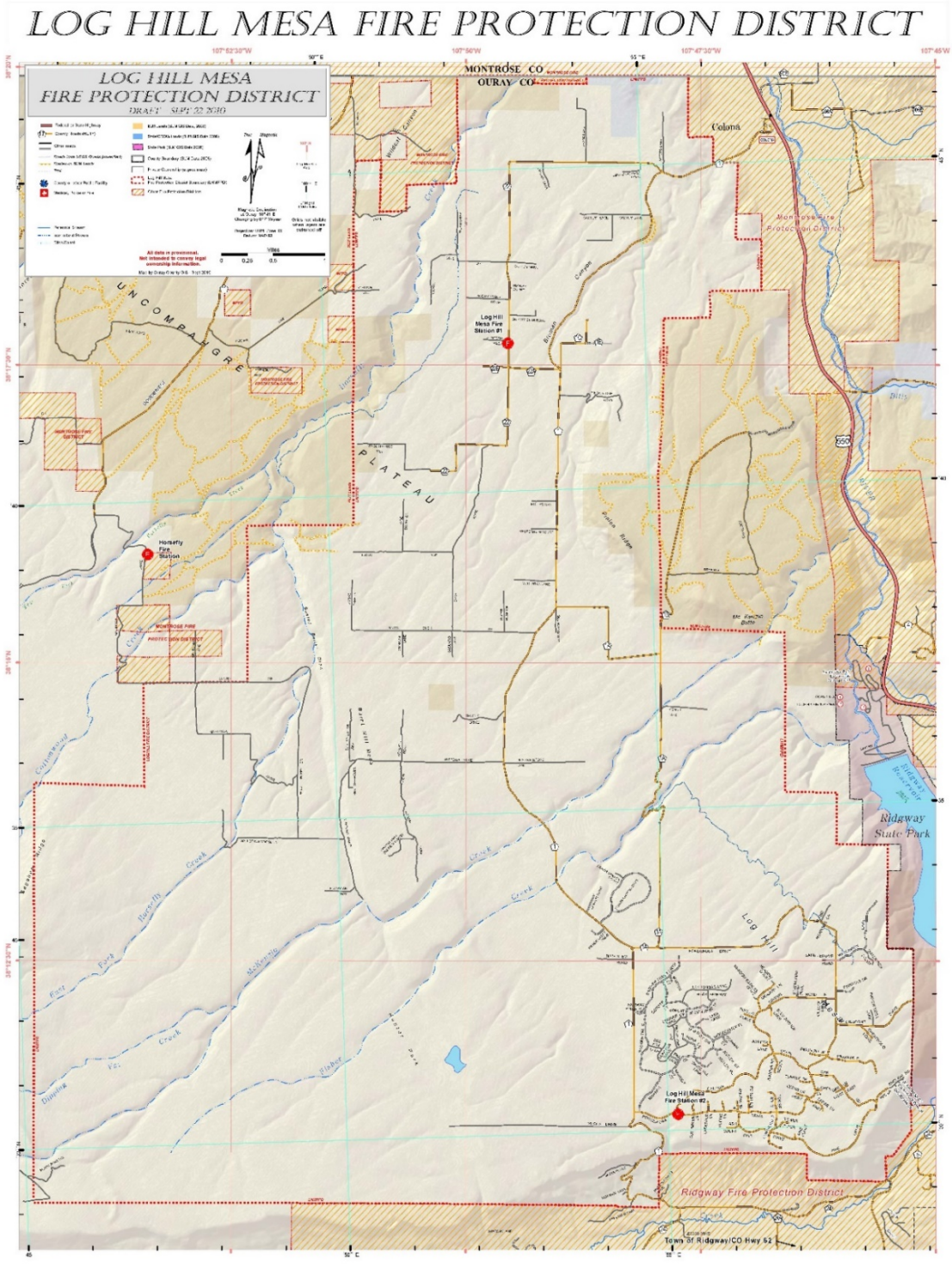
The Loghill Mesa FPD is located in the north/central portions of unincorporated Ouray County, between Montrose and Ridgway. The District itself occupies Log Hill Mesa, which is the southern tip of the Uncompahgre Plateau, a major land feature that runs from Grand Junction to Ridgway. With an average elevation of 8,000 feet, the District is approximately 9 miles wide and 11 miles long, and its 65 square miles represents about 10% of the County's land area. However, the District is more heavily populated than the rest of the County and contains approximately 20% of the County's residences. Structures in the District are almost exclusively single-family residential with some ranch buildings and include several high density pockets primarily at the south end, with the bulk of the District consisting of isolated structures interspersed with ranchland and piñon/juniper forest.

Due to the intermingling of fields and forests with residential areas, the Fire Department is equipped and trained for a dual role, that of fighting not only structural but also wildland fires. The District is governed by a Board of Directors, which administers a budget funded by property taxes, grants and donations. The Board provides policy and guidance to the Fire Department, an all-volunteer organization. With three facilities, more than a dozen apparatus, and a dedicated cadre of some 30

firefighters, the Fire Department is an integral partner in the County's emergency services' capabilities and resources.[4] Figure 2-4 shows a detailed map of the District.[5]

[4] http://www.loghillfire.org/overview.php
[5] http://www.loghillfire.org/district.php

Figure 2-4 Loghill Mesa FPD Map



2.7. Development Trends

As part of the planning process, the Planning Team looked at growth and development trends. These trends are examined further in the context of each hazard in the HIRA, and how the changes in growth and development affect vulnerability to hazards.

According to the U.S. Census Bureau, the 2017 estimated population of Ouray County was 4,783. This is an increase of 8% percent from the 2010 Census population of 4,436. Although still an increase in population, this is a smaller increase than was experienced during the previous hazard mitigation planning cycle for the County, where there was an 18.5% increase in population from 2000 to 2010.

Table 2-4 shows the total population, number of housing units, and percent change for each by jurisdiction between 2010 and 2017. The largest growth during this time period was experienced in Ridgway and unincorporated County, both experiencing a 9% increase in population. Additionally, Ridgway has experienced the highest increase in housing units from 2010 to 2017, with a 24% increase. During this time the City of Ouray experienced a loss in housing units (-7%), and unincorporated areas experienced a slight increase of 4% change.

Table 2-4 Ouray County Population and Housing Change from 2010 to 2017

Jurisdiction	2010 Population	2017 Population	# Change	% Change	2010 Housing Units	2017 Housing Units	# Change	% Change
City of Ouray	1,000	1,034	34	3%	800	743	-57	-7%
Town of Ridgway	924	1,003	79	9%	511	632	121	24%
Unincorporated County	2,512	2,746	234	9%	1,772	1,840	68	4%
Total	**4,436**	**4,783**	**347**	**8%**	**3,083**	**3,215**	**132**	**4%**

Population forecasts are produced annually by the State Demography Office on a County scale. Growth is projected to occur steadily through 2050. Table 2-5 shows the population projections for the County through 2050 and the percent change from the 2017 population.

Table 2-5 Ouray County Population Forecast through 2050

	2017	2020	2025	2030	2035	2040	2045	2050	2017-2050 % Change
Population	4,783	4,934	5,101	5,205	5,308	5,424	5,557	5,710	19%

2.7.1. Jurisdictional Growth

Development within the Town of Ridgway is guided by the Initial Growth Boundary (IGB), which delineates the area within which the Town will encourage urban levels of development in the next 10 to

20 years. The boundary includes areas that are contiguous to established parts of Ridgway that are already served by Town services, and to which utility extensions could logically and efficiently be provided. The purpose of the IGB is to support the community's desire to grow in an orderly, logical and sequential pattern outward from the existing town core. In general, urban levels of development outside the IGB would be considered premature until substantial development has occurred within the boundary.

Second, the Urban Growth Management Area (UGMA), establishes the long-term future municipal boundary for both the Town of Ridgway and City of Ouray. This boundary lies within Ouray County and outside the current municipal limits, but its designation is not intended to motivate annexation or development. The UGMA is intended to establish a boundary for future urban development and to make general land-use designations within that boundary to meet foreseeable future needs of the County and the municipalities, for example, by maintaining very low densities in these areas to preserve the land for future urban levels of development. To achieve this outcome, the County and municipalities will coordinate their planning efforts and land-use decision-making through specific intergovernmental agreement(s) (IGAs) that identify actions, responsibilities, jurisdictions and goals for the respective parties to the IGA.[6]

A concerted effort has been made to focus growth in the County to the existing incorporated areas of Ridgway and the City of Ouray. Growth is restricted due to the large amount of public land in the County, notably around the City of Ouray. Additionally, growth in the City of Ouray is confined to a large extent by geography. The City is nearly surrounded by public lands (U.S. Forest Service). Growth has occurred toward the north end of the City that extends into the Uncompahgre River Canyon. The confines of this canyon have limited development potential and is bordered by flood hazard areas from the Uncompahgre River to the west and debris flows from Skyrocket and Bridalveil creeks and other smaller drainages to the east. There has been some growth on steep hillsides around the City that could be prone to rockfall hazards and have difficult or limited access for emergency vehicles.

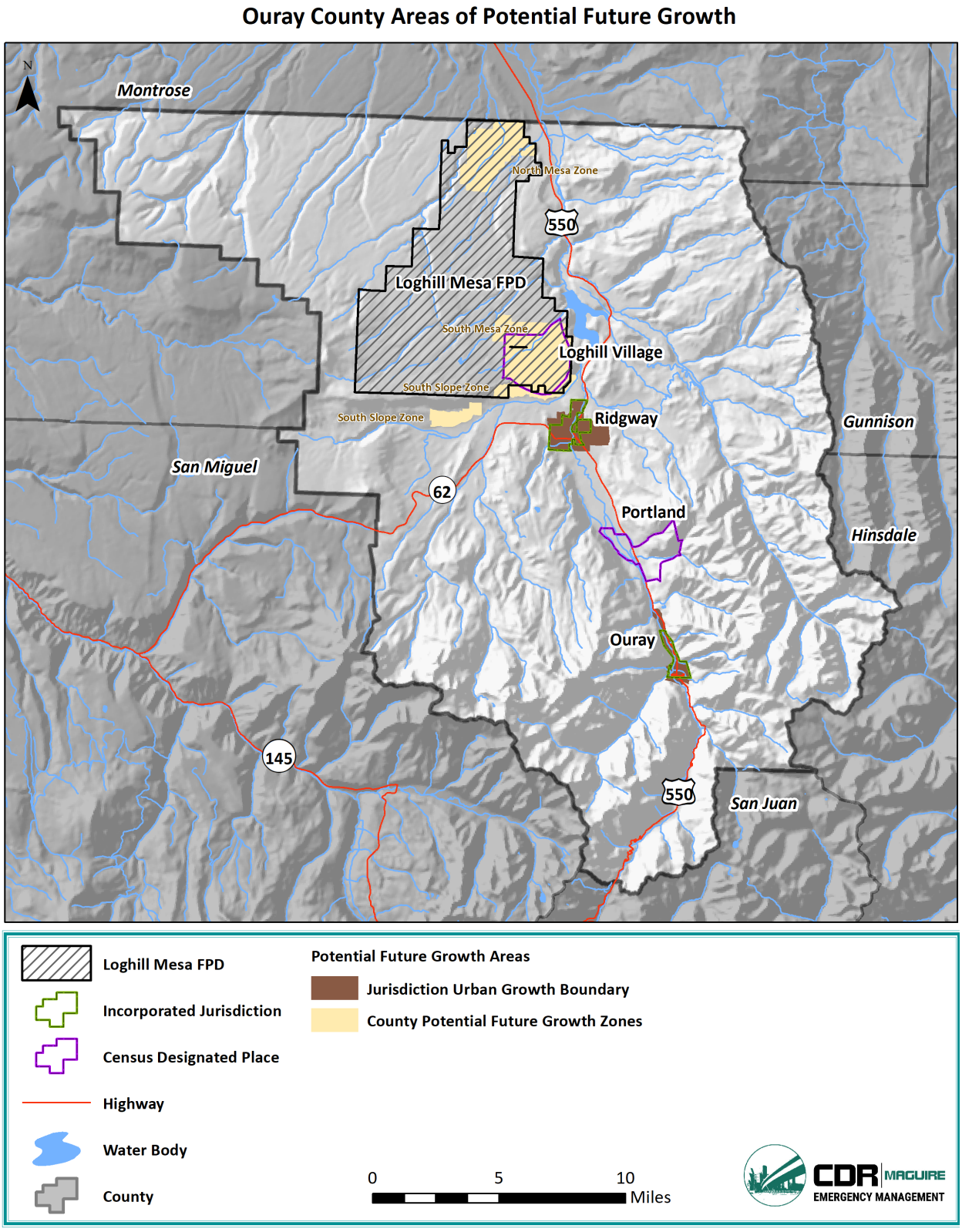
2.7.2. County Growth

As mentioned previously, growth in the County is restricted by the large amounts of public lands. Areas with future development potential in the County are zoned for subdivisions at 1 dwelling unit per 6-acres density. The remaining private land in the County is designated as 1 per 35-acre statutory zoning.[7]

Figure 2-5 shows both jurisdictional UGMA areas, which designate future growth that spans outside of the current jurisdictional boundaries, as well as the areas in the County zoned for 1-per-6 subdivisions, indicating potential future development. These areas for future development will be utilized to assess vulnerability of future development to hazards in each hazard profile.

[6] Town of Ridgway and Ouray County Land Use Departments
[7] Ouray County Land Use Department

Figure 2-5 Ouray County Future Growth



3. Planning Process

3.1. Introduction

This section provides an overview of the planning process used to create the 2019 Ouray County Hazard Mitigation Plan update (Plan). This section includes how the Plan was prepared, who was involved in preparing the Plan, how the public and stakeholders were involved, and the review and incorporation of existing plans and studies.

3.2. Background on Hazard Mitigation Planning in Ouray County

Ouray County Emergency Management recognized the need and importance of this Plan and was responsible for initiating the Plan's original development and 2013 update process, which included securing funding. The first version of this plan was approved by FEMA in 2008. Since the original development of the plan, FEMA guidance for local hazard mitigation plans has been refined and updated. The County contracted with AMEC Environment and Infrastructure (AMEC) in 2008 and 2013 to facilitate and develop a multi-jurisdictional, multi-hazard mitigation plan as well as its update. In 2019, the County contracted with CDR Maguire to facilitate this 2019 update.

3.3. The Planning Process

The planning process was organized in five phases, including:

- Phase I: Organize resources/planning process
- Phase II: Assess risks
- Phase III: Develop the mitigation strategy
- Phase IV: Implement the plan and monitor progress
- Phase V: Plan adoption

The following sections detail each phase of the planning process.

3.3.1. Phase I: Organize Resources

Hazard Mitigation Planning Steering Committee Kickoff Webinar

This phase started with a commitment to updating the Ouray County Hazard Mitigation Plan from the County and participating jurisdictions. Efforts such as refining the scope of the Plan and the schedule; discussing coordination with participating departments and individuals who should be invited to serve on the local planning teams; establishing clear participation standards for all Plan participants; gathering and review of initial data and documents relative to the planning process; clearly defining roles and responsibilities of CDR Maguire and all adopting jurisdictions and entities; discussion of an initial public involvement strategy; and setting dates for the kick-off meeting with the local planning team all identified as important initial planning steps.

Obtaining this information was accomplished by coordination between CDR Maguire and the Ouray County Emergency Manager. A kickoff webinar was held on April 9, 2019 with the Hazard Mitigation

Planning Steering Committee (Steering Committee), listed in the table below. A copy of the agenda can be found in Appendix A.

Table 3-1 Ouray County Hazard Mitigation Planning Steering Committee

Name	Jurisdiction	Title
Glenn Boyd	Ouray County	Ouray County Emergency Manager
Lance Fitzgerald	Ouray County	Ouray Sheriff
Shay Coburn	Town of Ridgway	Town Planner
Justin Perry	City of Ouray	City of Ouray Police Chief
Tom Austin	Loghill Mesa Fire Protection District	Loghill Fire
Connie Hunt	Ouray County	County Administrator
Mark Thompson	State of Colorado	DHSEM
Mike Garner	CDR Maguire	Project Manager
Lisa Clay	CDR Maguire	Project Planner

Major outcomes of the kickoff webinar were a discussion of what went well and what could be improved from the County's previous plans; discussion of how to conduct outreach to the planning team, stakeholders, and the public; communication preferences between the Steering Committee; initial conversation about hazards and major events since the previous plans; and participation standards. It was agreed that there would be three in-person workshops during the planning process to include a planning team kickoff, review of the Hazard Identification and Risk Assessment Results, and a Mitigation Strategy workshop.

The planning team kickoff meeting was scheduled for June. In between in-person meetings, CDR Maguire and Ouray County's Emergency Manager would communicate weekly, or on an as-needed basis. The agreed-upon participation standards were as follows:

CDR Maguire:

- Facilitate the planning process to ensure tasks are being completed in agreement with the project timeline.
- Provide overall planning guidance and plan organization in close coordination with participating jurisdictions.
- Guide the public participation process.
- Overall plan writing and data analysis with input from participating jurisdictions and planning team.
- Ensure the plan meets all FEMA requirements.

Hazard Mitigation Planning Steering Committee:

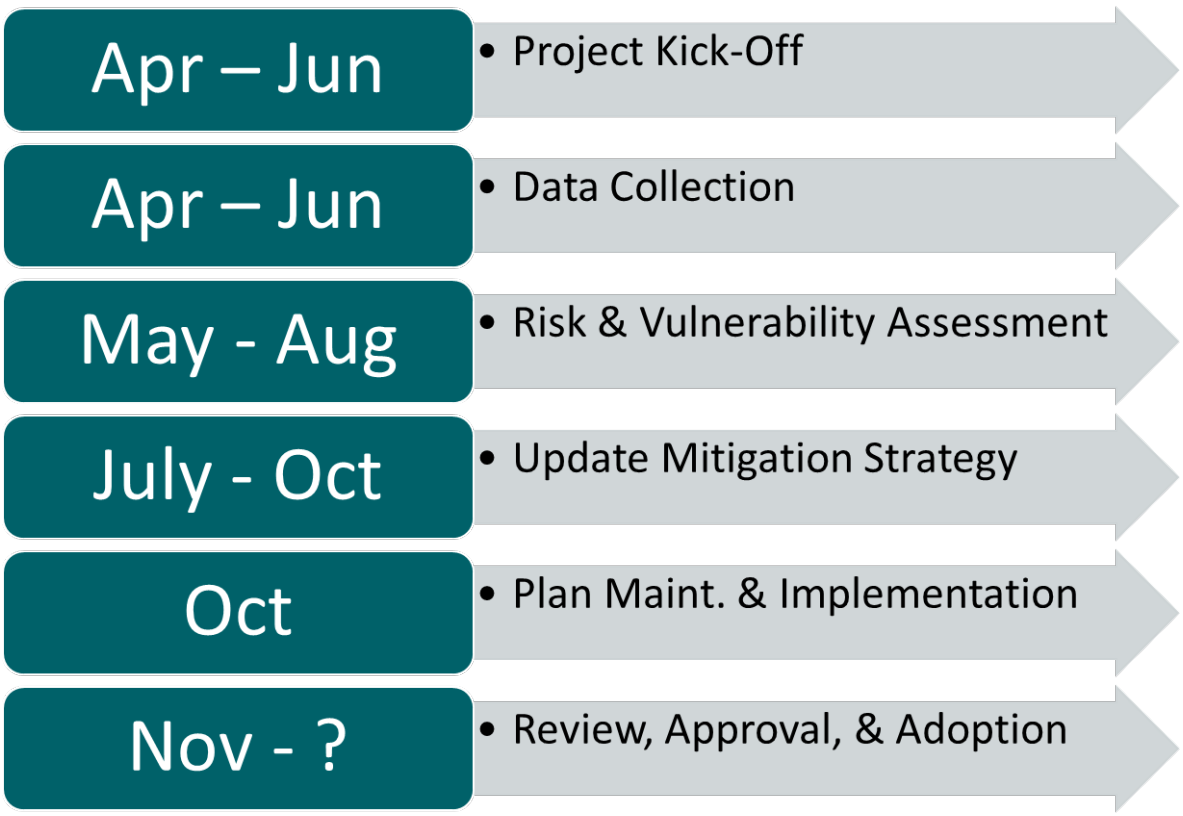
- Work closely with CDR Maguire to ensure data requests are being fulfilled and Plan moves forward on schedule.
- Aids with communication between the planning team, the public, stakeholders, and CDR Maguire.
- Participates in planning team meetings.

Planning Team

- Meeting attendance and participation.
- Providing requested information and data.
- Participation across jurisdictional staff.
- Community and stakeholder involvement and education.
- Review draft plan sections
- Adopt plan as participating jurisdictions.

Figure 3-1 shows the schedule for the planning process.

Figure 3-1 Planning Process Schedule



Local Planning Team Kickoff Meeting

The planning team kickoff meeting was held on June 13, 2019 in Ouray County. The meeting was also offered as a webinar for participants that couldn't attend in-person. In preparation for the kickoff, CDR Maguire coordinated with Ouray County to create a local planning team representing the County, the City of Ouray, the Town of Ridgway, the Loghill Mesa FPD, local stakeholders, and neighboring entities to be invited to the kickoff meeting. The planning team was formed based on the previous Hazard

Mitigation Plan planning team, the current Local Emergency Planning Committee (LEPC), and additional input from CDR Maguire and the Steering Committee. Participants were invited through email. The local planning team is presented in Table 3-2.

Table 3-2 Ouray County Local Planning Team (LPT)

Name	Title	Organization
Ben Tisdel	BOCC	Ouray County
Connie Hunt	County Admin / CFO	Ouray County
Don Batchelder	BOCC	Ouray County
Glenn Boyd	EM	Ouray County
Heidi Pankow	Ouray Tourism Office	Ouray County
Jeff Bockes	GIS	Ouray County
John Peters	BOCC	Ouray County
Kat Papenbrock	Ouray Tourism Office	Ouray County
Kimberly Mitchell	EMS Chief	Ouray County
Lance Fitzgerald	Sheriff	Ouray County
Steven Calkins	Road and Bridge	Ouray County
Susie Mayfield	Assessor	Ouray County
Victoria Durnan	Public Health	Ouray County
Kendra Jenkins	Treasurer's Office	Ouray County
Rosalind Penney	Director Public Health	Ouray County
Tanner Kingery	Deputy Director Public Health	Ouray County
Chris Hawkins	Community Development	City of Ouray
Gary Ray	Acting Police Chief	City of Ouray
Jennifer Miller	PIO	City of Ouray
Joe Coleman	Public Work	City of Ouray
Justin Perry	City Administrator	City of Ouray
Melissa Drake	Finance Director	City of Ouray
Pam Larson	Mayor	City of Ouray

Name	Title	Organization
Chase Jones	Public Works	Town of Ridgway
Jennifer Coates	Town Manager	Town of Ridgway
John Clark	Mayor	Town of Ridgway
Shane Schmalz	Interim Marshal	Town of Ridgway
Shay Coburn	Planner	Town of Ridgway
	Chamber of Commerce	Town of Ridgway
John Rogers	Fire Chief	Loghill Mesa FPD
Tom Austin	Assistant Chief	Loghill Mesa FPD
Bobbie Lucero	EM	Gunnison County
Chris Asborn		USFS - Montrose Interagency Unit
Chris Miller	Fire Chief	Ouray Fire
Courtney Haynes	Wildfire Mitigation Specialist	West Region Wildfire Council
Craig Kaminsky	Training officer/organizer	Ouray FPD
Drew Petersen	Field Manager	State of Colorado
Greg Fisher	EM	Montrose County
Greg Nelson		American Red Cross
Henry Mitchell	EM	San Miguel County
Jamie Gomez	Director	West Region Wildfire Council
Jodi Rist	Forester	CSFS
Kirsten Copeland		State Parks
Kris Stewart	EM	Delta County
Luke Odom	Battalion Chief	DFPC
Mandy Stoll Steimer	Exec. Director	WestCO
Mark Thompson	Mitigation Office	State of Colorado
Mary Kay Wray	Government Ops	American Red Cross
Pam Memcimer		Dallas Creek Water
Patricia Gavelda	Mitigation Office	State of Colorado

Name	Title	Organization
Scott Morrill	EM	Gunnison County
Scott Pankow	Superintendent	Ouray K-12
Susan Lacy	Superintendent	Ridgway K-12
Tad Rowan	Fire Chief	Montrose FPD
Thomas Warnes		Black Hills Energy
Tom Fowlds		Bureau of Reclamation
Trevor Latta	Fire Chief	Ouray FPD
vacant	EM	Hinsdale County
Wiley Freeman		San Miguel Power
	Assistant Chief	Ridgway FPD

Major goals of the kickoff meeting were for the planning team members to understand the process and importance of hazard mitigation planning; understand their roles and responsibilities as members of the planning team; review the stage of the planning process the County was at currently; review data requests; review public involvement strategy; provide an overview of the capabilities assessment; and review next steps in the planning process. The full agenda and sign-in sheets can be found in Appendix A.



Major outcomes of the planning team meeting include finalized hazards to profile in the HIRA; discussion of recent community planning efforts; recent hazard events; and particular problem areas/hazard concerns in the County. Another important discussion was for the public involvement strategy. It was determined that the following tools and resources work the best for public involvement in Ouray County:

- Social media
- Newsletters
- Outreach through schools utilizing “Friday folders” students take home
- Outreach to summer residents through HOAs
- Outreach to campgrounds and short-term rentals through Facebook

The timeline for public involvement was also discussed, and CDR Maguire used this information to further refine the public involvement plan. Data requests, such as critical facilities, were once again

reviewed and the planning team provided input on other relevant plans. The following post-meeting action items were discussed for the local planning team:

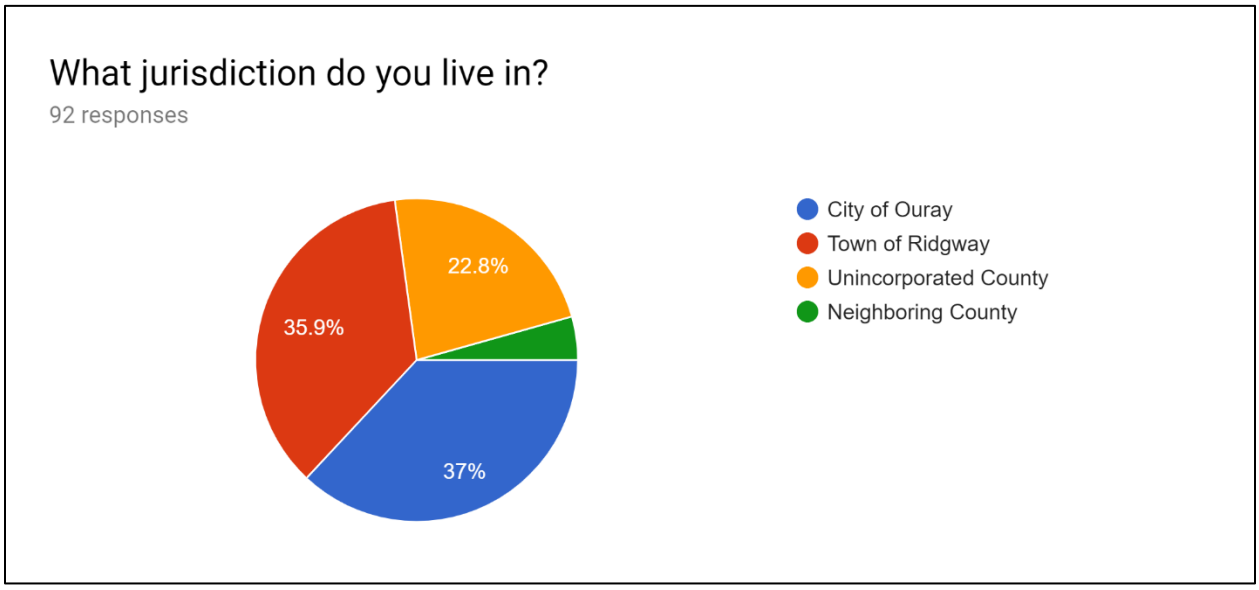
- Provide Best Available Data / Recent Community Plans
- Provide any additional Local Planning Team Participants
- Mitigation Capabilities Input
- Public Involvement Input

Public Involvement

Based on feedback from the Steering Committee and the planning team kickoff meetings, a Public Involvement Plan (PIP) was developed for the County in June 2019. The Steering Committee helped disseminate the PIP to the planning team members for their input on public involvement tools and the timeline to utilize each tool for outreach to the public. Examples of public outreach tools for the County include the County website, social media pages, and a County newsletter; public outreach tools for the City of Ouray include social media pages, newsletter, the City board meetings, school handouts, and in conjunction with the Master Plan update process; public outreach for the Town of Ridgway includes public flyers, social media, newsletter, school handouts, and a Town email; and public outreach for the Loghill Mesa FPD includes public meetings, their website, and social media pages. The completed PIP is provided in Appendix B. With input from the planning team, CDR Maguire helped develop the public outreach material and disseminate it in accordance with the PIP timeline. The timeline also ensured outreach would be utilized in each phase of the planning process so the public remained involved and informed.

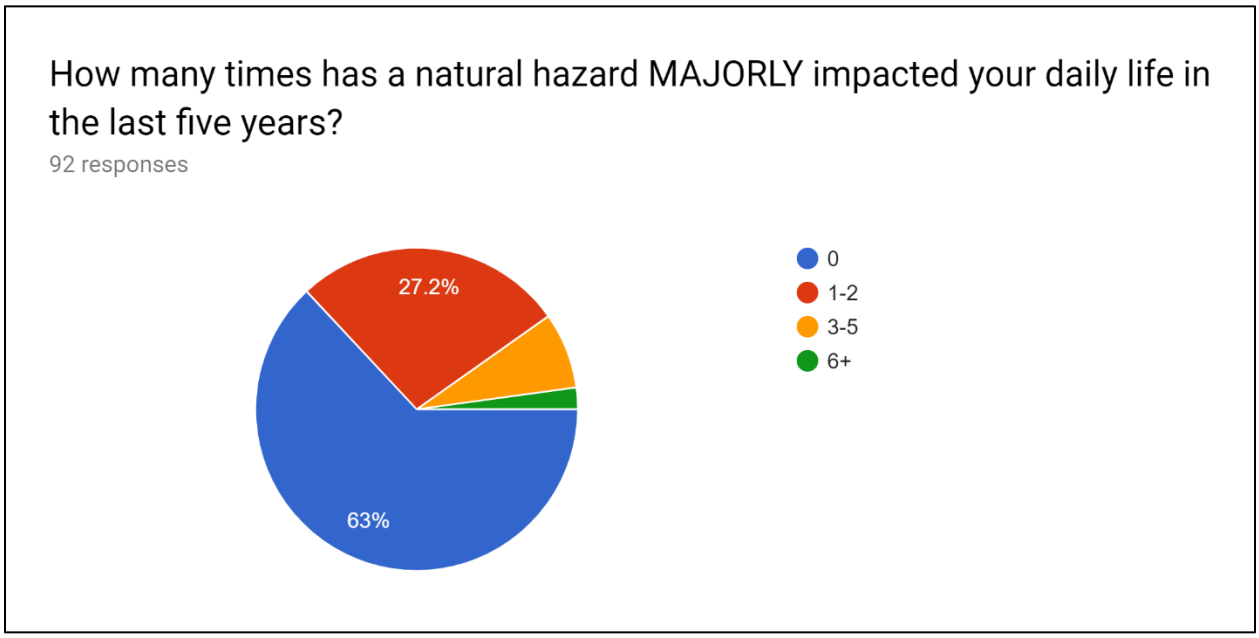
As part of the PIP, two surveys were distributed to the public during the planning process. The first was the Hazard Risk Perception Survey, distributed in August 2019. This survey was sent out to gain an understanding of public knowledge of hazards in their communities, and their perception of what poses the most risk. Overall, the survey gathered 92 responses. Figure 3-2 shows the distribution of the location of participants.

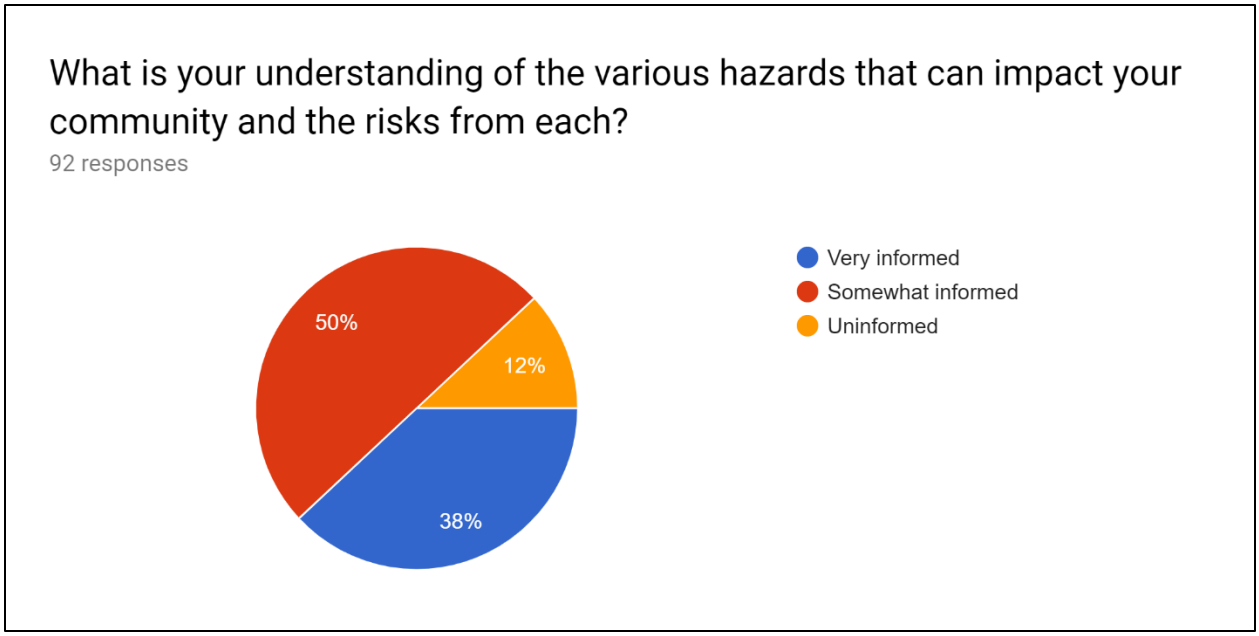
Figure 3-2 Public Survey 1 Responses

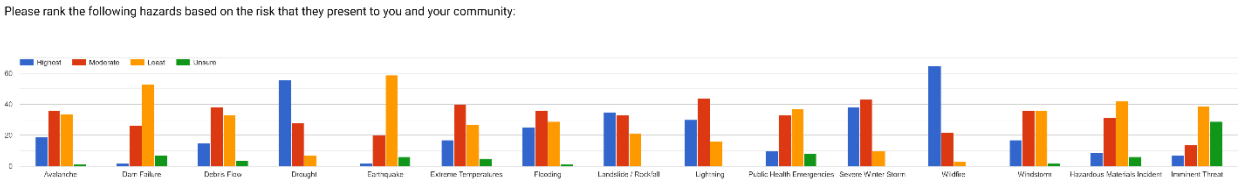


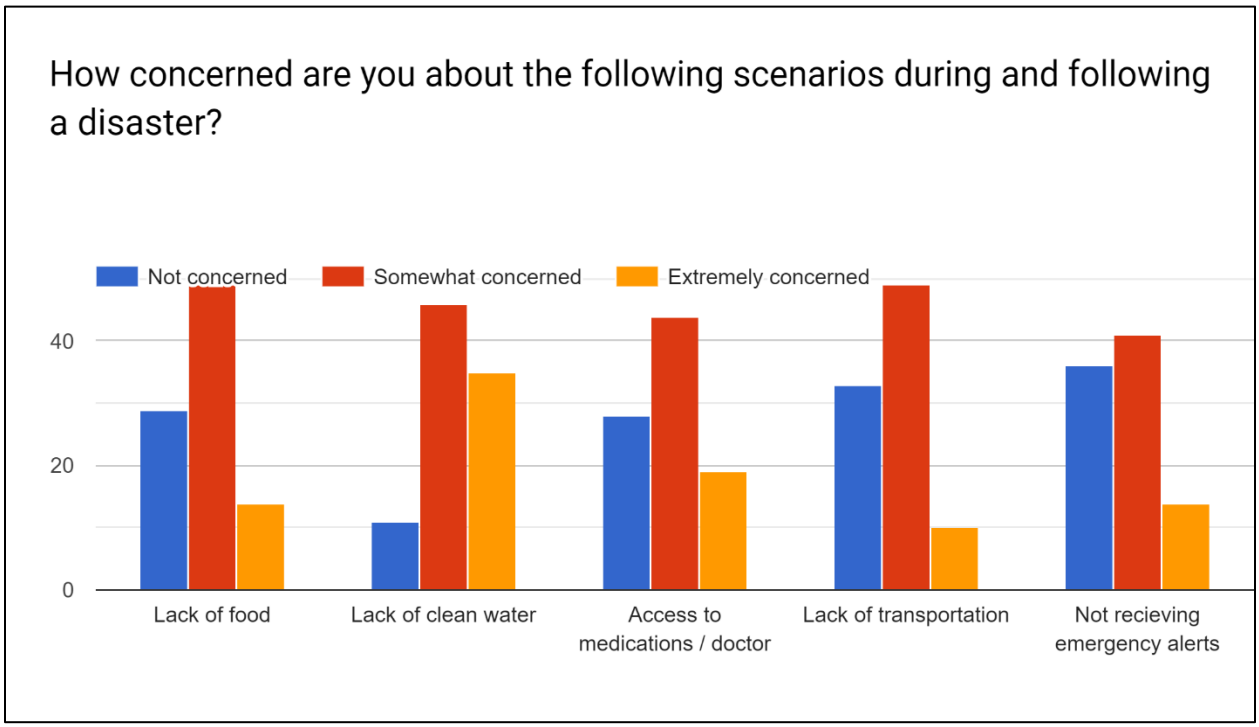
The results are portrayed in the figures below. Key takeaways from this survey are:

- Approximately 37% of the respondents have been majorly impacted by at least one natural hazard in the past five years.
- Only 38% of respondents consider themselves “very informed” on how various hazards can impact their community.
- Respondents ranked wildfire as their highest risk hazard, followed by drought. Earthquake ranked the least risk hazard.
- Lack of clean water was the top concern following disasters. Not receiving emergency alerts was the lowest of concerns.
- Over half of the respondents have an emergency kit, and over 60% have taken action to make their home or neighborhood more resistant to hazards.
- Social media is the most effective way to receive information about hazards by respondents (61%), followed by newspaper/mailings (50%).



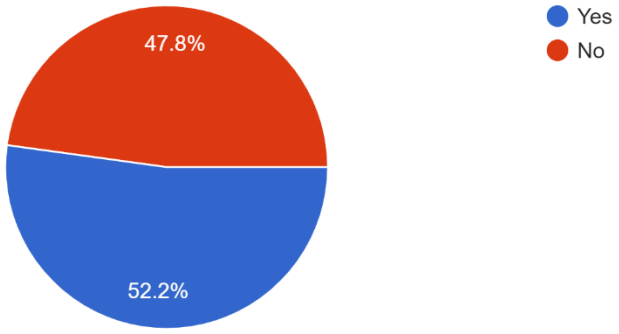

What is your understanding of the various hazards that can impact your community and the risks from each?
92 responses
50%
12%
38%
Very informed
Somewhat informed
Uninformed


Please rank the following hazards based on the risk that they present to you and your community:
Highest
Moderate
Least
Unsure
60
40
20
0
Avalanche
Dam Failure
Debris Flow
Drought
Earthquake
Extreme Temperatures
Flooding
Landslide / Rockfall
Lightning
Public Health Emergencies
Severe Winter Storm
Wildfire
Windstorm
Hazardous Materials Incident
Imminent Threat


How concerned are you about the following scenarios during and following a disaster?
Not concerned
Somewhat concerned
Extremely concerned
40
20
0
Lack of food
Lack of clean water
Access to medications / doctor
Lack of transportation
Not recieving emergency alerts

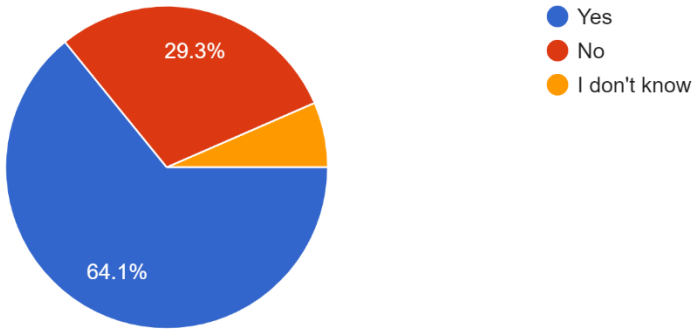
Do you have a emergency preparedness kit?

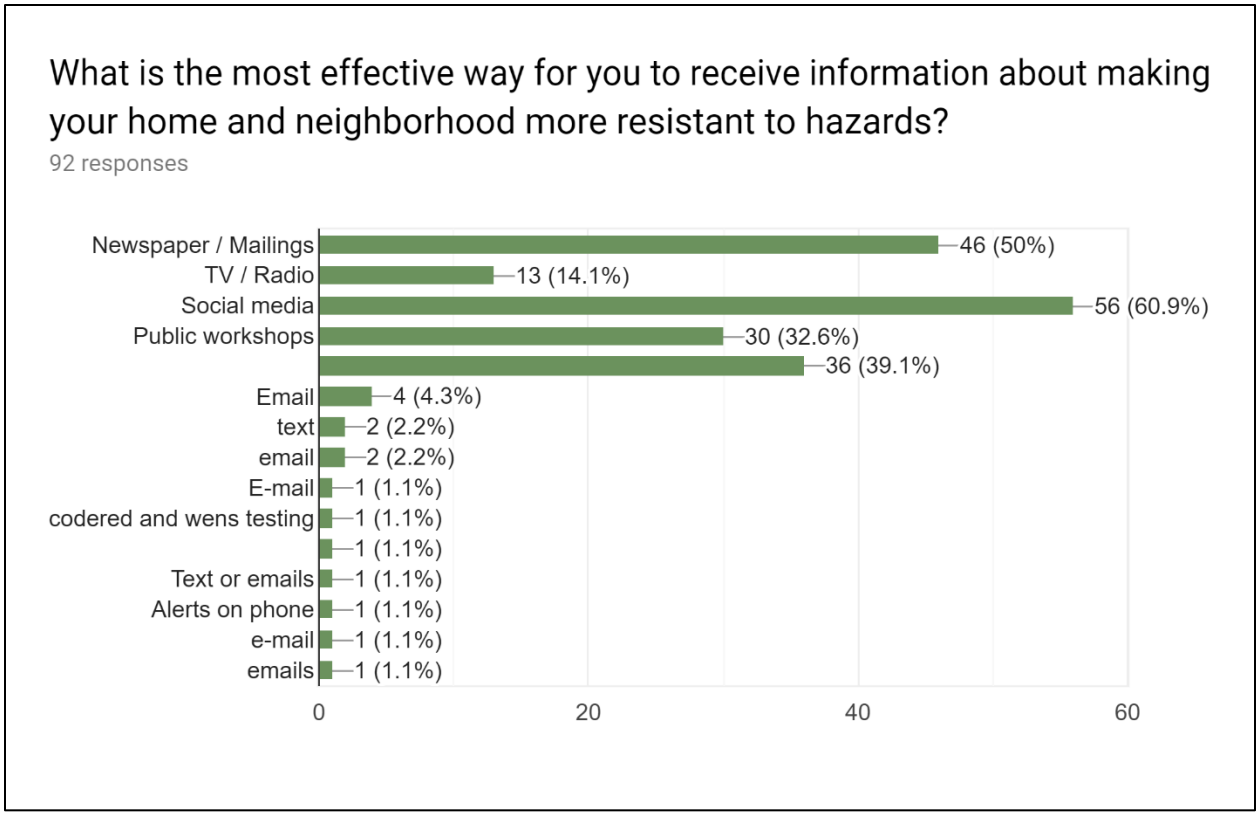
92 responses



Have you taken action to make your home or neighborhood more resistant to hazards?

92 responses

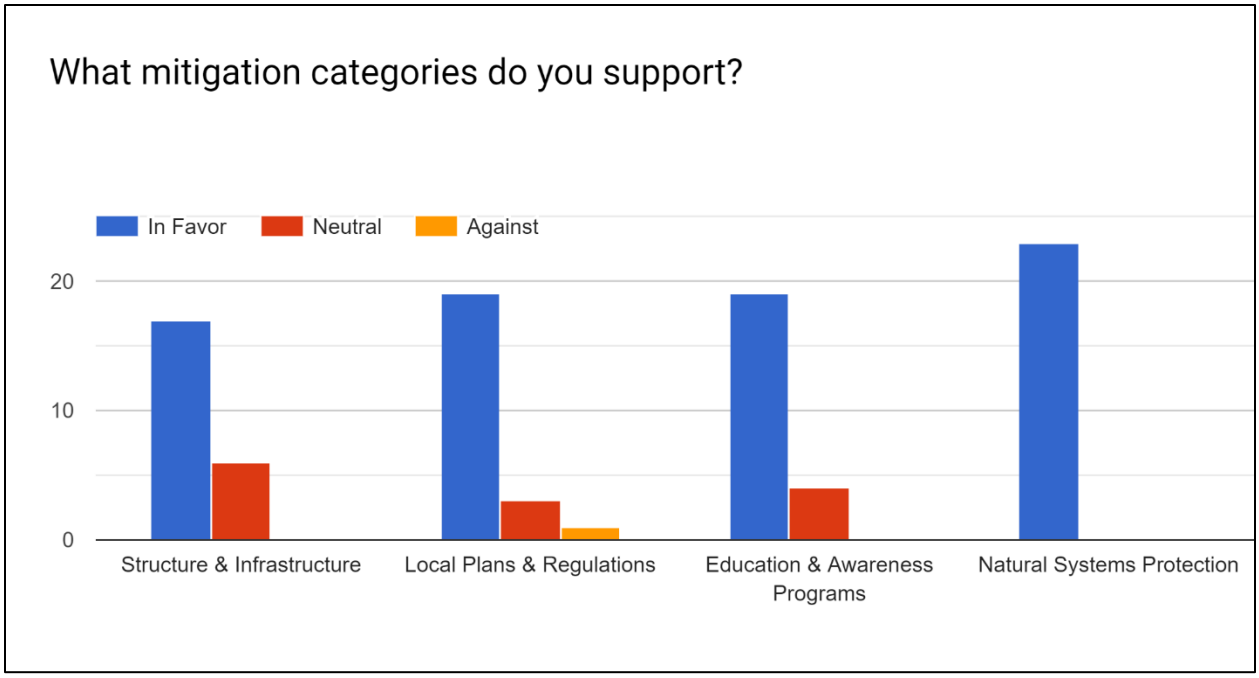


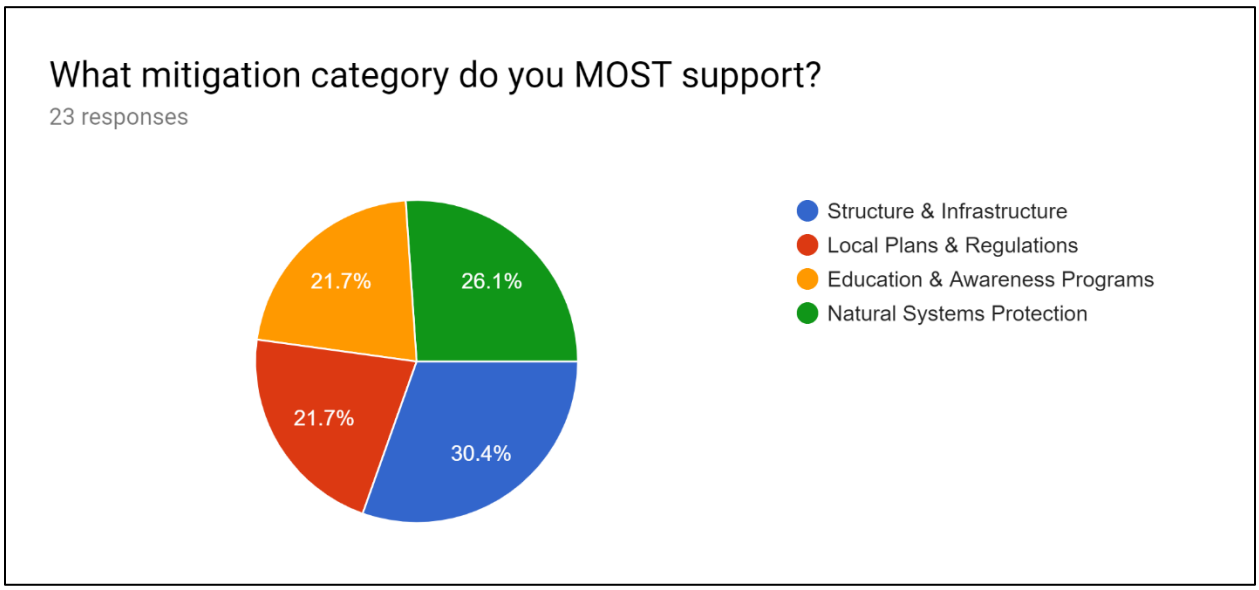


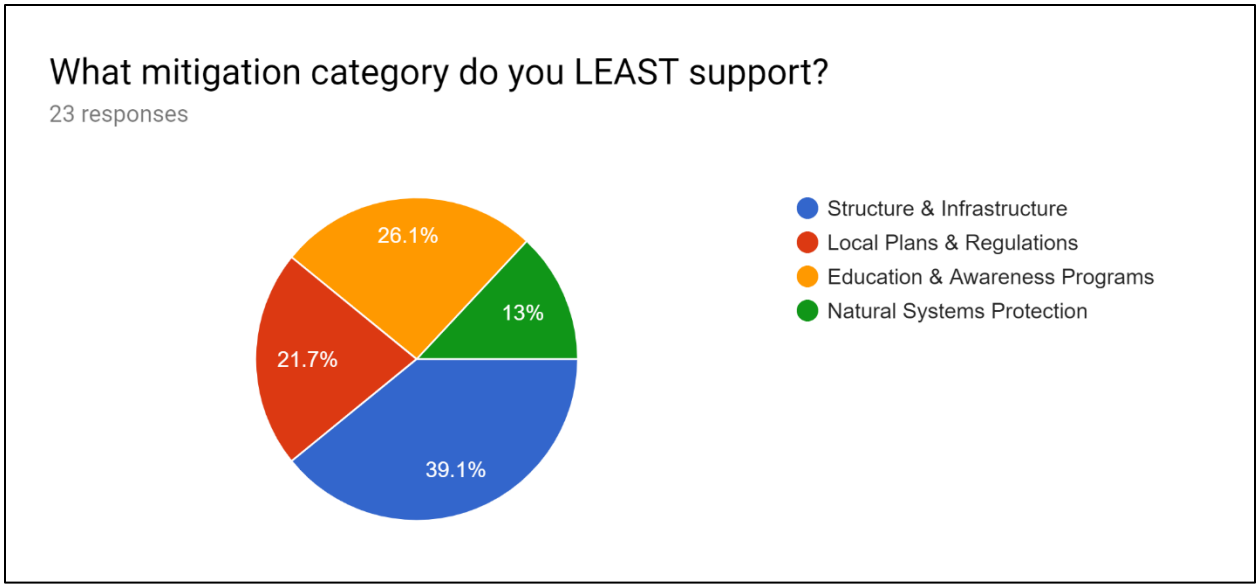
The second survey distributed to the public was the Public Hazard Mitigation Survey, distributed in September 2019. This survey was sent out to educate the public on mitigation actions, gain an understanding what types of mitigation strategies the public supports, and give the public an opportunity to contribute potential mitigation actions. Overall, the survey gathered 23 responses, with 52% of the responses from the Town of Ridgway, 44% from the City of Ouray, and 4% from Ouray County.

The results are portrayed in the figures below. Key takeaways from this survey are:

- Overall, the vast majority of respondents are in favor of all types of mitigation actions.
- Many of the comments discussed wildfire, flooding, ensuring access in/out of the County, responsible development, and public education/involvement.


What mitigation categories do you support?
In Favor
Neutral
Against
20
10
0
Structure & Infrastructure
Local Plans & Regulations
Education & Awareness Programs
Natural Systems Protection


What mitigation category do you MOST support?
23 responses
21.7%
26.1%
21.7%
30.4%
Structure & Infrastructure
Local Plans & Regulations
Education & Awareness Programs
Natural Systems Protection



The following write-in questions were also asked in the survey:

1. Please share your ideas for specific mitigation projects or actions that you would like to see implemented by your government, should funding be available:
    a. I think Wildland fire mitigation is something that should be done that doesn't cost very much you look at the houses up on queen street and many of them don't have a defensible space around them I think getting approval from the Forest Service wouldn't be extremely hard and If it's in city limits you can always ask the Fire Department to help cut some stuff it's also a great training opportunity for them
    b. Improve county roads between Ouray and Ridgway for emergency escape route in case hwy. 550 is closed for any reason.
    c. Removing the beetle kill and now the avalanche debris to reduce fire danger, improving the drainage through town to reduce the chance of severe flooding.
    d. Stop hazmat tankers traveling over Red Mountain Pass.
    e. Make new large hotels follow all zoning laws-no exceptions.
    f. For our Town, I feel the greatest threat comes mostly from fire, then probably from flooding. I would direct most funding to address mitigating these 2 forms of hazard as a priority.
    g. More public awareness of the issues and what individuals with or without the help of local government can do to mitigate hazards in our area.
    h. Upgrade and replace old parts and systems of our Public Works water treatment and waste water treatment plants to ensure safe and adequate supply and distribution of potable water and the treatment and disposal of sewage. Storm water management of run-off and paving and side-walking on Amelia Street around elementary school and all sensitive areas in town, especially where and as development of new residential areas occur. Improve auto and pedestrian traffic flow and safety in and around town and along and over Highways 62 and 550 by creating sidewalks, bike trails and lanes, pedestrian bridges or tunnels, and an alternative bypass around 62 in case of emergency, e.g., maybe along CR 5 to CR 24 and/or via CR 23 to CR 3A. I realize much of the latter projects would have to be in cooperation with or by CDOT.

   i. Be sure that we don't make potential impacts worse... like building in flood prone areas or on steep slopes. Updating regulations seem to be the best route but not sure.
   j. Protection and education on wild land fires.
   k. Redundancies in various utilities.
   l. Flood plain designation update.
2. If you would like to provide any additional comments to your jurisdiction relating to mitigating hazards, provide them below. If you would like to be contacted regarding your comments, please include contact information as appropriate.
   a. More rock scaling needed above some county roads.
   b. Do a better job at plowing 361 above next to the ice park and above it.
   c. All the various 4 categories are vital and useful for our Township to implement and promote. No one of those should be neglected since they are an inclusive approach to a community issue/challenge.
   d. I don't want to see government requiring old buildings to have to meet new standards at the cost of the building owner, or with new local taxes to address issues.
   e. Public education and outreach is particularly crucial in our rural area where demand for improvements is high but funding to provide is low. It is extremely helpful in encouraging self-regulation, expanding knowledge of hazards, projects, funding sources (or lack thereof), promoting positive behavior and activity, and encouraging volunteerism and fund-raising.

Lastly, the public was given the opportunity to review and comment on the draft plan between November 19, 2019 and December 6, 2019. Digital copies of the final draft plan were distributed in accordance with the public involvement plan. There were no comments received from the public.

Review and Incorporation of Existing Planning Mechanisms

Over the course of the planning process, numerous other plans, studies, reports, and technical information were obtained and reviewed for incorporation or reference purposes. The majority of sources referenced and researched pertain to the risk assessment and the capabilities assessment. To a lesser extent, the mitigation strategy also includes some technical information research. The following list shows the primary documents and technical resources reviewed and used for incorporation into this HMP.

Ouray County

- Ouray County CWPP (2011)
- Ouray County Disaster Recovery Plan (draft)
- Ouray County EMS MCI Plan
- Ouray County Public Information and Warning Plan (2016)
- Ouray County Rapid Needs Assessment Plan (2014)
- Ouray County Emergency Operations Plan (2015)

City of Ouray

- Ouray Fire Protection District 4 Neighborhood CWPP (2007)
- City of Ouray Emergency Operation Plan (2018)

Town of Ridgway

- Town of Ridgway Source Water Protection Plan (2012)
- Town of Ridgway Emergency Operations Plan (2019)

- Town of Ridgway Master Plan (2019)

Loghill Mesa Fire Protection District

- Loghill Mesa Fire Protection District CWPP (2012)
- Loghill Mesa Fire Protection District Evacuation and Reoccupation Plan (2011)

Other

- Grand Mesa Uncompahgre National Forests – Forest Plan Revision (currently in progress)

3.3.2. Phase II: Assess Risks

The Hazard Identification and Risk Assessment (HIRA) process began almost immediately. Data were gathered from other planning resources (see above), the planning team, the Steering Committee, the State of Colorado, and other publicly available data sources. Sources of data are discussed in the text and as footnotes throughout the HIRA section. The Steering Committee and planning team were instrumental in supplying jurisdictional-specific data to CDR Maguire, who performed the analysis and writing of the HIRA. As data requests were needed, CDR Maguire reached out to the Steering Committee, who would direct CDR Maguire to the correct person on the planning team for the data. Data were collected and incorporated into the HIRA through August 2019, and the draft results of the HIRA were presented to the planning team during the Risk and Vulnerability Assessment Workshop, which was the second in-person meeting for the County. Additionally, the results of the public Hazard Risk Perception Survey were incorporated into the HIRA. The draft HIRA was sent for planning team review in September 2019 and finalized in November 2019 after all comments were incorporated.

Planning Team Risk and Vulnerability Assessment Workshops



The planning team risk and vulnerability assessment workshop was held on August 5, 2019 in Ouray County. The meeting was also held as a webinar for participants that couldn't attend in-person.

Major goals of this workshop were for the results of the HIRA to be presented to the planning team and to receive any feedback on the results and hazard rankings, review critical facility analysis results, review remaining data requests, continue with the public involvement strategy, and to finalize mitigation goals as well as start gathering ideas for objectives. The full agenda and sign-in sheets can be found in Appendix A.

Outcomes of the workshop included final input on the HIRA results and rankings. Remaining data requests were provided to finalize the HIRA. The capability assessment results were also presented and reviewed. The goals from the 2015 Ouray County Hazard Mitigation Plan were reviewed and determined to still be relevant for this Plan update. Additionally, the public involvement strategy was discussed and the second public survey was to be sent shortly after the workshop. The following post-meeting action items were discussed for the local planning team:

- Continue local discussions relating to this project
- Begin identifying new mitigation actions

- Capability assessment survey revisions (if necessary)
- Public survey / involvement
- Review of Risk Assessment section

3.3.3. Phase III: Develop the Mitigation Strategy



Mitigation strategy development was initiated by reviewing goals from Ouray County's previous hazard mitigation plan. New goals were drafted during the planning team risk and vulnerability assessment workshops and finalized during the planning team mitigation strategy workshop. The previous mitigation actions were reviewed by each jurisdiction, and new actions were developed based on planning team input, the results of the HIRA, other planning documents, and the public mitigation strategy survey. All mitigation actions were incorporated into a database for easy tracking and updating by the County.

Planning Team Mitigation Strategy Workshop

The Ouray County planning team mitigation strategy workshop was held on October 21, 2019 in Ridgway, CO. The meeting was also held as a webinar for participants that couldn't attend in-person.

Major goals of this workshop were to review goals/potential objectives, review the results of the capability assessment, obtain status updates on past high priority mitigation actions, review the results of the public mitigation strategy survey, discuss plan maintenance and integration, and create new mitigation actions. The full agenda and sign-in sheets can be found in Appendix A.

Major outcomes of the workshop were discussions around plan maintenance, implementation, and integration (discussed more below and in Section 6 of this Plan). The planning team reviewed the 2015 high priority actions and the remaining were sent to the planning team to review after the meeting. Significant time was spent brainstorming new mitigation actions. A mitigation action project sheet was provided to all participants for the creation of mitigation actions, which would later be added to a database for simplified tracking. Additionally, it was determined to rank new mitigation actions based on defined priorities. It was decided to review the Plan annually by providing updates during one of the quarterly Multi-Agency Coordination group (MAC) meetings. The following post-meeting action items were discussed for the local planning team:

- Finalize past Mitigation Actions / Projects reporting
- Finalize new Mitigation Actions / Projects
- Review draft updated Plan
- Public Review and Comment

3.3.4. Phase IV: Implement the Plan and Monitor Progress

As discussed previously, the implementation phase was discussed during the Ouray County mitigation strategy workshop. It was determined that the Plan will be reviewed at a determined quarterly MAC

meeting, ensuring it is an agenda item at least once a year. Further discussion about implementation, monitoring, and Plan integration is discussed in Section 6 of this Plan.

4. Hazard Identification and Risk Assessment (HIRA)

4.1. Hazard Identification

As part of the update process, the hazards from Ouray County's existing plan were reviewed and new hazards were considered. The existing hazards were also cross-checked with hazards in the 2018 Colorado State Hazard Mitigation Plan (State Plan). The State Plan included several additional hazards. These hazards were discussed with the Local Planning Committee (LPC) to determine whether to include them in this Plan. It was determined that dense fog, hail, tornado, expansive soils, sinkholes/subsidence, animal disease outbreak, and radiological release were not applicable to Ouray County or its jurisdictions and that they would not be mitigated against, so they were not included in further analysis. The reasoning to include or not include the remaining hazards are described below:

- **Erosion/Deposition:** Roads adjacent to rivers may be impacted by erosion. It was determined to include this detail in the flood profile.
- **Radon/Carbon Monoxide/Methane/Other Seeps:** This hazard is applicable to the County and they would like to mitigate, so it was added to the public health emergency profile.
- **Wildlife Vehicle Collisions:** Wildlife vehicle collisions due occur in Ouray County, but the County nor jurisdictions mitigate against it. They are managed by CDOT, so this hazard is not profiled in this Plan.
- **Pest Infestation:** The main concern for pest infestation discussed was beetle kill in the County's forests. It was decided to add this to the wildfire profile, as the increased wildfire risk is the main issue for the County from beetle kill.
- **Mine Accident:** Mine accidents can occur in the County, but the County nor its jurisdictions have the capability to mitigate against them as they are under Federal jurisdiction.
- **Critical Infrastructure Disruption/Failure:** Due to the remoteness of the County, the failure of critical infrastructure could cause major impacts. It was determined to discuss these failures as they relate to hazards and identify critical infrastructure as part of the critical facilities analysis rather than its own hazard profile.
- **Power Failure:** Power failure will be discussed as impacts to profiled hazards as well as in the context of critical facilities/infrastructure.

The following Table 4-1 compares the hazards listed in Ouray County's previous Plan to the current identified hazards for this Plan, and hazards profiled by the State Plan.

Table 4-1 Hazards Profiled

Ouray County 2015 HMP	Ouray County 2019 HMP	2018 Colorado HMP
Avalanche	Avalanche	Avalanche
Dam Failure	Dam Failure	Dam Failure
Debris Flow	Debris Flow	Debris Flow
Drought	Drought	Drought
Earthquake	Earthquake	Earthquake

Ouray County 2015 HMP	Ouray County 2019 HMP	2018 Colorado HMP
Extreme Temperatures	Extreme Temperatures	Extreme Temperatures
Flooding	Flooding	Flooding
Hazardous Materials Incident	Hazardous Materials Incident	Hazardous Materials Incident
Landslide/Rockslide	Landslide/Rockslide	Landslide/Rockslide
Lightning	Lightning	Lightning
Mass Casualty Event	Mass Casualty Event	Mass Casualty Event
Public Health Emergency	Public Health Emergency (Radon/Carbon Monoxide/Methane Seeps were added for the 2019 Plan)	Public Health Emergency
Severe Winter Storm	Severe Winter Storm	Severe Winter Storm
Imminent Threat	Imminent Threat	Imminent Threat
Wildfires	Wildfires	Wildfires
Windstorm	Windstorm	Windstorm
		Dense Fog
		Hail
		Tornado
		Erosion/Deposition
		Expansive Soils/Heaving Bedrock
		Radon/Carbon Monoxide/Methane/Other Seeps
		Sinkholes/Subsidence
		Animal Disease Outbreak
		Wildlife Vehicle Collisions
		Pest Infestation
		Critical Infrastructure Disruption/Failure

Ouray County 2015 HMP	Ouray County 2019 HMP	2018 Colorado HMP
		Mine Accident
		Power Failure
		Radiological Release

It is important to note that many of these hazards are interconnected (for example, prolonged drought can increase risk to wildfire). Therefore, discussion of these hazards overlaps throughout the Risk Assessment.

4.1.1. Disaster Declaration History

Major disaster declarations were also used to identify and assess hazards in Ouray County. The following table presents a list of all federal disaster and emergency declarations that have occurred in the County, according to the Federal Emergency Management Agency (FEMA) and the U.S. Department of Agriculture (USDA). This list presents support for identifying which hazards pose the greatest risk to Ouray County communities.

Across Ouray County, there have been 22 presidential declarations and USDA secretarial disaster declarations from 1953 through 2019.[8] Five of these were presidential declarations and 16 of these were USDA secretarial disaster declarations as a primary or contiguous county. The USDA declarations were made for drought, freeze, frost, high wind, excessive heat, hail, and hard rain events. One event was a suspected presidential declaration in 1965 based on previous reports and conversations with the County.[9] Table 4-2 describes these events.

Table 4-2 Ouray County Declared Disasters (1953-2019)

Event/Hazard	Year	Declaration Type	Description
Flood	1965	Suspected Presidential	$20,292 received for repair of flumes and disaster relief from Federal Office of Emergency Preparedness
Heavy Rains and Flooding	1970	Presidential—Major Disaster Declaration	$3.2 million (2006 dollars) statewide
Flooding and Landslides	1973	Presidential—Major Disaster Declaration	$4.5 million (2006 dollars) statewide
Drought	1977	Presidential—Emergency Declaration	$4.6 million (2006 dollars) statewide
Severe Storms, Mudslides,	1984	Presidential—Major Disaster Declaration	$9.5 million (2006 dollars) statewide Included with 14 other Western Slope counties

[8] https://www.fema.gov/data-visualization-disaster-declarations-states-and-counties; https://www.fsa.usda.gov/programs-and-services/disaster-assistance-program/disaster-designation-information/index (reviewed 4/15/2019)

[9] Ouray County Floodplain Report

Event/Hazard	Year	Declaration Type	Description
Landslides, and Flooding			
Drought	2000	USDA	
Drought	2002	USDA	Included in statewide USDA declaration
Wildfire	2002	Presidential—Major Disaster Declaration	$7.1 million (2006 dollars). Included in statewide declaration
Late Freeze	2006	USDA	Included in declaration as a contiguous county (primary natural disaster areas were Dolores, Montezuma, and San Miguel counties)
Frost, Freezing Temperatures, and High Winds	2010	USDA	Included in declaration as a contiguous county
Drought and Early Freeze	2011	USDA	Included in declaration as a contiguous county
Drought, High Winds, Excessive Heat	2012	USDA	Included in declaration as a primary county
Frost, Freeze	2012	USDA	Included in declaration as a contiguous county
Drought	2013	USDA	Included in declaration as a contiguous county (primary natural disaster areas included Alamosa, Conejos, Delta, Garfield, Gunnison, Jackson, Jefferson, Mesa, Moffat, Montrose, Rio Blanco, Rio Grande, Routt, and Saguache counties)
Drought	2013	USDA	Included in declaration as a primary natural disaster area (other primary natural disaster areas in Colorado include Dolores, Hinsdale, La Plata, Montezuma, and San Miguel counties)
Frost, Freeze	2014	USDA	Included in declaration as a primary county
Hail Storms, Hard Rain	2017	USDA	Included in declaration as a contiguous county
Severe Freezes	2017	USDA	Included in declaration as a contiguous county
Drought	2018	USDA	Included in declaration as a contiguous county
Drought	2018	USDA	Included in declaration as a primary county
Drought	2018	USDA	Included in declaration as a contiguous county
Drought	2018	USDA	Included in declaration as a contiguous county

Additionally, the following State Disaster Declarations have been issued in the recent past:

- 2018, Flood-Mudflow-Rockslide (Red Mountain Pass)
- 2017, Wildfires (Statewide)
- 2014, Extreme Weather (Statewide)
- 2014, Rockslide (Red Mountain Pass)
- 2013, Winter Storm (Statewide)
- 2009, Severe Spring Storm (Statewide)

- 2009, Severe Blizzard (Statewide)
- 2003, Snow Emergency (Statewide)
- 2002, Drought (Statewide)
- 2002, Wildfires (Statewide)
- 1984, Flooding
- 1982, Flooding

These past events follow a similar pattern to the Federal Declarations, and help to further clarify those hazards presenting the most risk to the County.

4.2. Hazard Ranking

Hazards were ranked for each jurisdiction based on the results of this HIRA, LPC input, and public perception of risk. The overall ranks were derived by assigning each jurisdiction a value of 1 (low), 2 (medium), or 3 (high) for each hazard for: the probability of an event occurring, the potential impact of the hazard on property/structures/economy, and the potential impact of the hazard on people. The results were then summed for each hazard and jurisdiction to create an overall rank. A summed score of four or less equates to a "low" ranking, five to six equates to a "medium" ranking, and seven or greater equates a "high" ranking. The results are shown in Figure 4-1 below. Overall, risk varies somewhat with each jurisdiction, but consistently high ranked hazards include flooding, severe winter storms, and wildfire. Additionally, debris flows and landslide/rockfall are high hazards for the City of Ouray and unincorporated County.

Figure 4-1 Hazard Ranking

Jurisdiction	Avalanche	Dam Failure	Debris Flow	Drought	Earthquake	Extreme Temperatures	Flooding	Landslide/Rockfall	Lightning	Public Health Emergencies	Severe Winter Storm	Wildfire	Windstorm	Hazmat Incident	Mass Casualty Event	Imminent Threat
City of Ouray	L	L	H	M	M	L	H	H	M	L	H	H	M	M	L	L
Town of Ridgway	L	L	L	M	M	L	H	M	M	L	H	H	M	M	L	L
Unincorporated County	M	M	H	M	M	L	H	H	M	L	H	H	M	M	M	L
Loghill Mesa FPD	-	-	-	-	-	-	-	-	-	-	-	H	-	-	-	-

4.3. Building Inventory and Assets

In addition to people, structures and infrastructure have the potential to be exposed to all hazards identified in this plan. Building inventories and values in this Plan are based on assessments from the Ouray County's Assessor's Office from the 2018 tax year. Table 4-3 and Table 4-4 show the value of parcels with improvements. According to the Assessor's data, the sum of all improvements in the County, based on actual value, is $1,158,769,500. In order to get a complete estimate of building exposure the building content value is estimated and added. Contents exposure is estimated as a percent of the improvement value (specifically, 50% of the improvement value for residential structures, 100% for agricultural structures, 100% for commercial and utility structures, 100% for unknown structures, 0% for vacant land, and 100% for exempt structures), based on standard FEMA methodologies. Total exposure (building and contents) is estimated at $1,883,098,930. Land values are not included in this analysis because land remains following 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.

Table 4-3 Ouray County Property Inventory by Jurisdiction

Jurisdiction	Total Parcel Count	Improved Parcel Count	Improved Actual Value	Contents Exposure	Total Exposure
City of Ouray	997	716	$184,494,780	$125,068,610	$309,563,390
Town of Ridgway	1,025	674	$207,782,020	$141,666,915	$349,448,935
Unincorporated County	6,148	2,241	$766,492,700	$457,593,905	$1,224,086,605
Total	**8,170**	**3,631**	**$1,158,769,500**	**$724,329,430**	**$1,883,098,930**

Table 4-4 Ouray County Property Inventory by Property Type

Property Type	Total Parcel Count	Improved Parcel Count	Improved Actual Value	Contents Exposure	Total Exposure
Agriculture	264	208	$19,677,950	$19,677,950	$39,355,900
Commercial	1,578	514	$167,605,970	$167,605,970	$335,211,940
Exempt	1,055	111	$66,314,970	$66,314,970	$132,629,940
Residential	2,959	2,819	$866,962,180	$433,481,090	$1,300,443,270
Utilities	9	9	$37,249,450	$37,249,450	$74,498,900
Vacant Land	1,340	55	$958,980	$0	$958,980
Total	**7,205**	**3,716**	**$1,158,769,500**	**$724,329,430**	**$1,883,098,930**

4.4. Critical Facilities

For the purpose of this Plan, 'critical facilities' are defined as local assets vital to the health, safety, and well-being of residents and visitors during the time of and following a natural disaster. These facilities can include: community centers, churches, hospitals, libraries, non-profits, post offices, water treatment centers, police & fire stations, and city administration buildings. Critical facilities are essential to a

community's long-term disaster resilience as they are important delivery pathways for diverse crisis management services and resources. As part of the planning process, Ouray County identified facilities being termed as critical by utilizing the best available data from the GIS department.

The critical facilities analysis is located in a confidential appendix, available to the LPC and jurisdictions.

4.5. Hazard Profiles

4.5.1. Profile Methodology

The following sections, 3.5.4 through 3.5.18, profile each identified hazard to include the description, location, previous occurrences, extent, probability of occurrence, vulnerability assessment, and summary. Supporting information for each hazard can be found in Appendix C – HIRA Appendix. The hazard profiles are consistently formatted to cover the same information. This format includes seven different subsections that are described below:

- **Description:** A scientific explanation of the hazard.
- **Location:** Geographical areas within the County that are affected by the hazard.
- **Extent:** The strength or magnitude of the hazard. Measures of extent may include, but are not limited to, an established scientific scale, wind speed, speed of onset, or duration of the hazard event.
- **Previous Occurrences:** Information regarding historical events of the hazard in Ouray County. Previous occurrence data was derived from a variety of sources, including, but not limited to, the LPC, news articles, County websites, the State of Colorado, and federal databases. The National Center for Environmental Information (NCEI), which has been tracking severe weather since 1950, is a primary database used for previous occurrences in this Plan. Their storm events database tracks severe weather events on a county basis and contains data for the following identified hazards in this plan: extreme temperatures, flooding, lightning, windstorms, and severe winter storms.
- **Probability:** The likelihood of future events impacting the County. Given that an exact probability is often difficult to quantify, this characteristic is categorized into ranges to be used in hazard profiles:
    - Unlikely: Less than 1% annual probability
    - Possible: Between 1% and 10% annual probability
    - Likely: Between 10+% and 90% annual probability
    - Highly Likely: Greater than 90% annual probability
- **Vulnerability Assessment:** The vulnerability assessment addresses conditions that may increase or decrease vulnerability. This section will include the inventory exposed/impacts, potential losses, and future conditions.
    - **Inventory Exposed/Impacts:** A qualitative or quantitative analysis of impacts on structures, the economy, people, and the environment.
    - **Loss estimations**: A qualitative or quantitative analysis on potential losses from each hazard is conducted using best available data and resources. Methods utilized include GIS analysis and Hazus analysis where data is available. Additionally, damage estimates are calculated based on reported damages from previous occurrences by jurisdiction, where available. For this Plan, SHELDUS county-wide damage data was also utilized for a method of consistent loss estimations across hazards. It is noted that SHELDUS only reports on a county-wide scale, so it is not possible to determine losses by jurisdiction

using this data. Additionally, SHELDUS results may vary from other sources of data, such as NCEI, due to differences in reporting. It should be viewed as an additional resource to understand damage impacts and risks across hazards. SHELDUS results are explained in more detail in Section 4.5.2, as well in each hazard profile.

- **Future Conditions:**
  - **Land Use and Development**: Discusses the impact of development trends on jurisdiction's vulnerability to each hazard. Land use and development data was obtained from jurisdiction planners and population statistics from the U.S. Census Bureau.
  - **Climate Change**: Brief discussion on climate change impacts on each hazard, if applicable.

4.5.2. SHELDUS Results

The Spatial Hazard Events and Losses Database for the United States (SHELDUS) Version 17.0 was utilized to assess losses from the following hazards: avalanche, drought, flooding, hail, landslide, lightning, severe storm/thunderstorm, wildfire, wind, and winter weather. SHELDUS is a county-level dataset that allows for consistent comparison of losses across hazards. All loss information used in this Plan from SHELDUS is reported in 2017 dollars to facilitate even comparison between hazards. SHELDUS utilizes data from 1960 to 2017. It is recognized that this data is not reported by jurisdiction, but can still provide value in consistent comparison across hazards at the county-level. A summary of SHELDUS data is reported below, and damages are additionally reported in each hazard profile.

From 1960 to 2017, Ouray County experienced a total of 104 hazard events equating to $14,558,159 (2017 dollars) in damages reported across all hazards. The County experienced more winter weather events (36) than any other hazard. This is followed by wind events (29). Of the damages, $7,656,291 were crop damages and $6,901,868 were property damages. Total number of events by hazard is displayed in Figure 4-2 below, and total damages is displayed in Figure 4-3 below.

Figure 4-2 SHELDUS Total Events by Hazard

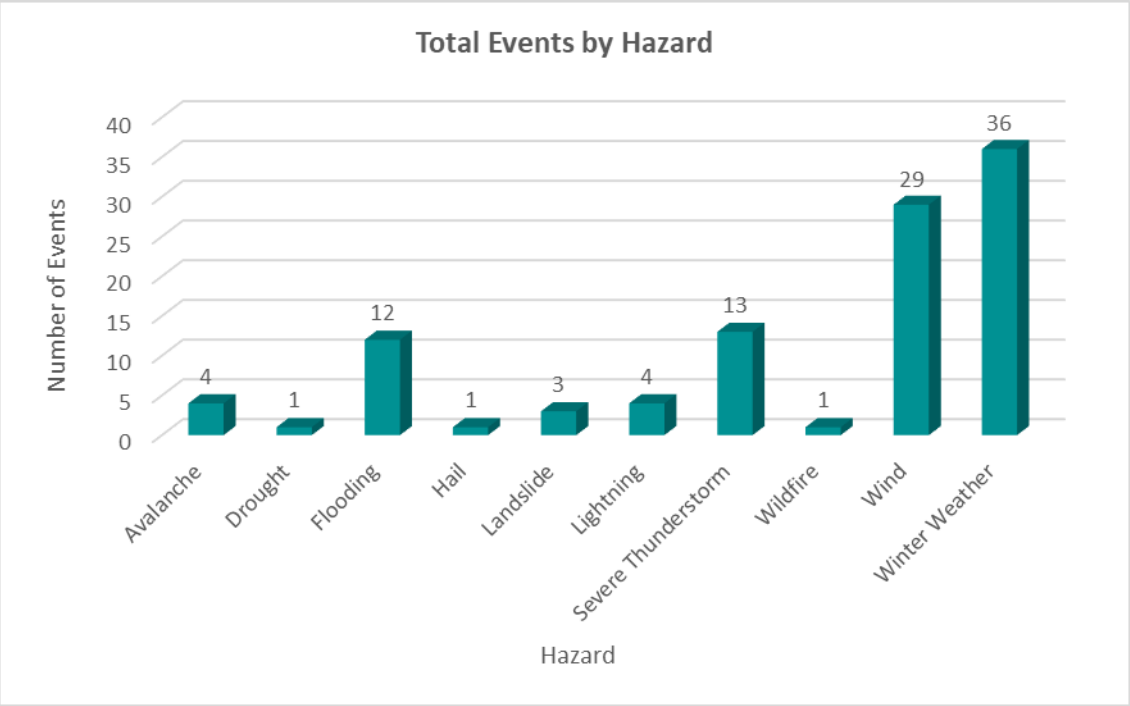
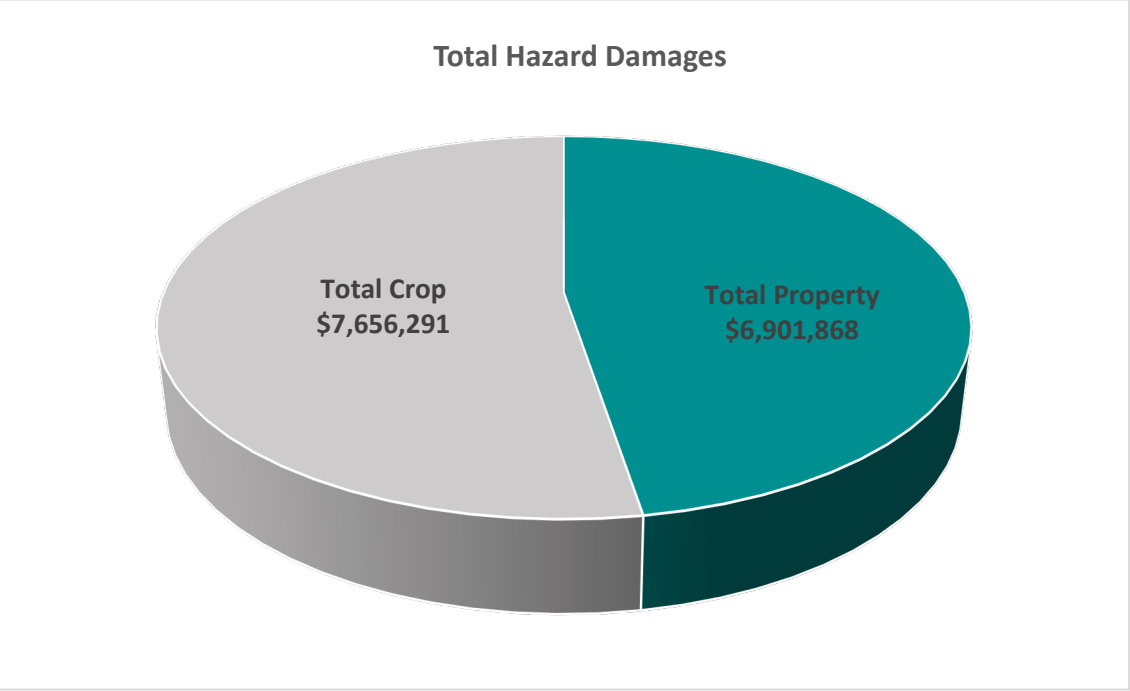
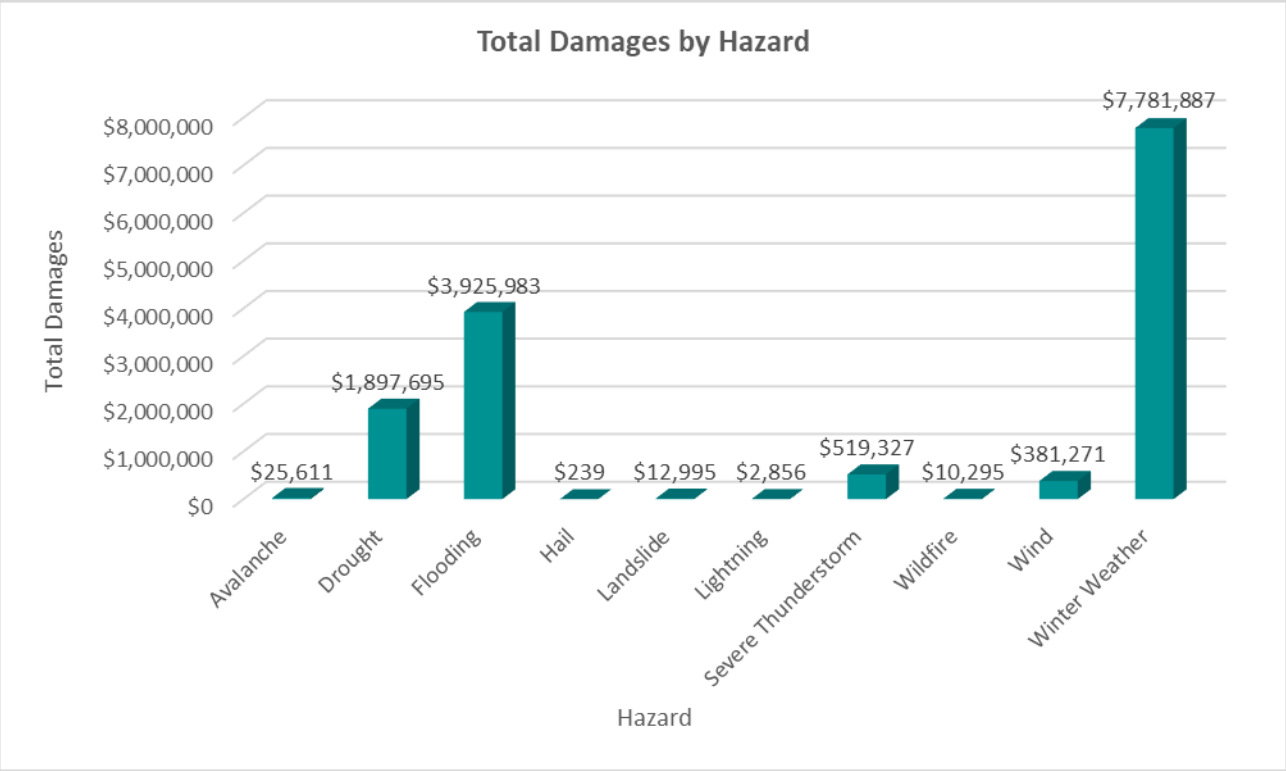


Figure 4-3 SHELDUS Total Hazard Damages



Winter weather caused the most in total damages from 1960 to 2017, causing $7,781,887 in total damages, representing approximately half of all damages. Flooding followed with $3,925,983 in total damages. Figure 4-4 shows damages by hazard.

Figure 4-4 SHELDUS Total Damages by Hazard



These damages are further broken down by property and crop damage by hazard (Figure 4-5 and Figure 4-6, respectively). Flooding has caused the most property damages in the county, with $3,512,069 in damages. This represents approximately half of the total property damages across all hazards. Winter weather caused the next highest in property damages, with $2,462,414 in damages. For crop damages, winter weather caused the most in damages, with $5,319,473. Drought caused the next highest in crop damages, with $1,897,695 in damages.

Figure 4-5 SHELDUS Property Damages by Hazard

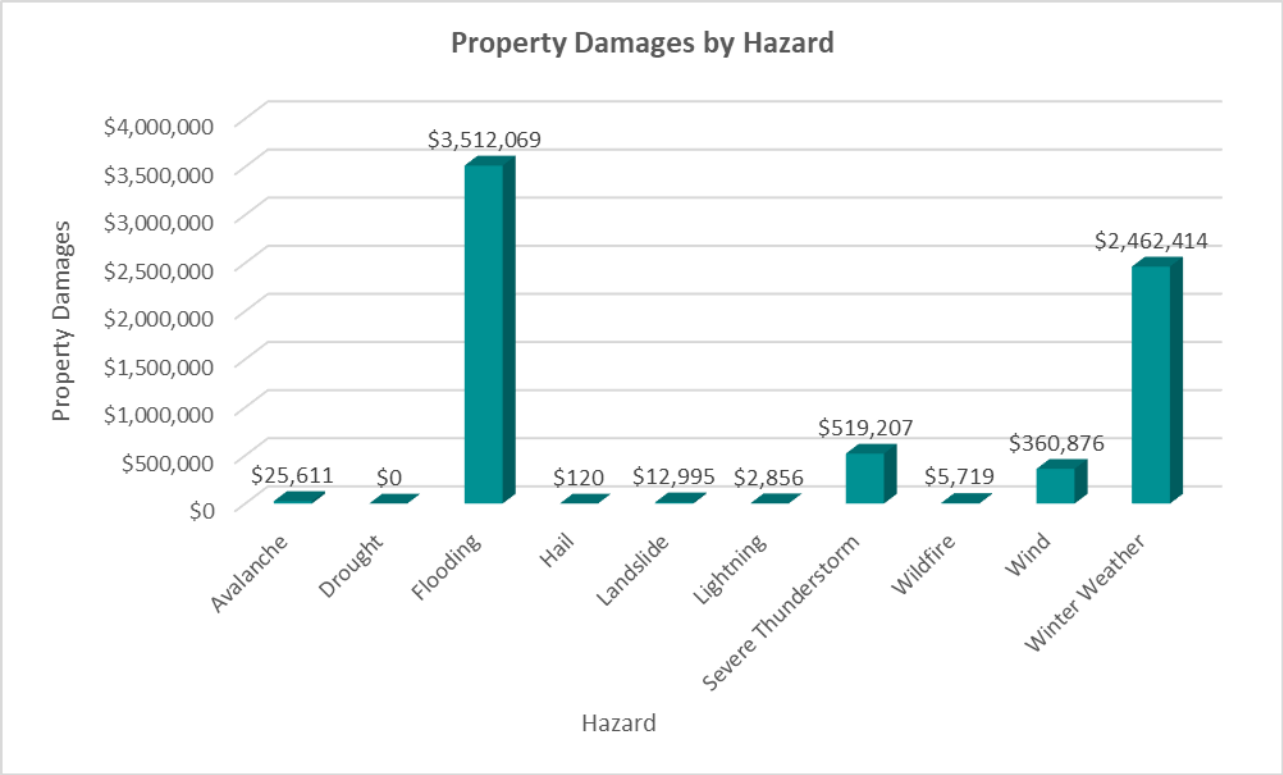


Figure 4-6 SHELDUS Crop Damages by Hazard

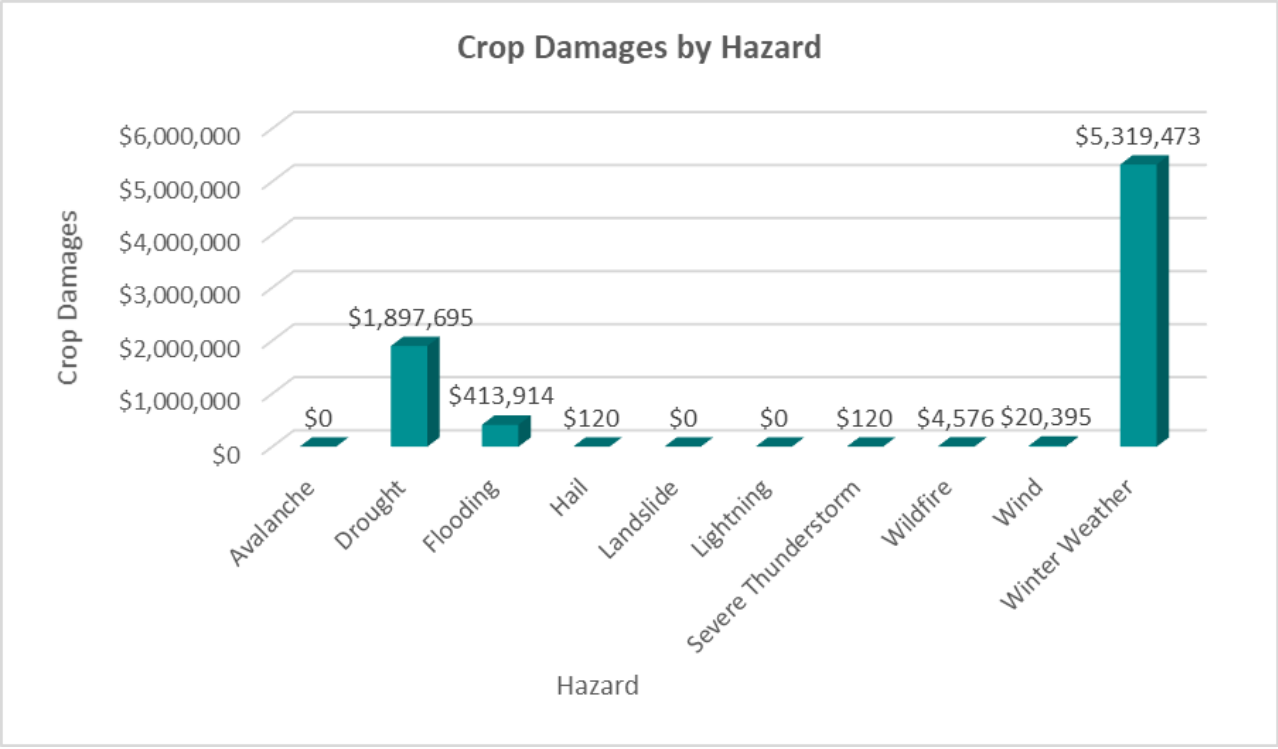


Table 4-5 summarizes all of the above information in a table.

Table 4-5 SHELDUS Summary Table

Hazard	Events	Crop Damage	Property Damage	Total Damage
Avalanche	4	$0	$25,611	$25,611
Drought	1	$1,897,695	$0	$1,897,695
Flooding	12	$413,914	$3,512,069	$3,925,983
Hail	1	$120	$120	$239
Landslide	3	$0	$12,995	$12,995
Lightning	4	$0	$2,856	$2,856
Severe Thunderstorm	13	$120	$519,207	$519,327
Wildfire	1	$4,576	$5,719	$10,295
Wind	29	$20,395	$360,876	$381,271
Winter Weather	36	$5,319,473	$2,462,414	$7,781,887
Total	**104**	**$7,656,291**	**$6,901,868**	**$14,558,159**

4.5.3. HIRA Summary

The following Table 4-6 summarizes key takeaways and identified gaps from each hazard profile for the County.

Table 4-6 HIRA Summary Table

Hazard	Key Takeaways	Identified Gaps
Avalanche	The southern County high country (unincorporated County), particularly Highway 550 is the most at-risk area to this hazard. Overall, the County ranks 5th in avalanche fatalities in Colorado and the hazard remains a significant risk to public safety. Cost of avalanche clean up and impacts of road closures to businesses can result in losses to the County. With continued interested in backcountry recreation, the exposure to this hazard is likely to increase.	The CAIC tracks avalanche activity closely in Colorado, however, monetary loss information for avalanche events is largely unavailable aside from SHELDUS, which only provides county-wide, summarized information. Data discussing the trickle-down impact of road closures due to avalanches to local businesses is unavailable.
Dam Failure	There are three low, one significant, and one high hazard dam in the County; one non-jurisdictional dam; and 93 livestock water tank and erosion control dams. The Town of Ridgway is downstream from two low hazard dams and the City of Ouray downstream from one low hazard dam. Montrose is the closest town downstream	With a lack of previous occurrences, it is difficult to quantify potential losses and impacts for this hazard. Access to GIS based inundation maps is limited to high hazard dams, so the loss estimate is not

Hazard	Key Takeaways	Identified Gaps
	from the significant and high hazard dams. Development in areas downstream of low hazard dams may increase their hazard rating. No previous occurrences of dam failure have happened in Ouray County.	representative of all dams in the County. Also as previously mentioned, flood event inundation mapping is currently not available for any dams.
Debris Flow	Debris flows are a significant concern for the City of Ouray and directly surrounding areas, although they can occur at many locations throughout the County. Other known problem areas for debris flows are County Roads 5 and 7 southwest of Ridgway, County Road 17 near Corbett Creek, and State Highways 62 and 145. The closure of roads due to debris flows is a major concern for access in and out of the County. Debris flows are closely related to flooding events in the County, and will continue to occur every year.	GIS data was not available during this Plan update. Without this information loss estimates and precise mapping of locations and facilities at risk is difficult.
Drought	Drought can impact all jurisdictions in the County. The County experienced notable drought in 2018 which caused impacts such as decreased recreation due to dry conditions in national forests, as well as impacts on the ranching community. Drought can be expected to continue to occur as a part of Colorado's natural climate as well as be exacerbated due to climate change. Secure water resources for future conditions will be very important to mitigate against the impacts of drought.	A lack of quantitative loss information, particularly for the business community, makes estimating losses due to drought difficult. Additionally, multiple methods of reporting drought and lack of coherent, long-term data specific for the County, lead to a lack of thorough previous records of significant drought.
Earthquake	There are several faults in and around Ouray County capable of producing damaging earthquakes. There have been 12 previous earthquakes recorded in the County producing damages such as cracked plaster, chimneys, and windows; fallen pictures from walls; broken dishes; and damages to the Ridgway school ceiling. The Hazus analysis resulted in an estimated $42.77 million in economic losses from a 2,500-year return period, magnitude 6.25 earthquake in the County. It is assumed the highest amounts of losses to be the jurisdictions, with more building stock and historic buildings.	GIS data that dates back beyond 1973 would be beneficial to visualize the spatial distribution of previous earthquakes and determine a more precise determination of locations at risk. Additionally, with the County being a single Census Tract, it is not possible to determine jurisdictional losses, also contributing to a less precise determination of

Hazard	Key Takeaways	Identified Gaps
	Other areas of concern are the Ridgway Reservoir and the Ridgway School District, which stated its ageing buildings may not be able to withstand an earthquake, putting students and staff at risk.	places within the County at risk.
Extreme Temperatures	Extremely cold temperatures are more prevalent in the County than extreme heat and all jurisdictions have similar exposure to both extreme cold and extreme heat. Extreme cold can impact both people and structures, causing issues like burst water pipes. Extreme heat primarily impacts human health and can be deadly. The influx of tourists during the summer months visiting for outdoor activities may not be prepared for extreme heat due to Ouray County's typically moderate climate and are particularly vulnerable to extreme heat events.	Extreme cold and extreme heat events happen more frequently in the County than is recorded (especially extreme cold). A more accurate description of previous occurrences and losses would aid in more thoroughly portraying risk and losses from this hazard.
Flooding	Flash flooding from thunderstorm events and snowmelt driven flooding are of particular concern to the County. Several creeks surrounding the City of Ouray cause flooding, which is also closely related to the debris flow hazard. Debris blocking creeks causing flooding is also a high concern for the County. According to the Hazus analysis, the County can experience an estimated $30.3 million in economic losses from a 1% annual chance flood. The City of Ouray is estimated to experience the most in losses. SHELDUS reports $3,925,983 in losses from flooding in the County, which is the second highest damage amount (behind winter weather) across the SHELDUS reported hazards.	Ouray County does not have an official DFIRM that can be incorporated into GIS for analysis. A DFIRM would improve the GIS analysis for this profile. Additionally, census blocks in Ouray County are large, which impact the results from the Hazus analysis and make it difficult for detailed location specific loss estimates throughout the entire County.
Landslide/ Rockfall	Landslides and rockfall are of particular concern to the City of Ouray and nearby unincorporated County. There have been over $1 million in recorded damages from rockfall, which is likely a low estimate. The Town of Ridgway and Ridgway School District are less impacted by this hazard. The impact on transportation routes, such as the closure of Highway 550 or County Road 17 are major concerns for the County since those are the only two ways in and out. At the time of writing	A rockfall study determining locations of previous rockfall as well as hazard areas at the County or City scale available in GIS would be beneficial for mitigating against this hazard. Additionally, recorded losses for landslide/rockfall are under-reported and do not

Hazard	Key Takeaways	Identified Gaps
	this Plan, County Road 17 has been closed just north of the City of Ouray for months. Additionally, the impact of landslides/rockfall on critical infrastructure, such as gas or power lines, significantly impacts the County. Rockfall originating on USFS owned land is a concern for the City of Ouray, and a study pinpointing precise rockfall hazard locations would be beneficial.	represent the full potential for damages from this hazard.
Lightning	Although there is not extensive previous occurrences or losses from lightning events lightning will continue to occur every summer in the County. The extensive outdoor activities during the summer months when most lightning strikes occur, continues to put people at risk to this hazard across all jurisdictions. Additionally, a lightning-caused wildfire could cause major damages and losses in the County.	
Public Health Emergencies	A pandemic flu event could significantly impact the population of the County, and in turn impact the economy. Typically, denser areas are at a higher risk to the spread of a pandemic flu. Additionally, the students and staff at the Ridgway School District are more vulnerable due to the potential for the quick spreading of the flu in a school. There have not been any recorded cases of the West Nile virus in Ouray County. However, cases have been reported in surrounding counties indicating the potential for cases in Ouray. All individuals are at risk to the West Nile virus, although the elderly are at a higher risk for the more severe impacts from the virus. Populations frequently working or recreating outdoors should be aware of how to reduce their risk to the West Nile virus. Radon, carbon monoxide, and methane seepages can occur anywhere in the County, although methane seepages may be more likely in the northern and central areas. Radon, carbon	It is difficult to determine specific locations of higher risk to radon, carbon monoxide, or methane seeps since most data is at the County or State scale. Loss estimates from public health emergencies are largely conceptual due to lack of previous occurrences and recorded loss data.

Hazard	Key Takeaways	Identified Gaps
	monoxide, and methane seepages can be deadly to people in the County.	
Severe Winter Storm	According to the NCEI database, there were 855 blizzard, heavy snow, winter storm, and winter weather events from January 1996 to January 2019. The southern portion of the County and the City of Ouray typically experience more winter weather events than the Town of Ridgway and the Ridgway School District, although the entire County experiences severe winter weather annually. SHELDUS reported $7,781,887 in damages, which is the most out of any SHELDUS reported hazard. Impacts and losses can be expected county-wide.	The damages from winter weather events are likely under-reported in the NCEI data, making it difficult to derive jurisdictional losses and how winter weather impacts different areas of the County. This may be due to the fact that many Ouray County residents are accustomed to and prepared for severe winter weather events.
Wildfire	Nearly the entire County is vulnerable to wildfires. The highest risk areas are generally in the northern/central parts of the County, including the Loghill Mesa FPD (and the community of Loghill Mesa) and areas surrounding the Town of Ridgway. The County has 2,618 parcels in moderate or high wildfire risk areas, with $1,083,030,105 in total exposure value. The Loghill Mesa FPD has the most number and highest value of parcels in these risk areas. Future development in the County is directed towards areas in the northern County with high risk to wildfire. In addition, climate change is increasing the County's risk to wildfire. Overall, comprehensive mitigation techniques addressing forest health, current and future development, and climate change impacts are necessary to reduce wildfire risk in the County.	The State and County has done extensive work to identify wildfire risk areas. More information on damages from previous wildfires could provide additional loss estimates for the County. Additionally, fully understanding the economic impact from major fires (such as the 416 fire) on local businesses could improve the understanding of impacts of fire on the business community.
Windstorm	All jurisdictions are vulnerable to wind events. The southern high country experiences the most high wind events, however, that region is largely undeveloped. The County has experienced 29 wind events according to SHELDUS, which is the second highest number of events across all SHELDUS reported hazards (behind winter	Due to reporting wind events in NWS zones, it is difficult to derive jurisdictional impacts and losses to wind events.

Hazard	Key Takeaways	Identified Gaps
	weather). The County can experience $6,689 in annual damages from wind.	
Hazardous Material Incident	A transportation related hazmat release is more likely in the County due to a lack of fixed facilities. The exception is hazmat incidents related to the mining industry. Highways 550 and 62 are the most vulnerable routes to an incident. This makes the City of Ouray, Town of Ridgway, and Ridgway School District vulnerable to a transportation incident that occurs nearby. Human health and the impacts on the environment are the primary potential losses from a hazmat release.	Although there have been reported incidents, there is not damage/loss data available for these incidents. Recorded losses would aid in determining vulnerability to this hazard.
Mass Casualty Events	A mass casualty accident could take many forms in the County. Accidents are a concern on the stretch of Highway 550 south of the City of Ouray due to its sharp curves, steep drop-offs, and lack of guard rails. Additionally, there have been plane crashes in the County in the past, and with the steep, mountainous terrain, if a plane crashes in the County survivors are unlikely. Mass casualty events can overwhelm emergency services in the County.	With a lack of extensive previous occurrences, it is difficult to determine the full extent of vulnerabilities to this hazard in the County.
Imminent Threat	Targets such as critical facilities and infrastructure, schools, and government buildings are at a higher risk to imminent threats. Additionally, events that occur during the busy summer tourist season where large numbers of people are gathered in one area are at a risk to an attack. The County has had to defend against cyber-attacks in the past. An imminent threat event could overwhelm County emergency services.	With a lack of extensive previous occurrences, it is difficult to determine the full extent of vulnerabilities to this hazard in the County. However, continued training exercises can help prepare for these events and assess the response capabilities.

4.5.4. Avalanche

Description

An avalanche is defined as a mass of snow moving down a slope.[10] An avalanche occurs when the stress (from gravity) trying to pull the snow downhill exceeds the strength (from bonds between snow grains) of the snow cover. There are four ingredients of an avalanche: a steep slope, a snow cover, a weak layer

[10] https://avalanche.org/avalanche-education/

in the snow cover, and a trigger. About 90% of all avalanches start on slopes of 30-45 degrees and about 98% of all avalanches occur on slopes of 25-50 degrees. Avalanches release most often on slopes above timberline that face away from prevailing winds (leeward slopes collect snow blowing from the windward sides of ridges). Avalanches can run, however, on small slopes well below timberline, such as gullies, road cuts, and small openings in the trees. Very dense trees can anchor the snow to steep slopes and prevent avalanches from starting; however, avalanches can release and travel through a moderately dense forest.

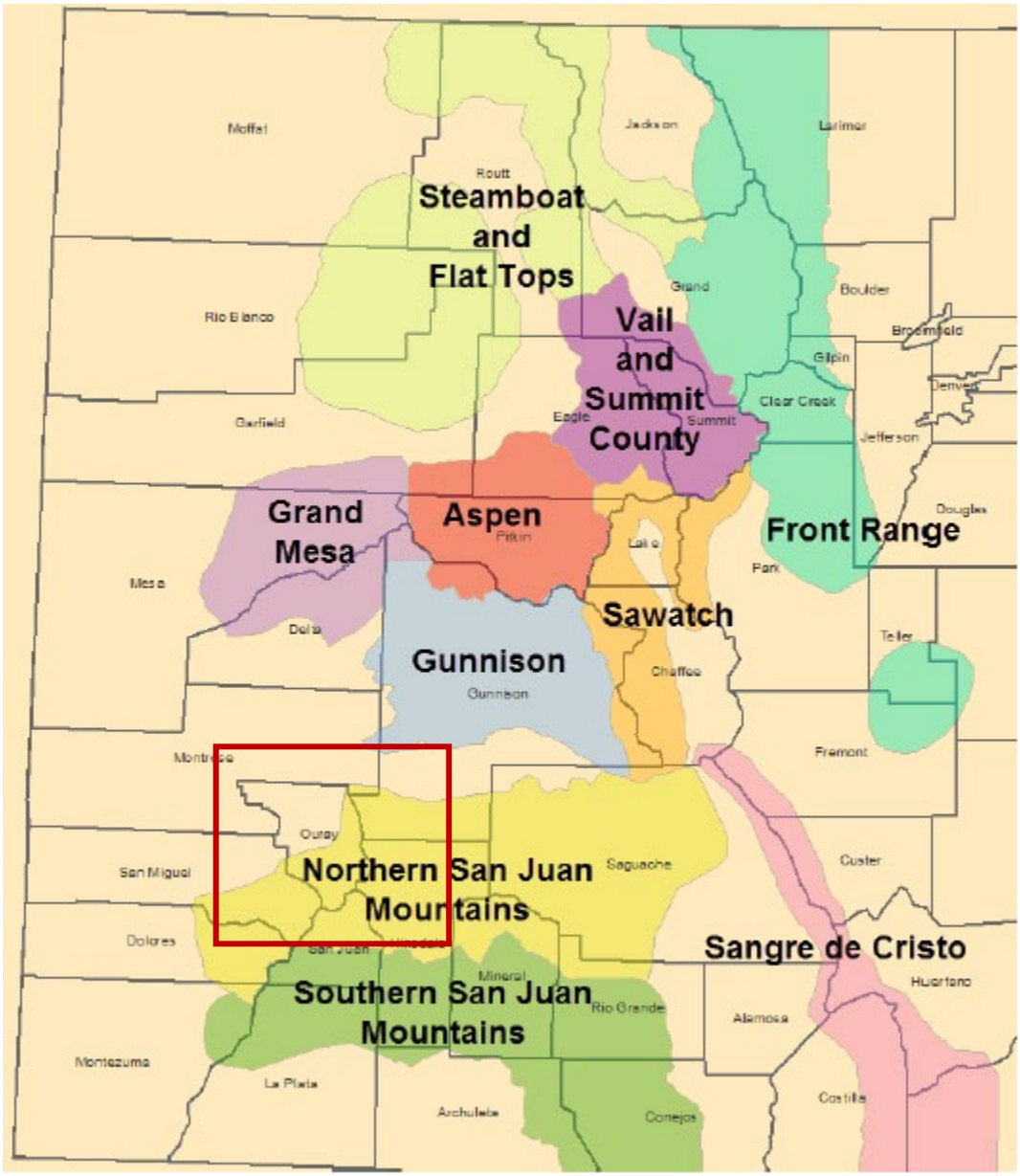
Skiers, snowboarders, and snowmobile operators are most commonly associated with avalanche hazards. However, motorists and others not engaging in recreation are also at risk of being caught in an avalanche. Colorado is a top-ranking state for the avalanche hazard because of its snowfall and mountain recreation.

Location

The Colorado Avalanche Information Center (CAIC) provides avalanche forecasting zones that can be used to indicate the locations of avalanche danger throughout Colorado, as shown in Figure 4-7 below. Much of the southern and eastern portions of the County are located in the Northern San Juan Mountain zone. These are mountainous areas of the County that experience heavy snowfall.[11] The San Juan Mountains that form the dramatic scenery in southern Ouray County are regarded as one of the most avalanche-prone regions in Colorado and rank high among the world's other avalanche-prone areas.

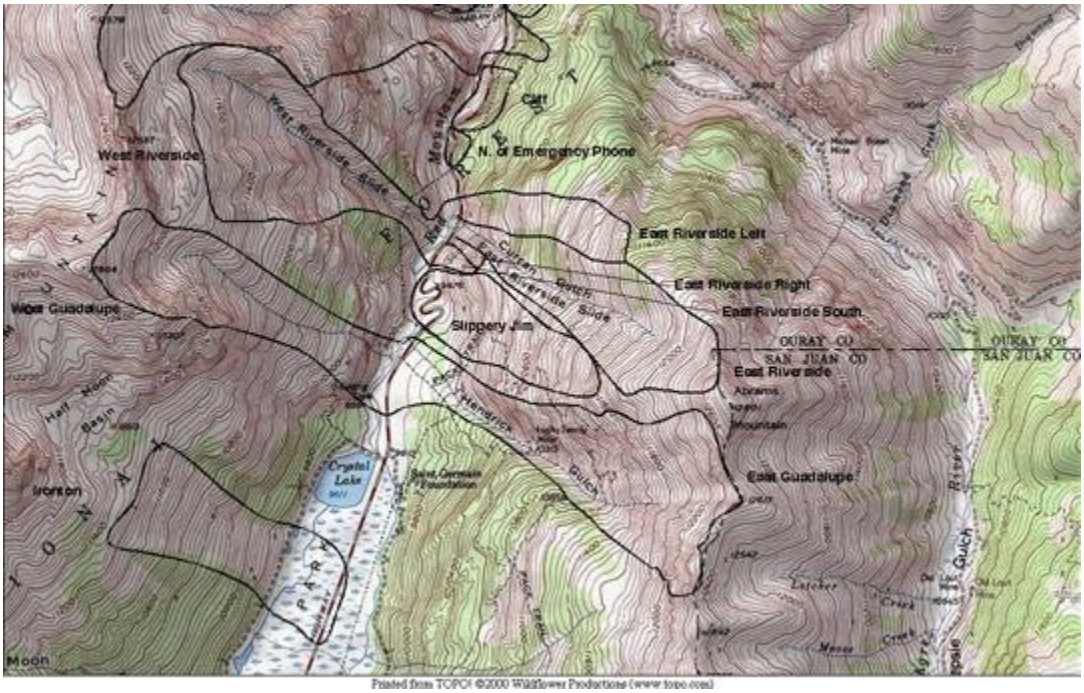
[11] Colorado Avalanche Information Center (CAIC)

Figure 4-7 Avalanche Forecasting Zones in Colorado



Southern Ouray County high country (undeveloped) and State Highway 550 over Red Mountain Pass and the Camp Bird Road area are particularly prone to avalanches, and the area is a popular destination for backcountry users. A map of the known avalanche paths affecting Highway 550, courtesy of the Colorado Avalanche Information Center, is provided in Figure 4-8.

Figure 4-8 Slide Paths in the Vicinity of East Riverside Slide Affecting Highway 550



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The East Riverside slide on Red Mountain Pass is notoriously dangerous because it impacts Highway 550. The East Riverside slide path and the avalanche shed are shown in Figure 4-9.

Figure 4-9 East Riverside Slide Path and Snow Shed on Highway 550



Extent

The North American Avalanche Danger Scale (Figure 4-10) is used by the U.S. and Canada to communicate the potential for avalanches to cause harm or injury.[12] Understanding avalanche conditions can help prevent injuries from occurring, however, once an avalanche is triggered it has a sudden onset making them difficult to escape from.

Figure 4-10 North American Public Avalanche Danger Scale

North American Public Avalanche Danger Scale

Avalanche danger is determined by the likelihood, size and distribution of avalanches.

Danger Level		Travel Advice	Likelihood of Avalanches	Avalanche Size and Distribution
5 Extreme		Avoid all avalanche terrain.	Natural and human-triggered avalanches certain.	Large to very large avalanches in many areas.
4 High		Very dangerous avalanche conditions. Travel in avalanche terrain not recommended.	Natural avalanches likely; human-triggered avalanches very likely.	Large avalanches in many areas; or very large avalanches in specific areas.
3 Considerable		Dangerous avalanche conditions. Careful snowpack evaluation, cautious route-finding and conservative decision-making essential.	Natural avalanches possible; human-triggered avalanches likely.	Small avalanches in many areas; or large avalanches in specific areas; or very large avalanches in isolated areas.
2 Moderate		Heightened avalanche conditions on specific terrain features. Evaluate snow and terrain carefully; identify features of concern.	Natural avalanches unlikely; human-triggered avalanches possible.	Small avalanches in specific areas; or large avalanches in isolated areas.
1 Low		Generally safe avalanche conditions. Watch for unstable snow on isolated terrain features.	Natural and human-triggered avalanches unlikely.	Small avalanches in isolated areas or extreme terrain.

Safe backcountry travel requires training and experience. You control your own risk by choosing where, when and how you travel.

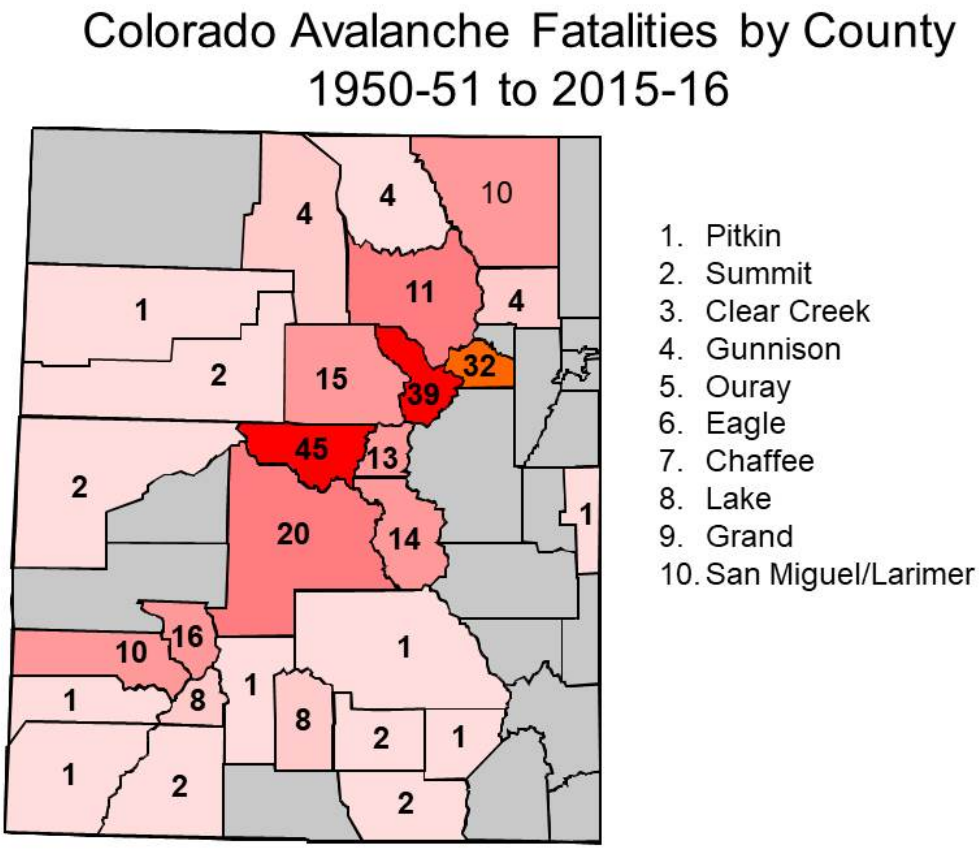
Previous Occurrences

Avalanches occur naturally every winter in the County. This discussion focuses on those avalanches that have collided with people or property. A detailed account of avalanche history in Ouray County has been compiled in Avalanche Hazard in Ouray County, Colorado 1877-1976 by Betsy Armstrong. In that report, 62 lives were lost, and 192 people were caught in avalanches between 1877 and 1976. Thirty-three sites of human activity, including mines and towns, have been damaged or destroyed. The sheer number of deadly events illustrates the danger of avalanches in the County.

More recently, avalanche fatalities have been due to backcountry recreation and travelers, particularly on Highway 550. According to the Colorado Avalanche Information Center, between 1950 and 2016, the County experienced 16 fatalities due to avalanches. Figure 4-11 shows the number of avalanche fatalities in Colorado between the winters of 1950-51 and 2015-16.[13] During this time period, Ouray County ranked fifth in the State in avalanche fatalities. Previous occurrences of avalanche fatalities, injures, or damages, particularly in more recent years, are limited to unincorporated Ouray County where backcountry users recreate. The incorporated communities typically do not experience avalanches.

[12] https://avalanche.org/avalanche-encylopedia/#extreme-danger
[13] https://avalanche.state.co.us/accidents/statistics-and-reporting/

Figure 4-11 Colorado Avalanche Fatalities by County, 1950 to 2016



Significant events since the 2015 Plan are noted below. Some incidents may have occurred just outside of Ouray County but may have involved Ouray first responders. Significant events previous to the 2015 Ouray County Hazard Mitigation Plan can be found in Appendix C – HIRA Appendix.

- **March 2019** – Historic snow totals triggered avalanches and snow slides along Highway 550 south of Ouray. Additionally, during avalanche mitigation along the highway, CDOT crews triggered slides that piled snow and debris as high as 60 feet over a 300-foot section of the highway. These slides caused Highway 550 to close for 23 miles between the City of Ouray and Silverton, impacting business on the south side of the town. This closed off Ouray to virtually everything south of town.[14]
- **January 5, 2019** – An avalanche on Upper Senator Beck Basin, northwest of Red Mountain Pass caught six skiers. When the avalanche caught Skier 1, his ski bindings released and he fell forward, traveling head downhill on his belly. He was under the snow at times, but rose to the surface as the debris stopped. He lost both skis and one ski pole. He was carried to the bottom of the slope. When the first avalanche stopped, Skier 1 was partially buried, not critical (his head was not under avalanche debris). He stood up and saw a second avalanche coming at him from an adjacent slope. The debris from the second avalanche ran over the debris of the first avalanche, but stopped short of Skier 1. The first avalanche caught Skier 2 and carried him to the

[14] https://weather.com/news/news/2019-03-12-avalanches-cut-off-colorado-town-ouray

bottom of the slope. The rest of the group was preoccupied with their own involvement in the slide, so we do not know Skier 2's condition at the end of the first avalanche. The second avalanche overran Skier 2's position in the debris of the first avalanche. The avalanche carried Skiers 3, 4, 5, and 6 between 15 and 20 feet downhill. The debris around them remained in large blocks, several feet thick and up to 12 feet wide. Skiers 3, 4, 5, and 6 stood up in the blocks of debris and looked around. They saw the second avalanche overrunning the debris of the first avalanche, but could not see Skiers 1 and 2. The rescue effort included members from Ouray County Search and Rescue, San Juan County Search and Rescue, La Plata County Search and Rescue, Careflight, and the Colorado Avalanche Information Center.[15]

Probability

Avalanches occur every winter in Ouray County. However, avalanches causing death or damages are less frequent. Based on the CAIC avalanche fatality data, from 1950 to 2016 there have been 16 fatalities in Ouray County, or a 24% annual chance of occurrence. This equates to a probability of "likely." The probability of occurrence is highest in unincorporated Ouray County, specifically around Highway 550 south of the City of Ouray.

Vulnerability Assessment

Inventory Exposed/Impacts

Avalanches pose a serious threat to backcountry recreationists, and frequently close State Highway 550 over Red Mountain Pass. The closures inconvenience travelers and commerce, but serve to minimize life safety impacts as avalanche control work is done by CDOT. However, road closures due to avalanche activity can result in serious transportation disruptions due to the limited number of roads within the County. State Highway 145 at Lizard Head Pass in San Miguel County often experiences avalanche closures during the same time as Highway 550, thus obstructing all access to the County from the south and west. Stranded travelers or commuters are often faced with a lack of lodging availability. Backcountry avalanche incidents involve search and rescue teams and resources, which can put these personnel in areas of risk.

Additionally, Ouray County is known as a worldwide destination for ice climbing. Many of the climbs are at the bottom of avalanche chutes, thus climbers may not be aware of dangers lurking high above them.

The keys to limiting impacts to individuals recreating in the area are knowledge and awareness of the hazard and being properly equipped for self-rescue, if necessary, with tools such as locater beacons, shovels, and probes.

In addition, the County experiences challenges with managing the impacts of avalanches due to the multi-jurisdictional nature of an event. For example, the 2019 avalanches originated on USFS land, crosses CDOT highway, and then impacts the City of Ouray through debris clogging creeks.

Potential Losses

It is public safety that is threatened the most by this hazard. Those most vulnerable include individuals recreating in and traveling through or under avalanche hazard areas. While road closures help to mitigate impacts to travelers on Highway 550, CDOT snowplow drivers can still be exposed while clearing roads of snow or avalanche debris. Additionally, costs associated with the removal of the avalanche debris can be significant. Avalanches inside and outside of the County can disrupt

[15] CAIC

transportation in and out of the County, which negatively impacts residents, businesses, and travelers and may result in economic losses to local businesses in the County.

The only available loss information is SHELDUS data. According to this data, there has been $25,611 (2017 dollars) in property damages from avalanches in Ouray County from 1960 to 2017, equating to approximately $450 in annual damages. No further information regarding these damages is provided by SHELDUS.

Future Conditions

Land Use and Development

The County's vulnerability to this hazard has fluctuated with development trends in the County, specifically as they relate to the mining industry. When the mining activity subsided considerably, so did the deaths and damage from avalanches. A renewed interest in mining is occurring in the Camp Bird Road area, and the County has been pressured to keep the road plowed year-round to allow access to the high-country area. This has the potential to put County road crews, and miners and mining infrastructure, at risk. Mining companies contract with Helitrax for avalanche control by helicopter, but the LPC noted that safety concerns remain.

Aside from mining concerns, avalanches primarily occur in the steep, remote, unincorporated portions of the County, and on public land that is not subject to development. The primary concern with the avalanche hazard is the continued interest in backcountry recreation, particularly on the Red Mountain Pass area, which is subject to avalanches.

Climate Change

According to the 2018 Colorado State Hazard Mitigation Plan, climate change may impact avalanches in the following way:

"Avalanche officials in several western states have noticed a pattern associated with increased avalanche risk.[16] Snow occurs early in the winter and is then followed by a long period without snow. This creates a thin snowpack that becomes structurally weaker as winter goes on. New layers of snow may not bond well to the weak base layer, creating prime conditions for avalanches. As Colorado experiences winters with higher average temperatures and lower average precipitation, these conditions that increase avalanche risk become more common."

With avalanches being prevalent every winter in Ouray County and winter backcountry recreation remaining popular, it will be imperative for avalanche forecasters to monitor these changes and incorporate them into avalanche predictions and education in the future.

Summary Risk Ranking

Hazards were ranked for each jurisdiction based on the results of this HIRA, LPC input, and public perception of risk. The overall ranks were derived by assigning each jurisdiction a value of 1 (low), 2 (medium), or 3 (high) for each hazard for: the probability of an event occurring, the potential impact of the hazard on property/structures/economy, and the potential impact of the hazard on people. The results were summed for each hazard and jurisdiction to create an overall rank. A summed score of four

[16] Freedman, Andrew. "Avalanches Taking Toll; Foreshadowing the Future?" February 24, 2012. http://www.climatecentral.org/news/thin-snowpack-in-the-west-raises-avalancherisks

or less equates to a "low" ranking, five to six equates to a "medium" ranking, and seven or greater equates a "high" ranking. The results are shown in the following figures below.

Table 4-7 Avalanche Risk Ranking

	Probability (of losses)	Potential Impact (economic)	Potential Impact (people)	Score	Risk Rank
City of Ouray	1	1	1	3	L
Town of Ridgway	1	1	1	3	L
Unincorporated County	2	1	2	5	M

4.5.5. Dam Failure

Description

Dam failure incidents involve unintended releases or surges of impounded water. Dam failure can be caused by rainfall, earthquakes, blockages, animal activity (such as burrowing), landslides, lack of maintenance, improper operation, poor construction, vandalism, and terrorism.

Dam failures can be arranged into four classifications: overtopping, foundation failure, structural failure, and other unforeseen failures. Overtopping failures result from the uncontrolled flow of water over, around, and adjacent to the dam. Earthen dams are most susceptible to this type of failure. Hydraulic failures account for approximately 28% of all dam failures. Foundation and structural failures are usually tied to seepage through the foundation of the main structure of the dam. Deformation of the foundation or settling of the embankment can also result in dam failure. Structural failures account for approximately 28% of all dam failures, and foundation problems account for another 25%. Earthquakes or sabotage account for 12% of all dam failures, while inadequate design and construction account for the remaining 7% of failures. According to the Association of State Dam Safety Officials, the average age of dams in the U.S. is 51 years. This means many dams are likely reaching their useful life cycle and are in need of maintenance.

Dams are classified through the U.S. Army Corps of Engineers (USACE) based upon hazard potential. This classification is based on the consequences if the dam were to fail, *not the potential of failure, or the existing condition of the dam*. The dams are rated (1) high, (2) significant, or (3) low hazard. The Army Corps of Engineers based the hazard potential designation on such items as acre-feet capacity of the dam, distance from nearest community downstream, population density of the community, and age of the dam.

- **High Hazard Dam Failure:** In case of failure of the dam, the dam would likely cause loss of life.
- **Significant Hazard Dam Failure:** Dam would, in case of failure, likely cause significant property damage, but no loss of life.
- **Low Hazard Dam Failure:** Dam would likely cause only minimal property damage. Hazard potential classification is no guarantee of safety.

Location

According to the Colorado Division of Water Resources, Dam Safety, as of April 16, 2019, there are five jurisdictional dams in Ouray County. A jurisdictional dam is a dam creating a reservoir with a capacity of

more than 100 acre-feet, or creates a reservoir with a surface area in excess of 20 acres at the high-water line, or exceeds 10 feet in height measured vertically from the elevation of the lowest point of the natural surface of the ground where that point occurs along the longitudinal centerline of the dam up to the crest of the emergency spillway of the dam.[17] Three of these dams are low hazard, one significant hazard, and one high hazard. Both the significant and high hazard dams have an Emergency Action Plan (EAP). These dams are listed in Table 4-8.

Table 4-8 Jurisdictional Dams in Ouray County

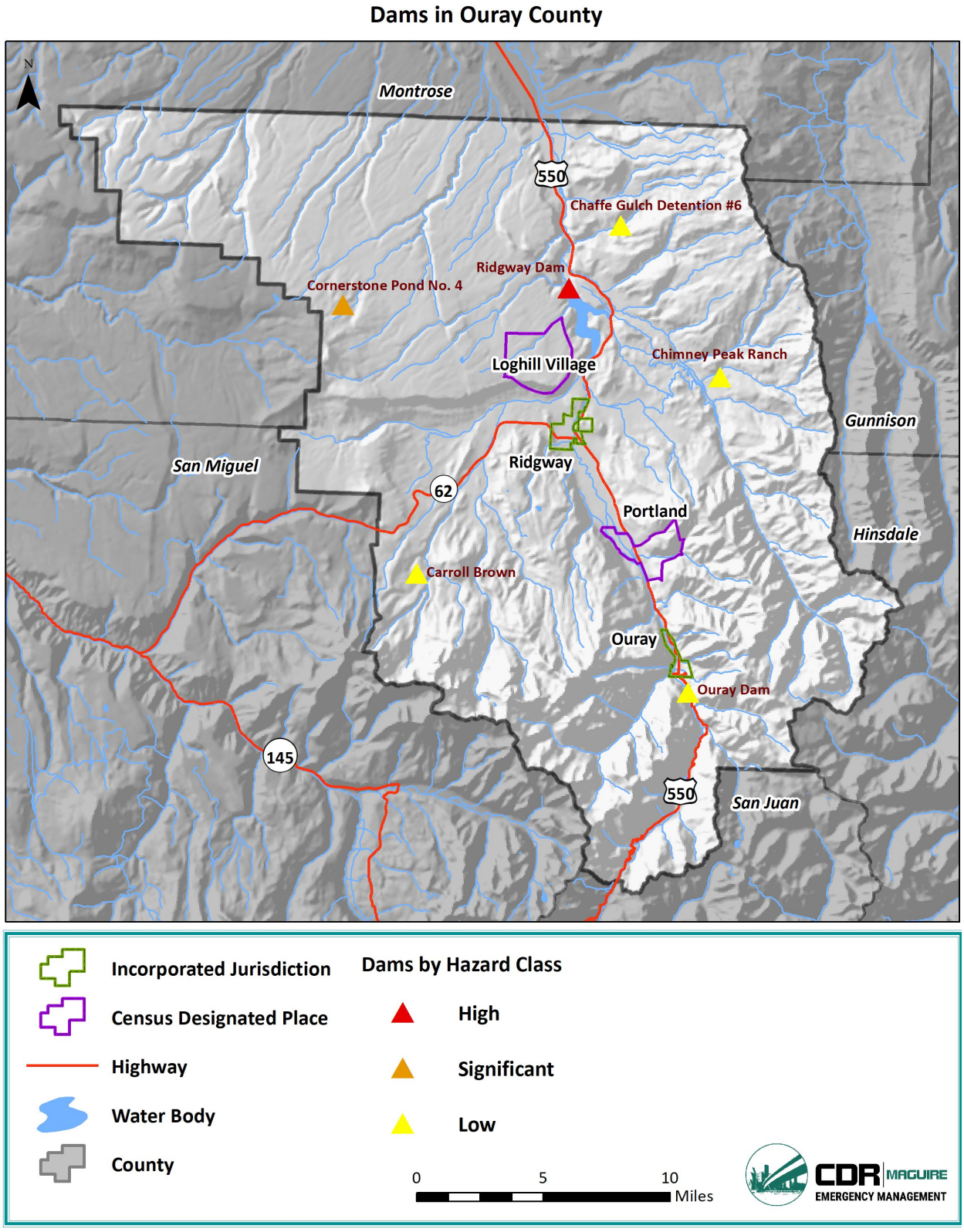
Dam Name	Stream	Downstream Town	Hazard Class	EAP	EAP Date
Carroll Brown	Spring Creek	Ridgway	Low	Not Required	
Chaffe Gulch Detention #6	Chaffee Gulch	Ridgway	Low	Not Required	
Ouray	Uncompahgre River	Ouray	Low	Not Required	
Ridgway	Uncompahgre River	Montrose	High	Yes	9/20/2017
Cornerstone Pond No. 4	Cottonwood	Montrose	Significant	Yes	1/11/2008

Additionally, there is one non-jurisdictional dam in the County. A non-jurisdictional dam is a dam creating a reservoir with a capacity of 100 acre-feet or less and a surface area of 20 acres or less and with a height measured as defined in Rules 4.2.5.1 and 4.2.19 of 10 feet or less.[18] This dam is the Chimney Peak Ranch Dam (Forgotten Reservoir) on Nate Creek and has a low hazard class.

These dams are mapped in Figure 4-12 below.

[17] https://data.colorado.gov/Water/DWR-Dam-Safety-Jurisdictional-Dam/mgjv-xmr5
[18] https://data.colorado.gov/Water/DWR-Dam-Safety-Non-Jurisdictional-Dam/6smc-zj6j

Figure 4-12 Dams in Ouray County



Lastly, there are 93 livestock water tank and erosion control dams in the County. These structures include all reservoirs built after April 17, 1941, on watercourses which the state engineer has determined to be "normally dry" and having a capacity of not more than ten acre-feet and a vertical height not exceeding fifteen feet from the bottom of the channel to the bottom of the spillway.[19]

Additionally, there are two dams that were identified by the LPC that are not included in the Colorado Dam Safety database. The Full Moon dam, located south of the City of Ouray on Crystal Lake, and a Federal Energy Regulatory Commission (FERC) regulated dam also south of the City of Ouray.

Extent

As mentioned previously, extent can be measured using the ratings of high, significant, and low hazard dams. Additionally, extent can be measured by factors such as speed of onset and warning time. The speed of onset depends on the type of failure. If a dam is inspected regularly then small leaks allow for adequate warning time. Once a dam is breached, however, failure and resulting flooding occurs rapidly. Dams can fail at any time of year, but the results are most catastrophic when the dams fill or overtop during winter or spring rain/snowmelt events.

Previous Occurrences

There is no history of previous dam failures in Ouray County. However, there have been over 130 known dam failures in Colorado since 1890.

Probability

Based on no previous occurrences, the probability of a dam failure in the County is unlikely. However, as dams age and as development occurs, it is still important to consider the impacts of a failure event. Although low probability of occurrence, a dam failure could cause devastating impacts.

Vulnerability Assessment

Inventory Exposed/Impacts

Dam failures can result in downstream flooding. Water released by a failed dam generates tremendous energy and can cause a flood that is catastrophic to life and property. Three factors that influence the potential severity of a full or partial dam failure are the amount of water impounded; the density, type, and value of downstream development and infrastructure; and the nature of the terrain between the dam and the downstream development. A dam failure event can dislodge trees and boulders, carrying them downstream into developed areas.

A catastrophic dam failure could challenge local response capabilities and require evacuations to save lives. Impacts to life safety would depend on the warning time and the resources available to notify and evacuate the public and could include major loss of life and potentially catastrophic damage to roads, bridges, and homes. Associated water quality and health concerns could also be an issue.

Ridgway Dam is the only high hazard dam in the County. If this dam were to fail, the Uncompahgre River valley downstream of Ridgway Reservoir would be inundated. The greatest impacts would be in Montrose County to the north of Ouray County. The proximity of this dam to potentially active faults has led the Bureau of Reclamation to regularly monitor the dam and microseismicity of the area (see earthquake profile). The core of the Ridgway Dam has been designed to withstand a M 8.0 earthquake. Ridgway Dam has an electronic notification system that would alert the Bureau of Reclamation in the

[19] https://data.colorado.gov/Water/DWR-Livestock-Water-Tank-and-Erosion-Control-Dams/r2rp-ecjb

event of a problem with the dam from an earthquake. The abutments have been shored up and an inactive fault below the dam was filled in during construction. Seismic monitoring is ongoing.

Ouray Reservoir was an old power generating facility that has silted in. Lake Lenore is not listed in the state or federal databases, but the LPC feels that this dam could impact the Dexter Creek drainage if it failed.

The Full Moon dam contains a small volume of water and was drilled for testing in 2007. The dam underwent repairs and improvements related to safety in 2013. Improvements to the outlet system allowed shutoff during an emergency and spillway improvements to double the capacity with additional rip rap to retard future erosion. Repairs were conducted by a Bureau of Reclamation team from Provo, Utah, that specializes in dam repair. Expenditures for the project are estimated at $300,000.

Cornerstone dam in the northern County was recently constructed in 2006-2007 and is rated as a significant hazard dam. It could impact Government Springs Road and one home below it. Other homes further downstream could be damaged, but the risk is not considered life threatening.

Both Cornerstone and Ridgway dams have emergency action plans.

All jurisdictions contain a dam or are located downstream from a dam in the County, therefore all jurisdictions are at risk to the impacts from this hazard. The Town of Ridgway is downstream from two low hazard dams and the City of Ouray downstream from one low hazard dam. Montrose (Montrose County) is downstream from the only high and significant hazard dams in the County. In addition, inundation areas for high hazard dams are available through Colorado Dam Safety. These areas are mapped in Appendix E (FOUO). Based on this data, portions of northern unincorporated County, following Highway 550 into Montrose County, are at risk to dam inundation from the Ridgway dam. The Highway could experience significant damages, which could cut off access to the County from the north. Based on this data, there are 84 parcels in the inundation area.

Additionally, Colorado Dam Safety has performed several analyses of dam failure risk throughout the State. First, the social vulnerability of populations in the event of a dam failure were analyzed for high and significant hazard dams across the State. Social vulnerability was measured based on factors such as age (under 5/over 65), race and ethnicity, percent living in group quarters, population, population density, income, English speaking ability, percent of population living in mobile homes, and more. The only dam included in this analysis in Ouray County was the Ridgway dam, which received a social vulnerability score of 2.1, which equates to a “medium-high” social vulnerability. Colorado Dam Safety also analyzed population at risk to dam failure. For the Ridgway dam 13,446 people were determined at risk, some of which are in Montrose County.

Lastly, Colorado Dam Safety conducted a first of its kind analysis to determine risk from high hazard dams during a range of release scenarios. Recent flooding events in Colorado in 2013 and 2015, and nationwide in 2017, have highlighted cases where excessive reservoir inflows caused dam spillway flows at dams to exceed normal rates and/or required controlled releases of water to lower reservoir levels. In some of these cases hazardous conditions developed in the channels and floodplains downstream of the dams and emergency actions were required. Although all high hazard dams in Colorado have dam failure inundation maps to delineate flooding limits for dam failures, no mapping exists nor is it required to be developed for the range of releases that might be anticipated to occur during flooding events. The

"Colorado High Hazard Dam Release – Downstream Floodplain Impacts Database and Ranking Tool" was created to begin to fill this gap. This database and ranking tool provides a screening level assessment of the potential for hazardous conditions downstream of high hazard dams throughout the state. It provides a ranking of high hazard dams where there is either a high, moderate or low likelihood of the existence of dangerous conditions created by dam and reservoir release operations simultaneously with naturally occurring flood conditions. Overall, 367 dams were analyzed, and in Ouray County, the Ridgway dam ranked 159th. This indicates a relative medium risk for the dam compared to other dams in the State for downstream floodplain impacts.

Potential Losses

Since there has not been documented previous occurrences of dam failures in Ouray County, there are not annual loss estimates available for this Plan. Significant losses could occur from a dam failure, including (but not limited to) building damage, flooding, infrastructure damage, and potential deaths and injuries.

Based on Colorado Dam Safety inundation data, as mentioned previously, there are 84 parcels located in the Ridgway dam inundation limits. These parcels have $26,598,530 in total exposure value (improvement value plus estimated contents value). This represents a worst-case scenario assuming all parcels were impacted from a dam inundation event at the Ridgway dam.

Future Conditions

Land Use and Development

Although dam failures are a relatively low frequency hazard, future development could still be threatened if structures are built in inundation zones. Flooding due to a dam failure event is likely to exceed the special flood hazard areas regulated through local floodplain ordinances. Jurisdictions should consider the dam failure hazard when permitting development downstream of the high and significant hazard dams. One important fact to note is that low hazard dams could become significant or high hazard if development occurs below them.

Regular monitoring of dams, exercising and updating of Emergency Action Plans (EAPs), and rapid response to problems when detected at dams are ways to mitigate the potential impacts of these rare, but potentially catastrophic, events.

Climate Change

Dams and other hydrologic containment structures are designed based on calculations of a river's flow behavior, and any changes in weather patterns can have significant effects on the hydrologic information used for the design of a dam. Although there is no consensus that annual mean precipitation will increase in Colorado due to climate change, it is possible that precipitation may increasingly come in the form of extreme storms. Extreme precipitation events may result in large floods that could stress dams, and thus potentially increase the risk of failure of these structures. In the last 100 years, overtopping due to inadequate or improperly designed spillways is the leading cause of dam failure and resulting loss of life.[20] The 2018 Colorado-New Mexico Regional Extreme Precipitation Study utilized an updated methodology to more accurately predict extreme precipitation events for dam

[20] Colorado-New Mexico Regional Extreme Precipitation Study (REPS) handout; https://www.esrl.noaa.gov/psd/outreach/resources/handouts/co-nm-precip-handout-psd.pdf

safety. This study also utilized the latest climate predictions and science for the region to incorporate into the model. These methods and results can be utilized to more accurately predict dam failures due to extreme precipitation events in the face of a changing climate.

Additionally, the structural integrity of earthfill dams may be compromised by climate change impacts such as drought and severe storms. Changes in vegetation and prolonged drying due to drought, embankment erosion due to severe storms, and more extreme fluctuations in water levels due to severe storms and increased frequency of drought all make earthfill dams vulnerable to climate change. The structural integrity of non-erodible dams, such as concrete, are less vulnerable to climate change, but extreme temperatures may lead to cracking or joint movement.[21]

Summary Risk Ranking

Hazards were ranked for each jurisdiction based on the results of this HIRA, LPC input, and public perception of risk. The overall ranks were derived by assigning each jurisdiction a value of 1 (low), 2 (medium), or 3 (high) for each hazard for: the probability of an event occurring, the potential impact of the hazard on property/structures/economy, and the potential impact of the hazard on people. The results were summed for each hazard and jurisdiction to create an overall rank. A summed score of four or less equates to a "low" ranking, five to six equates to a "medium" ranking, and seven or greater equates a "high" ranking. The results are shown in the following figures below.

Table 4-9 Dam Failure Risk Ranking

	Probability (of losses)	Potential Impact (economic)	Potential Impact (people)	Score	Risk Rank
City of Ouray	1	1	1	3	**L**
Town of Ridgway	1	1	1	3	**L**
Unincorporated County	2	2	2	6	**M**

4.5.6. Debris Flow

Description

Debris flows are among the most destructive geologic processes that occur in mountainous areas. A debris flow is a mass of water and earth materials that flows down a stream, ravine, canyon, arroyo, or gulch. Technically if more than half of the solids in the mass are larger than sand grains (e.g., rocks, stones, boulders) the event is called a debris flow, otherwise it is called a mudslide or mudflow. For the purposes of this plan the term debris flow is meant to be a global term to include mudslides/mudflows. Many of Colorado's older mountain communities built in major mountain valleys are located on or near debris fans. A debris fan is a conical landform produced by successive mud and debris flow deposits, and the likely spot for a future event. Three of the five conditions necessary for debris flows to occur: (1) steep slopes, (2) loose rock and soil material, and (3) clay minerals, are adequately met by the geography and geology in the Ouray area. The last two conditions for debris-flow occurrence: (4)

[21] 2018 Colorado State Hazard Mitigation Plan

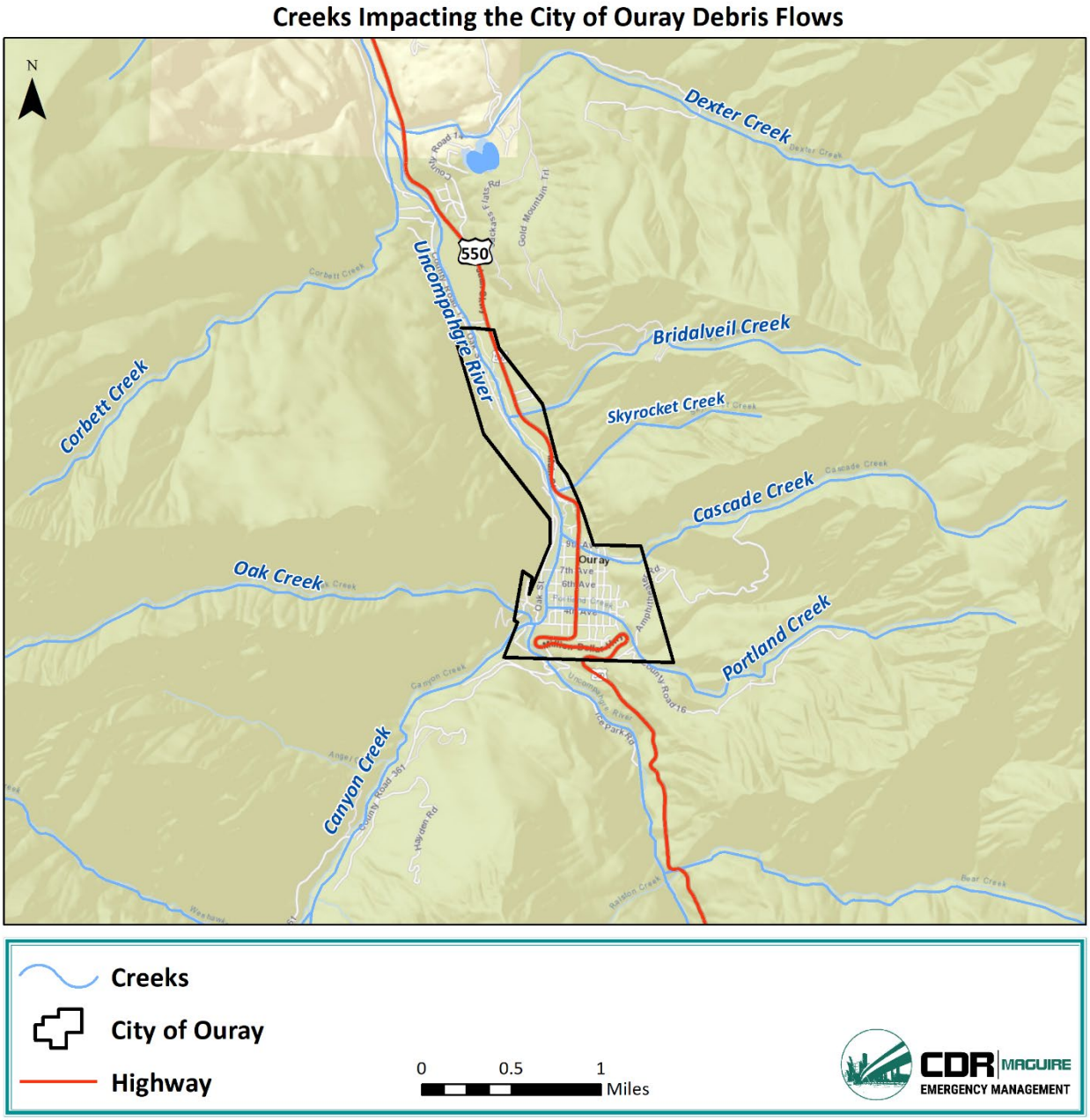
sufficient antecedent soil moisture, and (5) rainfall of sufficient intensity and duration to initiate slope movement, are provided by snowmelt and intense summer thunderstorms.

The debris flow problem can be exacerbated by wildfires that remove vegetation that serves to stabilize soil from erosion. Heavy rains on the denuded landscape can lead to rapid development of destructive mudflows.

Location

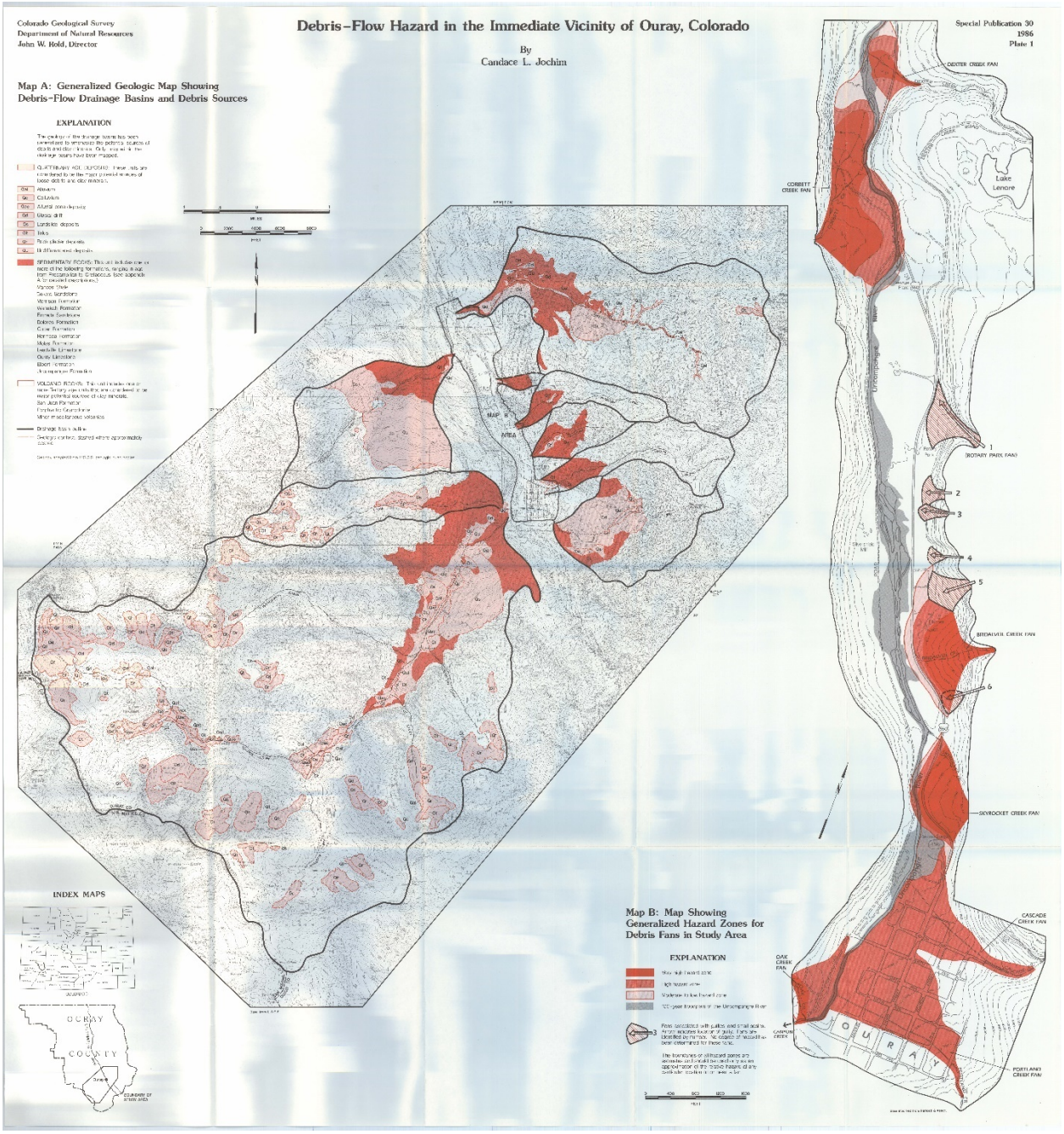
Due to the geology and steep topography in Ouray County, debris flows occur in the southern portion of the County, particularly in and around the City of Ouray and the Highway 550 corridor, following heavy rains. The City of Ouray and surrounding areas have been developed near debris fans since it was founded in 1875. According to the Colorado Geological Survey's (CGS) Special Publication 30: Debris-Flow Hazard in the Immediate Vicinity of Ouray, Colorado (1986 Candace Jochim author), there are eight creeks and several smaller basins and gullies that directly affect the City of Ouray, including Portland, Cascade, Skyrocket, Canyon, Oak, Bridalveil, Corbett, and Dexter. The main part of the City is located on the debris fans of Portland, Cascade, and Oak Creeks (the corporate limits include Skyrocket and Bridalveil Creeks). These creeks are mapped in Figure 4-13 below.

Figure 4-13 Creeks Impacting the City of Ouray Debris Flows



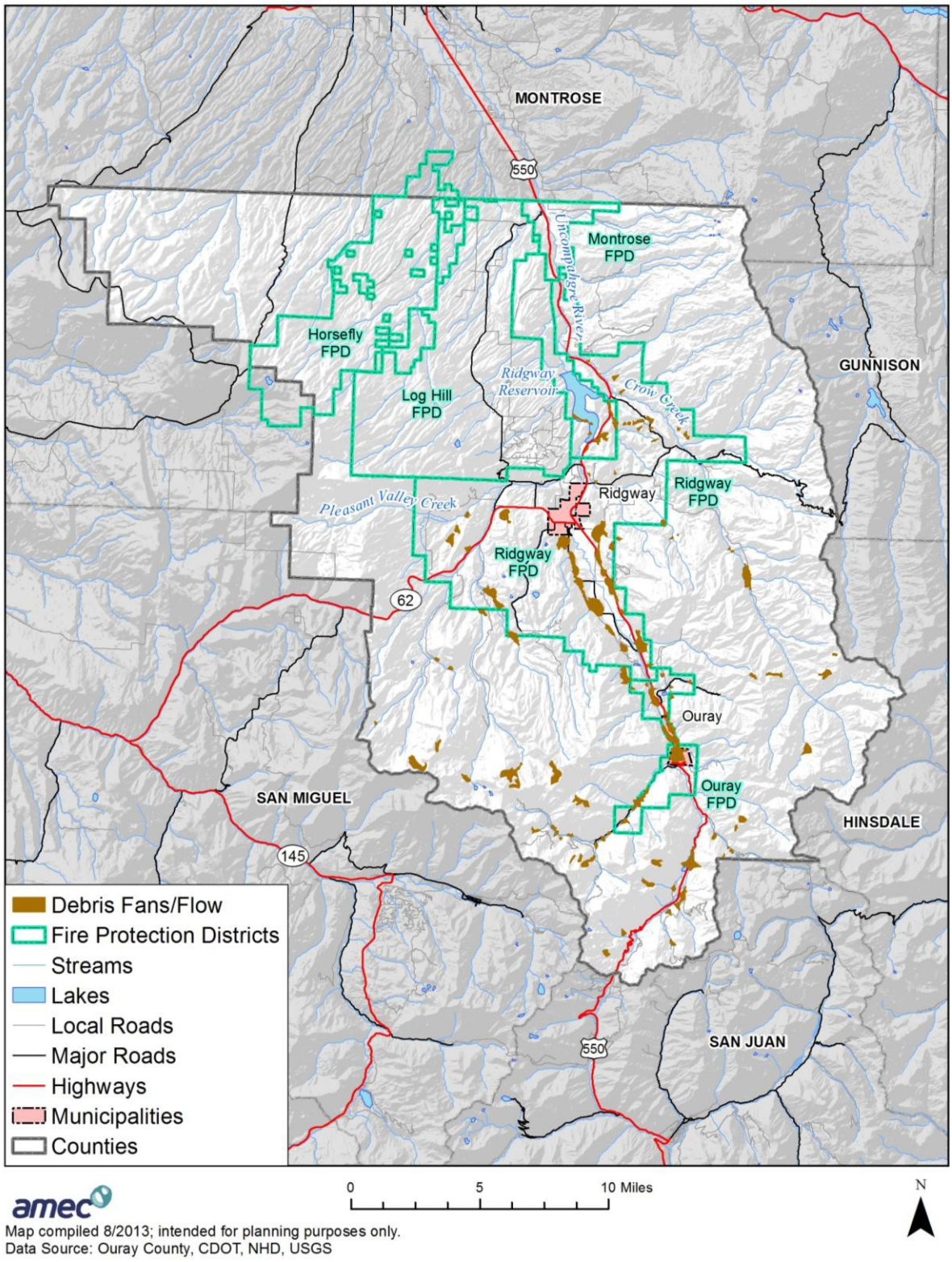
Debris flow hazard areas have been studied and mapped in CGS Special Publication 30. The maps detail very high, high, and moderate to low hazard zones. The majority of the Bridalveil Creek Fan and Skyrocket Creek Fan are designated “very high hazard.” The Cascade Creek and Portland Creek fans, upon which most of the City of Ouray is built, are designated as “high hazards.” No GIS data was available for this Plan update. Figure 4-14 shows debris fans in the City of Ouray and its vicinity, provided by the CGS.

Figure 4-14 Debris Flow Hazard in the City of Ouray



Additionally, The Corbett Creek fan and Dexter Creek fan are debris flow-susceptible areas in the unincorporated County. According to the LPC, County Roads 5 and 7 southwest of Ridgway require regular repairs and inspection due to damage from debris flows. County Road 17 near Corbett Creek has also been impacted several times in the past. Mudslides have also overrun and closed State Highways 62 and 145 several times a year. No GIS data was available for this Plan, therefore the county-level mapping of debris fans from the 2015 Ouray County Hazard Mitigation Plan is shown in Figure 4-15 below.

Figure 4-15 Debris Fans in Ouray County



Extent

Debris flows can occur rapidly with little warning during torrential rains. Debris and mudflows generally occur with floods and downpours associated with the late summer monsoon season. The CGS report identifies debris flow hazard areas based on the following scale:

- **Very High Hazard Zone**—This is the zone of greatest hazard. It is estimated that in this area the greatest impact from, and most frequent exposure to, debris flows and floods occurs. The zone is characterized by steep slopes, deposits of large boulders (greater than two feet in diameter), tree scars and burial, channels, levees, and lobes. Damage in this zone could include structural damage, such as buildings being moved off their foundations, walls and windows being broken, large accumulations of debris being piled in and around buildings, trees being toppled or severely damaged, and severe mud and water damage. Plugs of debris should be expected in this zone, and loss of life is possible.
- **High Hazard Zone**—This is the zone of high hazard. This zone is subject to debris flows and floods, but does not experience the maximum impact of the events. However, events may be just as frequent as in the Very High Hazard Zone. The zone is generally characterized by moderate to steep slopes, boulders, levees, lobes, tree scars and burial, and channels. Damage in this zone could include moderate damage to structures resulting from the pounding of boulders and logs, broken windows, basements filled with mud and debris, piles of debris in and around structures and in yards and streets, and severe mud and water damage.
- **Moderate to Low Hazard Zone**—This hazard zone is usually subjected primarily to mud and water flooding as a result of debris-flow events. This zone is characterized by low to moderate slopes, and deposits of abundant mud, and minor debris (small boulders, one foot or less and logs). Damage is usually comparatively minor, consisting of mud and water damage to outer walls of buildings, basements, and yards.

Previous Occurrences

The City of Ouray and Ouray County have histories of damaging mud and debris flows. Notable events occurred in 1878, 1909, 1927, 1929, 1951, 1965, 1971, 1973, 1981, 1982, 1984, 1988, 1998, 2002, 2003, 2005, 2008, 2010, 2013, 2014, and 2018 with many years having more than one event. The 1929 events were considered the most widespread and devastating. Note that this hazard is closely related to the flood hazard. All of these events included heavily sediment and debris-laden flood waters between the plugs or pulses of mud and debris. In Jochim's analysis of past events, the damage has been more debris than water related. The CGS report indicates that the 1981 and 1982 reports had damage and cleanup costs of $196,000 and $360,000, respectively. Those storms were considered to be 10 to 25-year storms, so the damage from a 100-year event would be much higher.

Mudslides have also overrun and closed State Highways 62 and 145 several times a year, cutting off the County from the west.

Events since the 2015 Ouray County Hazard Mitigation Plan are described below:

July 8, 2018 - Around 4 to 10 feet of mud and rock covered Highway 550 about two miles south of Ouray as a result of heavy rainfall. A section of the highway and cribwall that supports the highway were destroyed from the rock slides and debris flows that occurred. Highway 550 was closed for almost 24

hours until the debris was removed, and then the highway was limited to one lane for many weeks thereafter as the road was repaired. This event caused $500,000 in damages.[22]

August 15, 2014 - Highway 550 was closed due to a debris flow at mile marker 100 in the Uncompahgre River valley near Portland. Mud, trees and tires all flowed across both lanes of the roadway.

September 4, 2013 - Heavy rainfall caused mud and debris flows in Senator Gulch past Angel Creek.

Figure 4-16 Damage to County Road 17 from August 6, 2013 Debris Flow[23]



There is a long history of efforts to mitigate the hazard in the City of Ouray that began with the construction in 1909 of channels, or flumes, to route debris and water from Portland and Cascade creeks through the City. Over time the impacts of repeated debris flows have degraded the flumes, and often the flumes would plug and divert debris into nearby property. The most recent improvements to the flumes were made in 2005.

The CGS' Critical Landslides in Colorado, A Year 2002 Review and Priority List was done as part of an update of the 1988 Colorado Landslide Mitigation Plan. The update is a status report on 49 locations believed to pose the most serious landslide risk in Colorado that were identified in the 1988 plan. The hazard areas (landslide/rockfall or debris flow) are categorized into three tiers. Tier one listings are serious cases needing immediate or ongoing action or attention because of the severity of potential impacts. The report lists the Ouray Town Site and vicinity debris flows in Ouray County as a Tier one debris flow area. This excerpt is from the report:

[22] NCEI Storm Events Database, accessed April 2019
[23] LPC

"The main town site of Ouray is located on the coalescing debris fans of Portland and Cascade Creeks. A small portion of the town lying on the west side of the Uncompahgre River is on the debris fan of Oak Creek. Recently, the fan of Skyrocket Creek at the north edge of town was subdivided into several residential sites. One or more of these fans has had debris flow and flash flood events on 22 occasions between 1874 and 1982. Efforts were made to control the debris by construction of a timber-lined channel ("flume") with a concrete bottom that was completed in 1909. These provided some protection, but damage continued when the flumes became clogged or overflowed. Major events occurred in 1981 and 1983 and the decrepit flumes were overwhelmed, resulting in damage to many homes, businesses, and town facilities. Following these destructive events, the City received grants for design and replacement of the flumes with reinforced concrete structures. These new structures have yet to be tested by a major debris flood. They are more durable structures that will probably handle moderate-sized events, but it remains to be seen if they can tolerate the massive debris flow plugs of major events without malfunctioning. Debris plug fronts 25 to 30 ft. high have been reported, and deposits at the highway of 40 ft. depth have occurred (Jochim, 1986)."

"Some engineering studies and mitigation designs were made by private consultants to the developer before the Skyrocket fan was subdivided in 1996. A key part of the mitigation is the redesign and replacement of an old diversion structure above the fan. A wooden diversion structure at this location was built in the spring of 1929, and it failed during massive debris flows in July that same year. When the diversion failed, a drift of debris 40 ft. high was deposited on the highway below the fan. The new diversion is intended to intercept most of the debris flow volume and divert it to the north side of the Skyrocket fan. If this functions, it could minimize debris flow and flash flooding on the main fan that now contains several new homes. If it doesn't perform as intended, these homes and older City and residential areas west of US Hwy 550 will continue to be in very high-hazard areas."

The report's Year 2002 Evaluation and Recommendations includes: "Our recommendations in the year 2002 are that further building of homes on the Skyrocket fan be held in abeyance until adequacy of the diversion structures has been tested by a major debris event or until an independent review of the mitigation scheme confirms it to be adequate. For other parts of Ouray and vicinity, the report and maps of Jochim (1986), should be consulted for guidance in land-use decisions."

Probability

Debris flows in Ouray County have a 100% chance of occurrence in any year, equating to a "highly likely" probability. Based on the Jochim report, which analyzed past events, damaging storms occur at intervals of approximately 10 to 25 years.

Vulnerability Assessment

Inventory Exposed/Impacts

Debris flows can damage property, close roads, and cause injuries or death. A road closed due to debris flow activity can result in serious transportation disruptions due to the limited number of roads in the County. This has happened repeatedly along County Road 17 and State Highways 62 and 145. Although all jurisdictions are at risk to the impacts of debris flows, the City of Ouray and the nearby Highway 550 corridor are the most impacted areas of the County. A debris flow within the City itself could block major streets, making movement within the City largely impossible and severely hindering emergency response. When Highway 550 is closed, it severely reduces north/south access in and out of the County.

Debris flows originating from Portland and Cascade creeks, based on historic incidents, have posed a serious threat to the City of Ouray residents and residential and commercial property. The City of Ouray has done significant work on mitigating the debris flow hazard. The threat has been reduced somewhat by flumes that have been constructed to divert debris and flows through the City. There is still the potential for a large event to overwhelm these flumes, or for the flumes to be plugged with debris during an event, resulting in debris spilling onto local streets. The debris flow risk can also be significantly exacerbated by wildfires.

More recent development on the debris fans of Skyrocket and Bridalveil creeks incorporate geotechnical investigations and recommendations to reduce potential impacts. Homes on the debris fans are protected to some degree by dredged channels with berms that divert flows. These are not engineered structures and could be susceptible to failure or overtopping during a large event. Skyrocket Creek threatens the hot springs pool, which has been filled with debris in the past. The pool is a major economic engine for the City and can have 300-400 visitors at a time in the busy summer months. A worst-case scenario would be if a debris flow struck the crowded pool. Residential development on the Corbett Creek and Dexter Creek debris fans could also be potentially at risk. There are currently no warning systems on any of the problem drainages.

Potential Losses

In Jochim's analysis of past events, the damage has been more debris than water related. The CGS report indicates that the 1981 and 1982 reports had damage and cleanup costs of $196,000 and $360,000, respectively. Those storms were considered to be 10 to 25-year storms, so the damage from a 100-year event would be much higher. The most recent event in July 2018 caused $500,000 in damages.

With no updated GIS data for this Plan, data from the 2015 Ouray County HMP still remains as the best available loss estimations. A GIS analysis was conducted to determine population at risk and total exposure and potential losses of structures located in debris fans. Overall, it was determined that 292 people are at risk to debris flows in the City of Ouray and 90 people in unincorporated Ouray County, for a total of 382 people at risk. It should be noted that population has grown since the 2010 population estimates used in the previous Plan (3% increase in the City of Ouray and 9% increase in unincorporated County). Therefore, it can be assumed the population at risk is slightly higher than the previous Plan estimates. Additionally, since the City of Ouray's population swells during the summer tourism months, it was estimated that lodging-related tax revenues that could be lost to the City if a serious flood kept tourists away could be as high as $27,000 per month. Lastly, it was estimated that the City of Ouray contains $148,432,820 in total value of parcels located in debris fans and unincorporated County $38,822,795, for a total value of $187,255,615. The full debris flow analysis can be found in Appendix C – HIRA Appendix.

Overall, people and structures in the City of Ouray and directly surrounding areas are most at risk to damaging debris flows in the County. However, there are debris fans located throughout the County, and any structure located near a debris fan or steep slope is at risk to losses from this hazard.

Future Conditions

Land Use and Development

Debris Flows are a primary concern for the City of Ouray and unincorporated County near the City. The City of Ouray is projected to experience population growth through 2050, but at a slow rate. Hazard

maps and land use codes have been designed to discourage development of hazard-prone areas. The City of Ouray has developed on high hazard debris fan areas of Skyrocket and Bridalveil creeks. Development has also occurred on the Corbett Creek and Cutler Creek debris fans in unincorporated Ouray County.

Climate Change

Although there is no consensus that annual mean precipitation will increase in Colorado due to climate change, it is possible that precipitation may increasingly come in the form of extreme storms. These high-intensity rainfall events could lead to increased flash flood conditions, which exacerbates the potential for debris flows. Additionally, climate change is contributing to an increased frequency of high-intensity wildfires across the western United States. These high-intensity wildfires can decimate vegetation, which increases the risk for debris flows during a rain event.

Summary Risk Ranking

Hazards were ranked for each jurisdiction based on the results of this HIRA, LPC input, and public perception of risk. The overall ranks were derived by assigning each jurisdiction a value of 1 (low), 2 (medium), or 3 (high) for each hazard for: the probability of an event occurring, the potential impact of the hazard on property/structures/economy, and the potential impact of the hazard on people. The results were summed for each hazard and jurisdiction to create an overall rank. A summed score of four or less equates to a "low" ranking, five to six equates to a "medium" ranking, and seven or greater equates a "high" ranking. The results are shown in the following figures below.

Table 4-10 Debris Flow Risk Ranking

	Probability (of losses)	Potential Impact (economic)	Potential Impact (people)	Score	Risk Rank
City of Ouray	3	3	3	9	H
Town of Ridgway	1	1	1	3	L
Unincorporated County	3	2	2	7	H

4.5.7. Drought

Description

Drought is a condition of climatic dryness that is severe enough to reduce soil moisture and water below the minimum necessary for sustaining plant, animal, and human life systems. Influencing factors include temperature patterns, precipitation patterns, agricultural and domestic water supply needs, and growth. Lack of annual precipitation and poor water conservation practices can result in drought conditions.

Drought is a complex issue involving many factors, it occurs when a normal amount of moisture is not available to satisfy an area's usual water-consuming activities. Drought can often be defined regionally based on its effects:

- Meteorological drought is usually defined by a period of below average water supply.

- Agricultural drought occurs when there is an inadequate water supply to meet the needs of the State's crops and other agricultural operations such as livestock.
- Hydrological drought is defined as deficiencies in surface and subsurface water supplies. It is generally measured as streamflow, snowpack, and as lake, reservoir, and groundwater levels.
- Socioeconomic drought occurs when a drought impacts health, well-being, and quality of life or when a drought starts to have an adverse economic impact on a region.

Due to Colorado's semiarid conditions, drought is a natural but unpredictable occurrence in the State. However, because of natural variations in climate and precipitation sources, it is rare for all of Colorado to be deficient in moisture at the same time. Single season droughts over some portion of the State are common. The onset of drought in western Colorado mountainous counties is usually signaled by a lack of significant winter snowfall. Ouray County receives the majority of its precipitation as snow in the higher elevations between November and April. Hot and dry conditions that persist into spring, summer, and fall can aggravate drought conditions, making the effects of drought more pronounced as water demands increase during the growing season and summer months.

Location

The entire County is at risk to drought conditions including the populated areas of local water supplies for the City of Ouray and Town of Ridgway (domestic needs) and widespread areas of the County (agricultural, environmental, and recreational needs).

Extent

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 can take years before the consequences are realized. It is often not obvious or easy to quantify when a drought begins and ends. Droughts can be a short-term event over several months or a long-term event that lasts for years or even decades.

The Palmer Drought Severity Index (PDSI) was developed by Wayne Palmer in the 1960s and uses temperature and rainfall information in a formula to determine dryness (Table 4-11). Over time it has become the semiofficial drought index for risk assessment and hazard analysis. The Palmer Index is most effective in determining long term drought, a matter of several months, and is not used for short-term forecasts (a matter of weeks). It uses a zero as normal conditions and drought is shown in terms of negative numbers; for example, -2 is moderate drought, -3 is severe drought, and -4 is extreme drought. The following table provides an overview of the Palmer Index compared to other drought classification systems. The return period is related to how often the type of drought typically occurs. For example, a minor drought occurs every three to four years.

Table 4-11 Palmer Drought Severity Index

			Drought Monitoring Indices		
Drought Severity	**Return Period (years)**	**Description of Possible Impacts**	**Standardized Precipitation Index (SPI)**	**NDMC* Drought Category**	**Palmer Drought Index**
Abnormal Drought	3 to 4	Going into drought, short term dryness slowing growth of crops or pastures. Fire risk above average. Coming out of drought, some lingering water deficits, pastures or crops not fully recovered.	-0.5 to -0.7	DO	-1.0 to -1.9
Moderate Drought	5 to 9	Some damage to crops or pastures, fire risk high, streams, reservoirs, or wells low, some water shortages developing or imminent, voluntary water use restrictions requested.	-0.8 to -1.2	D1	-2.0 to -2.9
Severe Drought	10 to 17	Crop or pasture losses likely, fire risk very high, water shortages common, water restrictions imposed.	-1.3 to -1.5	D2	-3.0 to -3.9
Extreme Drought	18 to 43	Major crop and pasture losses, extreme fire danger, widespread water shortages or restrictions	-1.6 to -1.9	D3	-4.0 to -4.9
Exceptional Drought	44+	Exceptional and widespread crop and pasture losses, exceptional fire risk, shortages of water in reservoirs, streams, and wells creating water emergencies.	Less than -2.0	D4	-5.0 or less

*National Drought Monitoring Center

Previous Occurrences

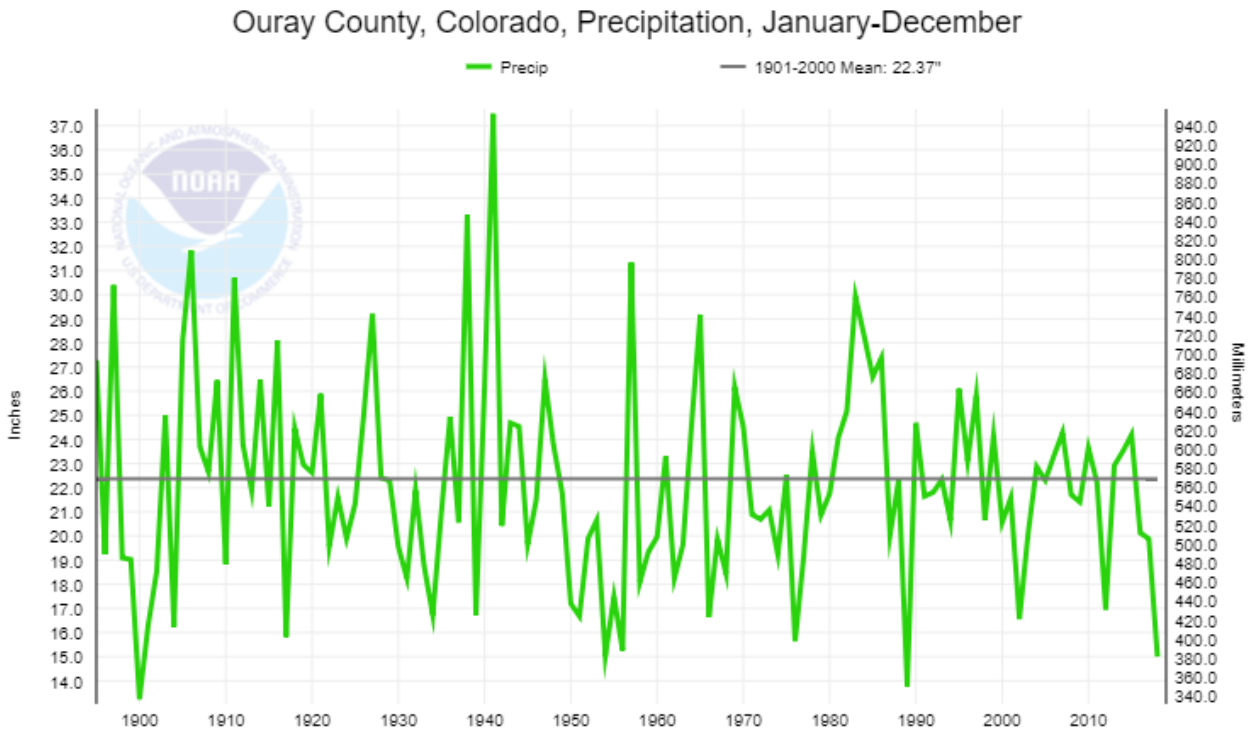
Previous occurrences of drought can be measured in several ways. For this Plan, previous occurrences were determined by reviewing precipitation averages over time to identify periods with precipitation amounts below the long-term average, and reviewing U.S. Drought Monitor records/current conditions. Drought conditions based on precipitation deficits are described in Table 4-12, indicating the top five years of precipitation deficit departure from the long-term average of 22.37 inches. [24] Precipitation deficits are also shown in Figure 4-17. It is evident significant precipitation deficits have occurred throughout history in Ouray County. However, recently, 2018 was the third driest year since 1895.

[24] https://www.ncdc.noaa.gov/cag/county/time-series for Ouray County

Table 4-12 Precipitation Deficits 1895-2018

1901-2000 Precipitation Average	Year	Total Precipitation	Deficit
22.37 in.	1900	13.24 in.	9.13 in.
22.37 in.	1989	13.78 in.	8.59 in.
22.37 in.	2018	15.01 in.	7.36 in.
22.37 in.	1954	15.04 in.	7.33 in.
22.37 in.	1956	15.26 in.	7.11 in.

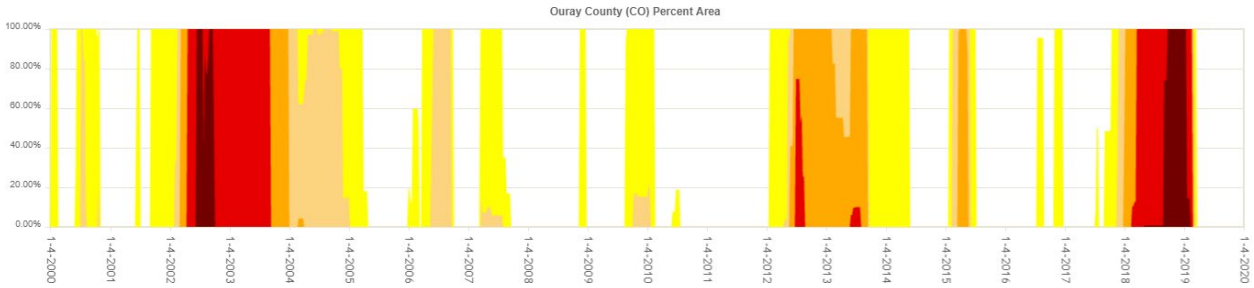
Figure 4-17 Precipitation Deficits 1895-2018



Drought conditions based on U.S. Drought Monitor records are shown in Figure 4-18. [25] Based on this data, the most severe drought conditions during this timeframe occurred from approximately 2002 to 2004, and again from 2018 to 2019. For parts of 2018, 100% of the County was experiencing exceptional drought conditions (D4). Additionally, the years of 2012 to 2014, the County experienced severe to extreme drought conditions (D2-D3).

[25] https://droughtmonitor.unl.edu/Data/Timeseries.aspx for Ouray County

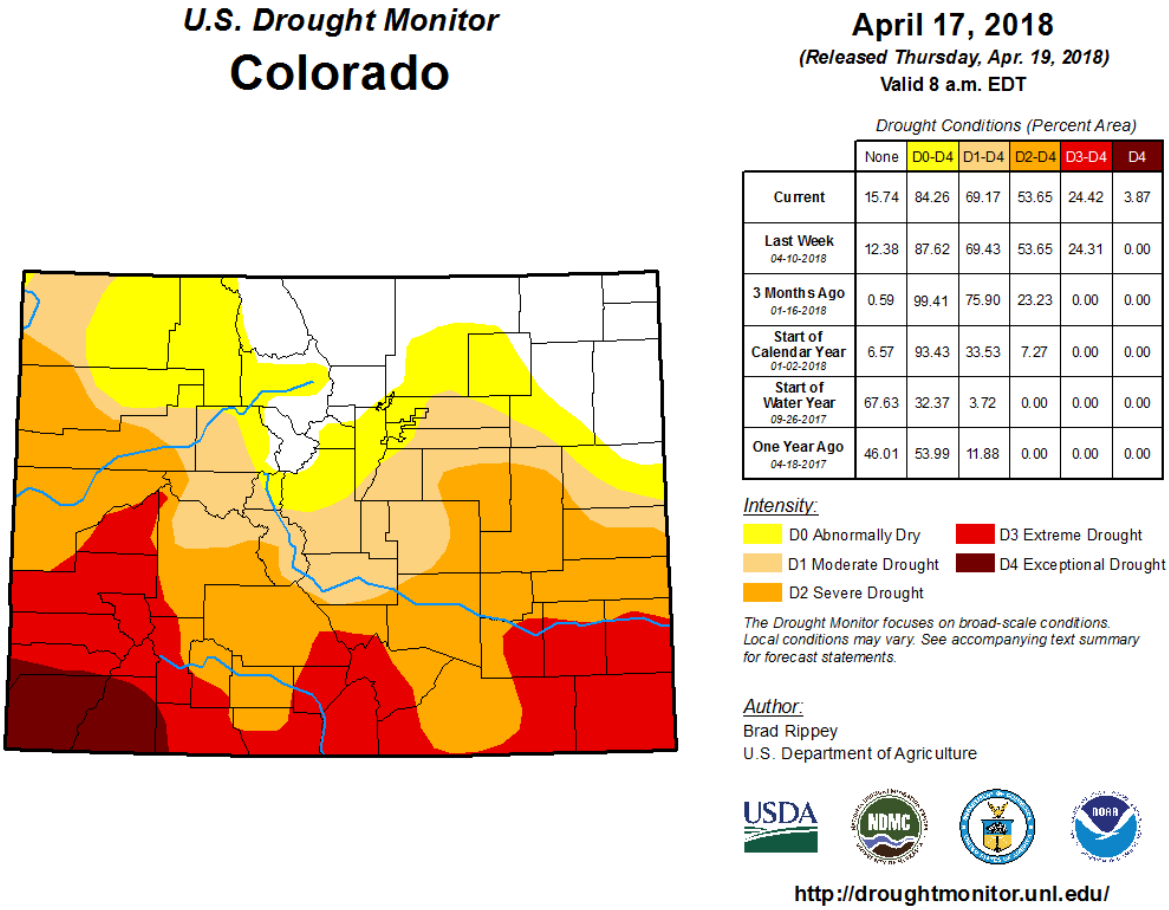
Figure 4-18 U.S. Drought Monitor Previous Droughts, 2000-2018



The winter of 2018 brought extremely low snowpack totals to southwest Colorado, leaving the April 1, 2018 snowpack totals between 50% and 69% of normal for Ouray County. The snowpack above Ridgway Reservoir was only at 46% of average and streamflows into the reservoir were at approximately 40% of average. Governor Hickenlooper activated the Colorado Drought Mitigation and Response Plan for the agricultural sector in 34 of the State's 64 counties, including Ouray.[26] Figure 4-19 shows drought conditions in Colorado April 17, 2018.[27] The County was fortunate in that reservoir storage levels were adequate to offset the historically low snowfall levels. Additionally, southwest Colorado received much higher snowfall during the 2018-2019 winter season. As of April 2019, the Gunnison River Basin (to include Ouray County) was at 148% of normal for snow-water equivalent measurements.[28] These circumstances helped ease the impact of the 2018 drought. However, the dry conditions led to wildfire concerns for the summer, which was one of the worst wildfire seasons on record for the State. As of April 2019, no part of Ouray County is experiencing drought conditions.

[26] https://www.telluridenews.com/news/article_3c54b03c-5fac-11e8-9ef4-675a7ff6f4c8.html
[27] U.S. Drought Monitor
[28] https://www.weather.gov/bou/co_snowpack

Figure 4-19 Drought Conditions in Colorado April 17, 2018



Additional details on previous occurrences of drought prior to the 2015 Ouray County Hazard Mitigation Plan can be found in Appendix C – HIRA Appendix.

Probability

According to the 2018 Colorado State Hazard Mitigation Plan, the probability of a drought occurring in any given year is 32.4%, equating to a likely probability. Based on the limited time-series data for Ouray County specifically, this is the most accurate probability estimate for Ouray County. Additionally, based on the NOAA Drought Outlook through the spring, above average precipitation is expected for the southwest United States, keeping drought at bay in Ouray County.[29]

Vulnerability Assessment

Inventory Exposed/Impacts

Drought impacts are wide-reaching and may be economic, environmental, and/or societal. The most significant impacts associated with drought in Colorado are those related to water intensive activities such as agriculture, wildfire protection, municipal usage, commerce, tourism, recreation, and wildlife preservation. An ongoing drought may leave an area more prone to beetle kill and associated wildfires.

[29] https://www.cpc.ncep.noaa.gov/products/expert_assessment/mdo_summary.php

Drought conditions can also cause soil to compact, increasing an area's susceptibility to flooding, and reduce vegetation cover, which exposes soil to wind and erosion. A reduction of electric power generation and water quality deterioration are also potential problems. Drought impacts increase with the length of a drought, as carry-over supplies in reservoirs are depleted and water levels in groundwater basins decline. The following discussion highlights past impacts from drought events.

Ridgway Reservoir is a state and local asset vulnerable to drought, in terms of water supply, water quality, and recreation. Recent reservoir renovations have helped to increase storage capacity. The reservoir does not provide water supply to Ouray residents. The water supply to much of the County is from a diversion from the Gunnison Basin, but water from Ouray County is required in exchange for Gunnison Basin water. However, the reservoir is a popular attraction for camping, biking, boating, winter sports, and birding, boosting the local economy.

In 2002, the drought-imposed fire restrictions impacted camping activity, and cancellation of the 4th of July fireworks display had economic repercussions. The 2002 and the 2012 droughts threatened the municipal water supply for the City of Ouray. The City does not have senior water rights. Because of this, users downstream with senior water rights can call on the City to curtail its water usage. This happened in both 2002 and 2012. In 2012, the City was attempting to acquire and repair the Red Mountain ditch to supplement its water supply. An augmentation plan was also in development to address this issue. It is reasonable to expect that the City will again be called on to curtail its water usage in the future, but an augmentation plan would help reduce the City's vulnerability to drought. After the 2012 drought, Ouray County Water Users Association was founded. The association, along with local partner organizations such as the Ouray County government, funded a water needs study by Wright Water Engineers in 2016. The study found significant supply gaps in agriculture, as well as some gaps in recreation, drinking and other uses, said Marti Whitmore, Ouray County's representative on both the Gunnison Basin Roundtable and Colorado River District. A new group of Ouray County water stakeholders formed in summer 2017, and was awarded an $83,200 grant from the Colorado Water Conservation Board for a follow-up study and creation of the Upper Uncompahgre Cooperative Stream Management Plan. The funding will help find solutions for how to fill those gaps.[30]

According to the LPC, the 2012 drought also brought increased hay costs, a decrease in agricultural production, reduced cattle herds, and an increase in beetle-killed trees. A comment at a public meeting during the 2013 update noted that washboard on county roads gets worse during drought due to less water for road maintenance. A secondary impact from that includes increased response time for first responders.

The 2018 drought brought extremely dry conditions into the summer months in the County. This led to Stage 2 fire restrictions. Additionally, the City of Ouray cancelled their 4th of July fireworks show, again causing economic repercussions. Stage 2 fire restrictions were enabled for the Uncompahgre National Forest in the County. Additionally, Stage 3 fire restrictions were imposed on the San Juan National Forest, closing campgrounds, day-use areas, roads, and trails. No hiking or camping was allowed in the Forest during these closures. Although the San Juan National Forest is not in Ouray County, it borders the Uncompahgre National Forest and is an economic driver in the region. Such a widespread closure

[30] https://www.telluridenews.com/news/article_3c54b03c-5fac-11e8-9ef4-675a7ff6f4c8.html

can impact the tourism economy in Ouray County. 2018 was the first time the San Juan National Forest has been closed in its history.

The Log Hill Mesa FPD's main concern with prolonged drought is the increase to the wildfire danger. The district works closely with the West Region Wildfire Council to monitor the drought situation and the Sheriff to recommend the implementation of fire restrictions. Water rights for the two water services servicing the district are relatively senior and seem secure. Additionally, the district can fill firefighting apparatus at the Ridgway Reservoir if necessary.

Additionally, drought can cause loss of water in the Ouray Ice Park, which is a major attraction in the County and contributes to the local economy.

The Ridgway School District's main concern with prolonged drought and or extreme temperatures is the maintenance of its greenscapes and increased vulnerability to the wildfire danger surrounding the schools.

Overall, a severe drought will affect the entire economy, particularly in relation to tourism, water supply, and wildfire concerns. Drought is one of the few hazards that has the potential to directly or indirectly impact each and every person within Ouray County, as well as adversely affect the local economy.

Potential Losses

No quantitative loss information was available from previous drought events. However, potential losses could be significant, particularly related to impacts on local businesses from decreased tourism/recreation as well as impacts on the ranching community in parts of unincorporated Ouray County.

Additionally, according to county-wide SHELDUS data, drought has caused $1,897,695 in damages from 1960 to 2017, all of which were crop damages. This equates to $33,292 in estimated annual crop damage from droughts in the County.

Future Conditions

Land Use and Development

Population growth can place a greater demand on limited water resources. Both the City of Ouray and the Town of Ridgway have experienced growth in the last decade and are projected to continue to grow. The municipalities have continued efforts to focus growth within municipal boundaries where utility infrastructure already exists, which helps reduce the need for new water sources. New development in unincorporated County, which has also experienced growth, could also put additional strain on water resources. The 2018 Colorado Drought Plan states, "growth in the Gunnison headwaters region will require additional water management strategies. The area between Ouray and Montrose is rapidly growing, and a rapid influx of retirees and growth in the Uncompahgre Valley may dramatically change the agricultural uses and other land uses in the area."

Climate Change

Increased temperatures are projected to increase the frequency of drought events in Colorado. Increased droughts could impact Ouray County in many ways, including increasing the wildfire risk; decreased snowpack, particularly at elevations below 8,200 feet; and earlier peak runoff.

Changes in hydrologic characteristics, such as snowpack amounts and timing of runoff, can impact water systems that rely on predictable snowmelt and runoff. Additionally, the Colorado Water Conservation Board states that decreased snowpack and changes in peak runoff could increase the vulnerability of water resource systems during intense or persistent drought. While such vulnerability may be somewhat buffered in large water systems by robustness and resilience in the design, smaller systems may be extremely vulnerable under climate scenarios not considered in their original design.

Summary Risk Ranking

Hazards were ranked for each jurisdiction based on the results of this HIRA, LPC input, and public perception of risk. The overall ranks were derived by assigning each jurisdiction a value of 1 (low), 2 (medium), or 3 (high) for each hazard for: the probability of an event occurring, the potential impact of the hazard on property/structures/economy, and the potential impact of the hazard on people. The results were summed for each hazard and jurisdiction to create an overall rank. A summed score of four or less equates to a "low" ranking, five to six equates to a "medium" ranking, and seven or greater equates a "high" ranking. The results are shown in the following figures below.

Table 4-13 Drought Risk Ranking

	Probability (of losses)	Potential Impact (economic)	Potential Impact (people)	Score	Risk Rank
City of Ouray	2	1	2	5	**M**
Town of Ridgway	2	1	2	5	**M**
Unincorporated County	2	1	2	5	**M**

4.5.8. Earthquake

Description

An earthquake is caused by a sudden slip on a fault, which is a plane of weakness in the earth's crust. 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. The amount of energy released during an earthquake is usually expressed as a Richter magnitude and is measured directly from the earthquake as recorded on seismographs. Another measure of earthquake severity is intensity. Intensity is an expression of the amount of shaking, typically the greatest cause of losses to structures during earthquakes, at any given location on the surface as felt by humans and defined in the Modified Mercalli Intensity Scale.

Liquefaction is the phenomenon that occurs when the strength and stiffness of a soil is reduced by earthquake shaking or other rapid loading. Essentially, the soil acts like a fluid, similar to wet sand near the beach, resulting in ground failure. Liquefaction causes two types of ground failure: lateral spread and loss of bearing strength. Lateral spreads develop on gentle slopes and entails the sidelong movement of large masses of soil as an underlying layer liquefies. Loss of bearing strength results when the soil supporting structures liquefies and causes structures to collapse.

Location

All of Ouray County, including the incorporated areas, could be impacted by earthquakes. The City of Ouray, Town of Ridgway, and the Ridgway School District, due to the nature of the historic building stock as well as being population centers, could endure the greatest losses if a significant earthquake were to occur.

Earthquakes are caused by the movement of faults, so understanding the history of Colorado's faults can help determine potential future earthquake locations. Ouray County could also be impacted by faults outside of the County boundaries. There are several faults near Ouray County, as shown in Figure 4-20.[31]

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

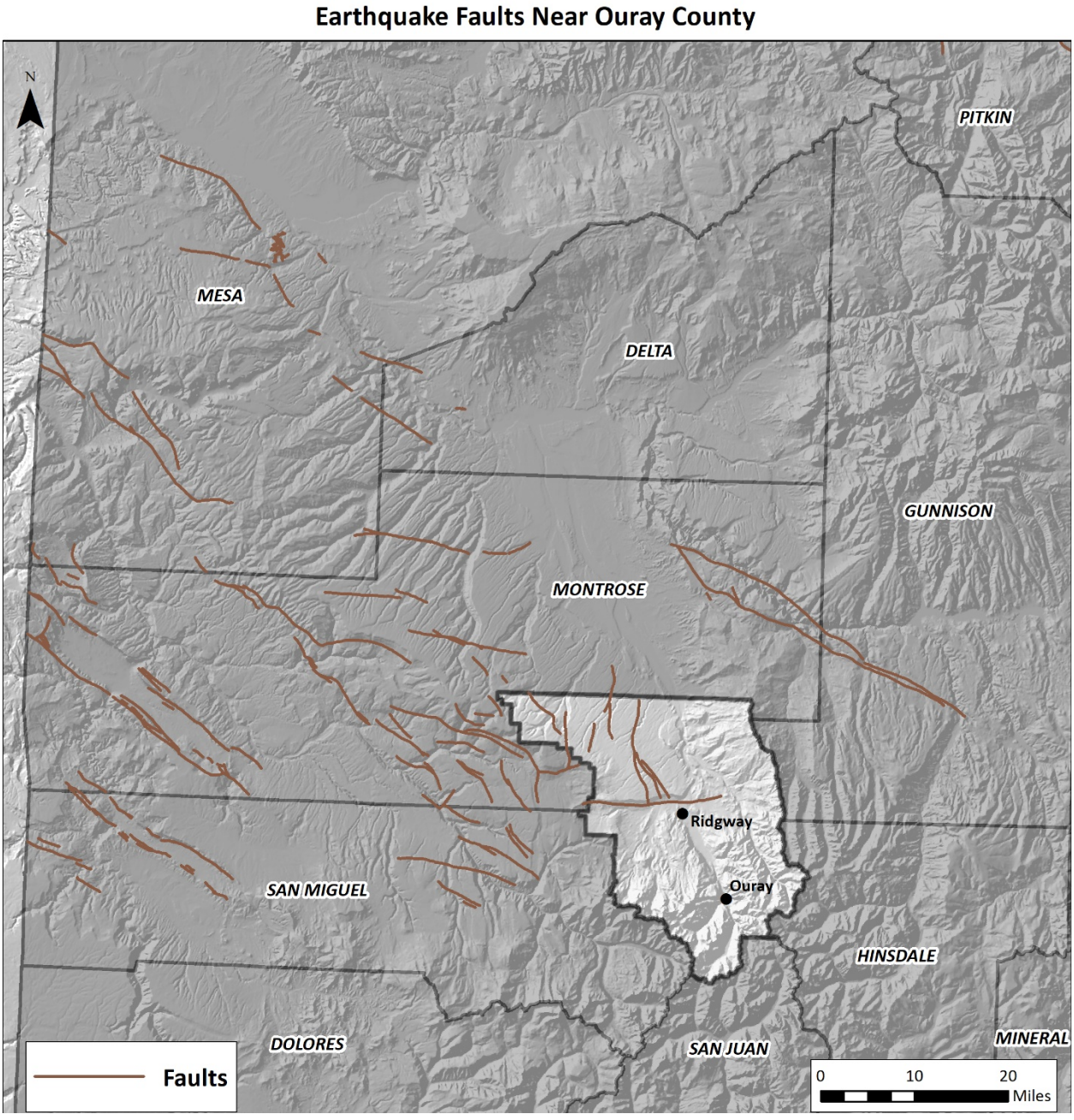
- H—Holocene (within past 15,000 years)
- LQ—Late Quaternary (15,000-130,000 years)
- MLQ—Middle to Late Quaternary (130,000 - 750,000 years)
- Q—Quaternary (approximately past 2 million years)
- LC- Late Cenozoic (approximately past 23.7 million years)

Faults that are considered by the CGS to be sources of damaging earthquakes that could affect the County are the Busted Boiler (LQ), Cannibal (LQ), Cimarron (LQ,Q), Roubideau Creek (H). The Busted Boiler is suspected of movement within the Late Quaternary (within past 130,000 years) and the Roubideau Creek fault moved in the Holocene or past 15,000 years. Other faults within the County: Cow Creek (LC), Log Hill Mesa Graben Faults (LQ), Montrose Faults SW (Q), Ridgway (Q), Ridgway Quarry Faults (LC). Faults in neighboring San Miguel County that are suspected to have had movement with the Quaternary age (past 1.6 million years) are the Big Gypsum Valley Graben Faults, the Dolores Fault Zone, and the San Miguel Canyon Faults (Source: State of Colorado Natural Hazards Mitigation Plan 2004 Earthquake Evaluation Report).

According to the Colorado Geological Survey, the potentially active faults within the vicinity of Ouray County are capable of producing a magnitude 6.25 earthquake.

[31] GIS data provided by DHSEM

Figure 4-20 Faults Near Ouray County



Extent

Earthquake magnitude is measured using the Richter Scale, an open-ended logarithmic scale that describes the energy release of an earthquake through a measure of shock wave amplitude (Table 4-14).[32] Each unit increase in magnitude on the Richter Scale corresponds to a 10-fold increase in wave amplitude, or a 32-fold increase in energy. Intensity is most commonly measured using the Modified Mercalli Intensity (MMI) Scale based on direct and indirect measurements of seismic effects. The scale levels are typically described using roman numerals, ranging from "I" corresponding to imperceptible

[32] FEMA

(instrumental) events to "XII" for catastrophic (total destruction). A detailed description of the Modified Mercalli Intensity Scale of earthquake intensity and its correspondence to the Richter Scale is given in Table 4-15.[33]

Table 4-14 Richter Scale

Richter Magnitudes	Earthquake Effects
< 3.5	Generally not felt, but recorded.
3.5 - 5.4	Often felt, but rarely causes damage.
5.4 - 6.0	At most slight damage to well-designed buildings. Can cause major damage to poorly constructed buildings over small regions.
6.1 - 6.9	Can be destructive in areas up to about 100 kilometers across where people live.
7.0 - 7.9	Major earthquake. Can cause serious damage over larger areas.
8 or >	Great earthquake. Can cause serious damage in areas several hundred kilometers across.

Table 4-15 Modified Mercalli Intensity Scale for Earthquakes

Scale	Intensity	Description of Effects	Corresponding Richter Scale Magnitude
I	Instrumental	Detected only on seismographs.	
II	Feeble	Some people feel it.	< 4.2
III	Slight	Felt by people resting; like a truck rumbling by.	
IV	Moderate	Felt by people walking.	
V	Slightly strong	Sleepers awake; church bells ring.	< 4.8
VI	Strong	Trees sway; suspended objects swing, objects fall off shelves.	< 5.4
VII	Very strong	Mild alarm; walls crack; plaster falls.	< 6.1
VIII	Destructive	Moving cars uncontrollable; masonry fractures, poorly constructed buildings damaged.	
IX	Ruinous	Some houses collapse; ground cracks; pipes break open.	< 6.9
X	Disastrous	Ground cracks profusely; many buildings destroyed; liquefaction and landslides widespread.	< 7.3
XI	Very disastrous	Most buildings and bridges collapse; roads, railways, pipes and cables destroyed; general triggering of other hazards.	< 8.1
XII	Catastrophic	Total destruction; trees fall; ground rises and falls in waves.	> 8.1

[33] FEMA

Another way to express an earthquake's severity is to compare its acceleration to the normal acceleration due to gravity. Peak ground acceleration (PGA) measures the strength of ground movements in this manner and represents the rate in change of motion of the Earth's surface during an earthquake as a percent. PGA can be partly determined by what soils and bedrock characteristics exist in the region. Unlike the Richter scale, PGA is not a measure of the total energy released by an earthquake, but rather of how hard the earth shakes at a given geographic area (the intensity). PGA is measured by using instruments including accelerographs and correlates well with the MMI scale. PGA is represented as %g, and is described in Table 4-16 below.

Table 4-16 PGA Intensity Descriptions

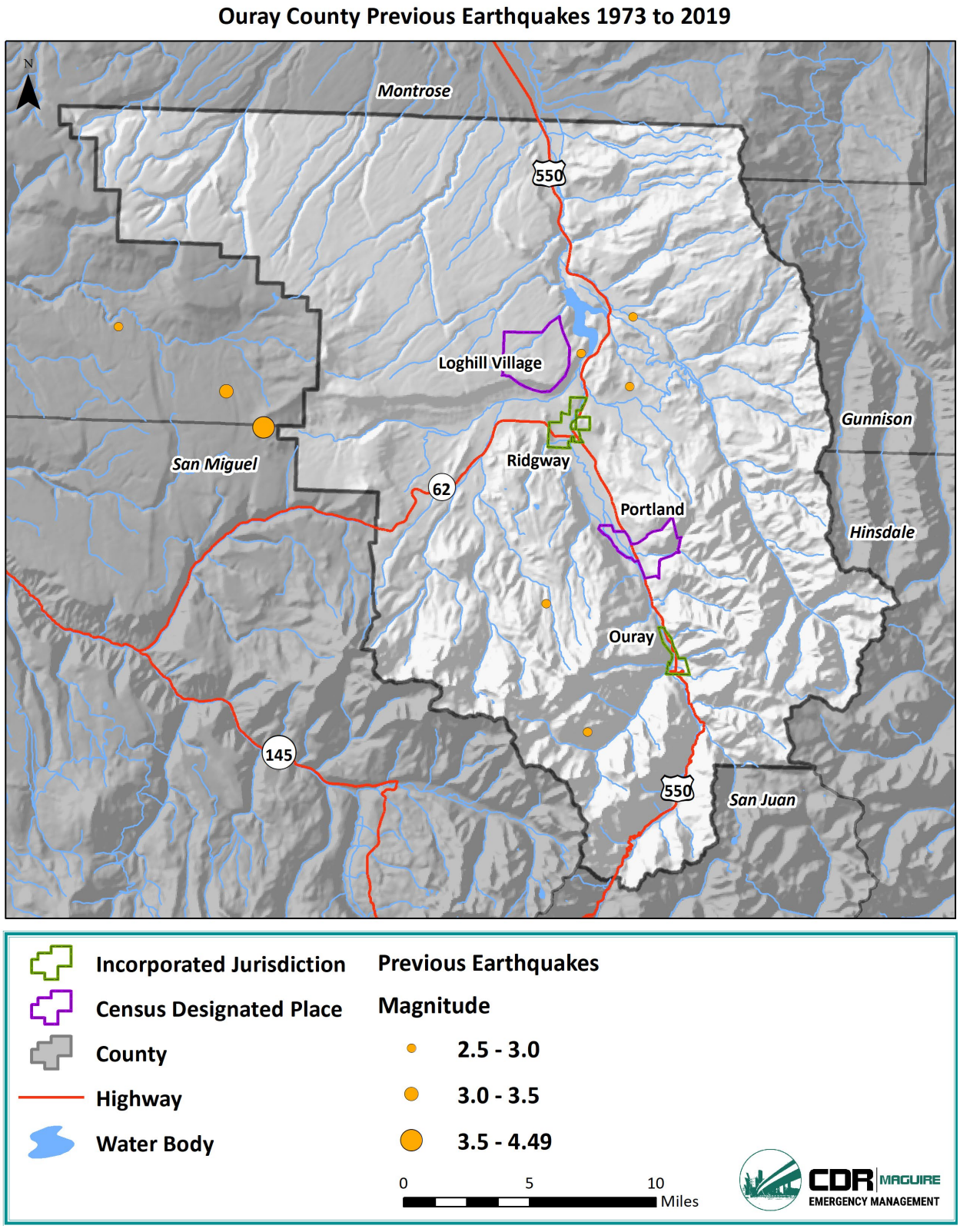
Perceived Shaking	Not Felt	Weak	Light	Moderate	Strong	Very Strong	Severe	Violent	Extreme
Potential Damage	None	None	None	Very light	Light	Moderate	Moderate/ Heavy	Heavy	Very Heavy
Peak Acc (%G)	< .17	.17-1.4	1.4-3.9	3.9-9.2	9.2-18	18-34	34-65	65-124	>124
Peak Vel (Cm/S)	< 0.1	0.1-1.1	1.1-3.4	3.4-8.1	8.1-16	16-31	31-60	60-116	>116
Instrumental Intensity	I	II-III	IV	V	VI	VII	VIII	IX	X+

Previous Occurrences

Figure 4-21 shows previous occurrences in and near Ouray County since 1973 based on USGS available data.[34] It is recognized this is not a comprehensive list of all previous earthquakes, but gives a picture of where previous earthquakes occurred in the County based on available GIS data.

[34] https://earthquake.usgs.gov/earthquakes/search/

Figure 4-21 Ouray County Previous Earthquakes, 1973-2019



Overall, Ouray County has experienced 12 previous earthquakes since 1897 that originated in the County. No events have occurred in the County since the 2015 Ouray County Hazard Mitigation Plan. Additionally, earthquakes in nearby counties can impact Ouray County. On March 4th, 2019, a magnitude 4.5 earthquake occurred near the Colorado-Utah border approximately seven miles southeast of the town of Paradox. The earthquake was felt across southwest Colorado and southeast Utah, however, no damages were reported.

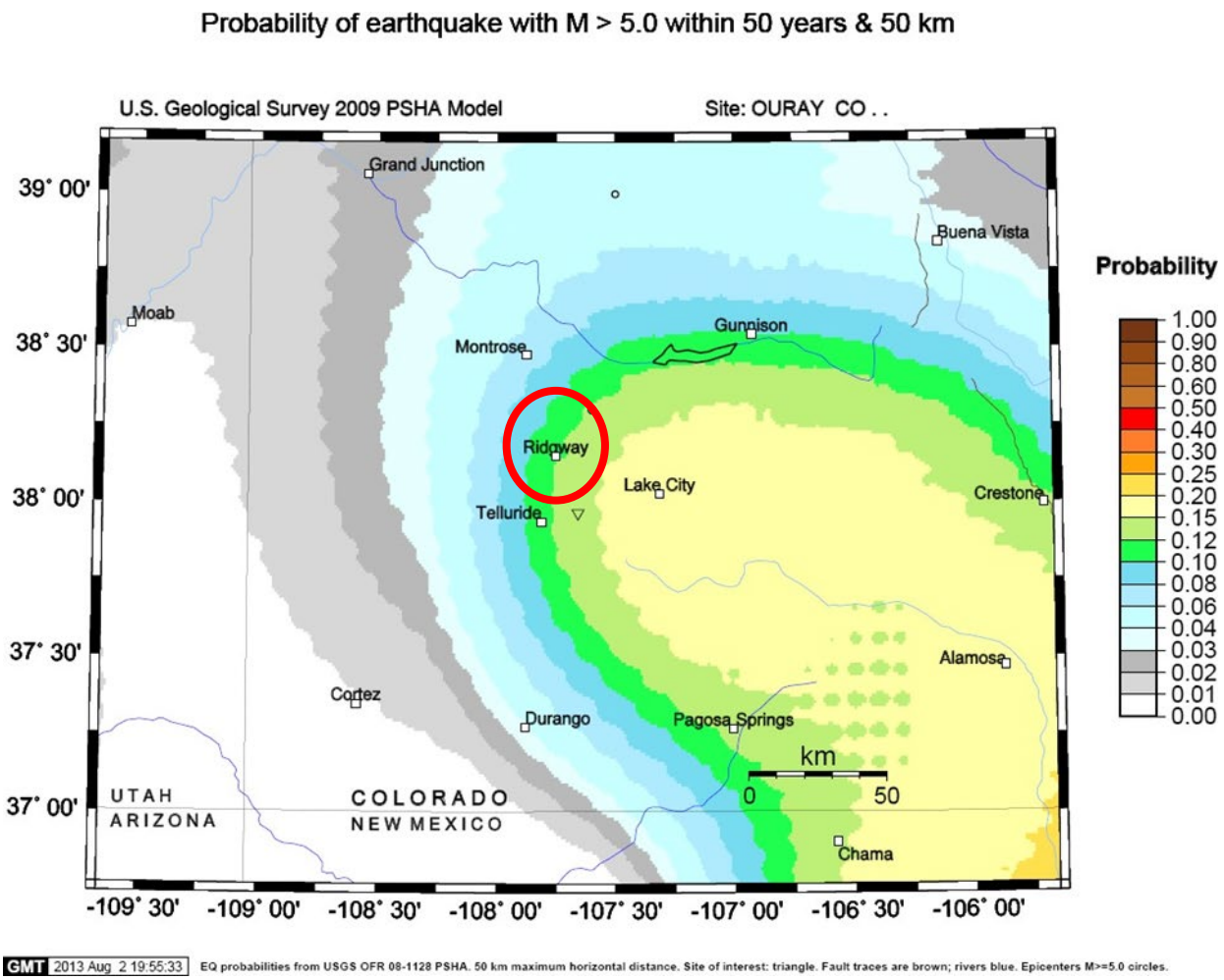
The strongest earthquakes experienced in the County were Intensity VI earthquakes, in 1913 and 1960. Impacts included: cracked plaster, chimneys, and windows; fallen pictures from walls; broken dishes; and damages to the Ridgway school ceiling. Additionally, in Montrose, a foundation cracked in three places. Full details of previous occurrences are described in Appendix C – HIRA Appendix.

Probability

Based on 12 previous occurrences of earthquakes in Ouray County from 1897 to 2019, there is approximately a 10% annual chance of occurrence, or a likely probability.

Figure 4-22 from the USGS shows the probability that a magnitude 5 or greater earthquake will occur in the next 50 years. Most of Ouray County is in the 10-15% probability range.

Figure 4-22 USGS Earthquake Probabilities



Vulnerability Assessment

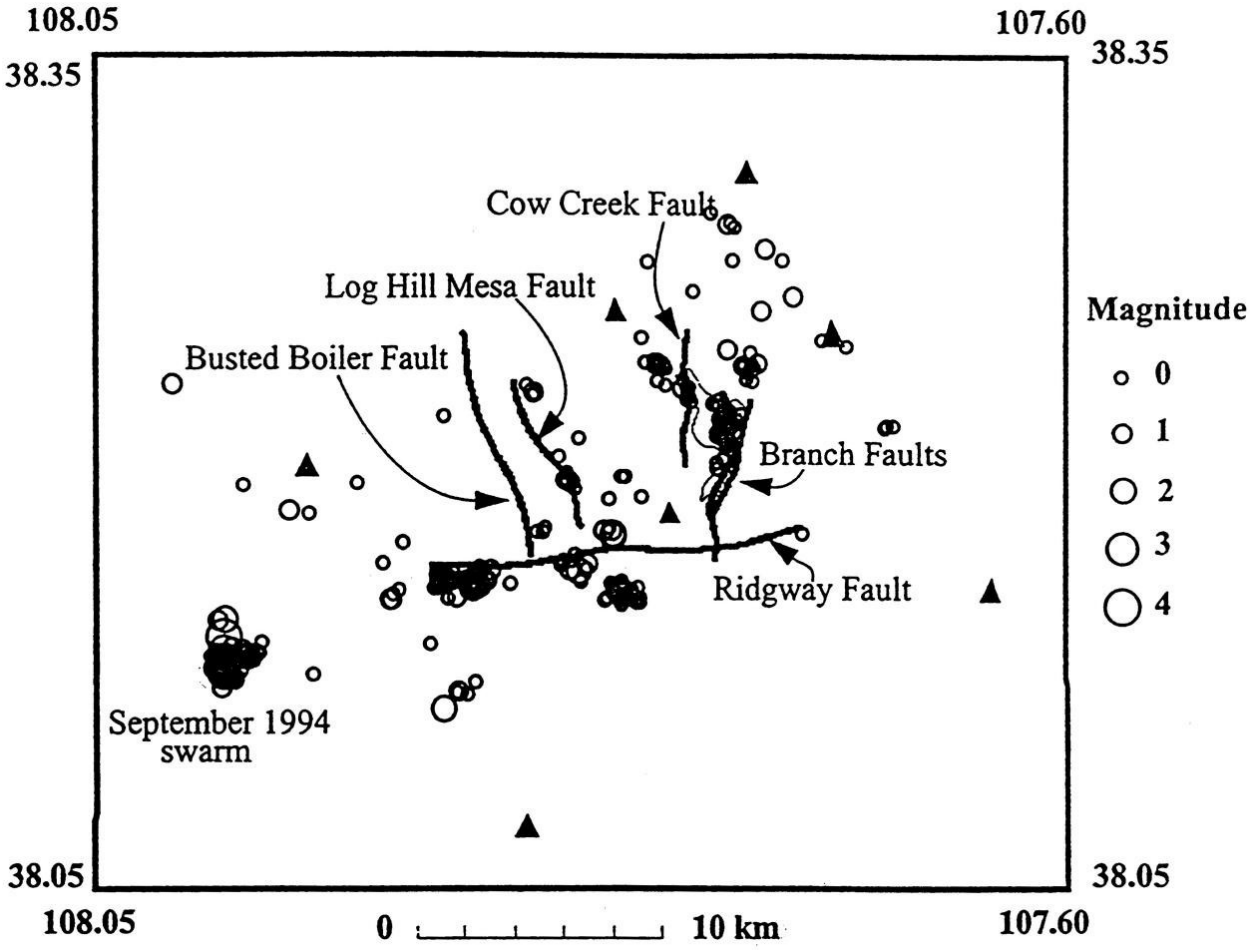
Inventory Exposed/Impacts

It can be assumed all existing and future buildings and populations are at risk to the earthquake hazard. However, building codes can help reduce the risk to structures during an earthquake. Previous damages from earthquakes in Ouray County include cracked plaster, chimneys, and windows; fallen pictures from walls; broken dishes; and damages to the Ridgway school ceiling. It is possible for faults near Ouray County to produce a 6.25 magnitude earthquake. A 6.1 magnitude earthquake could cause impacts such as mild alarm, cracked walls, and fallen plaster. Magnitude higher than 6.1 can cause impacts such as moving cars becoming uncontrollable, masonry fractures, and damage to poorly constructed buildings. Older buildings that are not constructed to modern day building codes are more at risk to these damages throughout the County.

An additional concern is Ridgway Reservoir. There have been several earthquakes near the reservoir in its history. According to Colorado Earthquake Information, 1867-1996, the U.S. Bureau of Reclamation, in cooperation with the USGS, has monitored seismicity near Ridgway Dam since 1985. Seismicity near Ridgway Dam increased about seven-fold subsequent to reservoir filling, which may be associated with north-trending branch faults of the Ridgway Fault. The most persistent seismicity observed in the region occurs near Cimarron Ridge, an area that includes the 1960 magnitude 5.5 event. Figure 4-23 shows the faults and seismicity in the vicinity of this network. Shaded triangles indicate seismograph stations. The Ridgway Reservoir Dam is the middle of the three triangles shown on the right side of the figure. According to the report a good correlation occurs between the fault locations and recorded seismicity.[35]

[35] Colorado Earthquake Information, 1867-1996

Figure 4-23 Seismicity and Faults in the Vicinity of Northern Ouray County



Ridgway School District is concerned that the elementary school building may not adequately protect students in the event of a major earthquake due to the age of the structure.

Potential Losses

The most appropriate loss estimation methodology for seismic hazards involves scenario modeling using FEMA's Hazus loss estimation software. There are two levels of Hazus analysis, 'Standard,' which uses the default FEMA-derived datasets and damage functions, and 'Enhanced,' which uses independently compiled and accurately verified structure and infrastructure inventories and damage functions. The earthquake analysis conducted for this report includes a Standard level analysis using the latest version, Hazus-MH Earthquake Model V4.2. This risk assessment leveraged census tract data to conduct a Standard Hazus probabilistic scenario for Ouray County.

A 2,500-year return period probabilistic scenario was used for the analysis (probability of 2% of occurrence in 50 years). A 2,500-year return period was chosen because the new International Building Code uses a 2,500-year map as the basis for building design. Based on CGS data, the highest magnitude earthquake that could be expected to occur in Ouray County is a 6.25. This value was used in the probabilistic scenario in Hazus.

Results

Hazus estimates that there are over 3,000 buildings in the county which have an aggregate total replacement value of $730 million (excluding contents). Hazus estimates that about 258 buildings will be at least moderately damaged. This is over 8% of the buildings in the County. There are an estimated two buildings that will be damaged beyond repair. Residential homes will be the most impacted.

The total economic loss estimated for the earthquake is $42.77 million, which includes building and lifeline related losses based on the County's available inventory. The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake. The total building-related losses were $23.61 million; 19% of the estimated losses were related to the business interruption of the County. By far, the largest loss was sustained by the residential occupancies which made up over 69% of the total loss. Due to the fact that the entire County is aggregated as one Census Tract, it is not possible to determine losses by jurisdiction. It can be assumed the highest losses will be in areas with a higher concentration of buildings, particularly the City of Ouray, Town of Ridgway, and Loghill Mesa. Additionally, the LPC noted that the losses and displaced residents would likely be highest in the Loghill Mesa community, which lies along the fault line the County.

The model estimates that a total of 5,000 tons of debris will be generated. Of the total amount, Brick/Wood comprises 39% of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 200 truckloads (at 25 tons/truck) to remove the debris generated by the earthquake.

Hazus estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates two households to be displaced due to the earthquake. Only one person is estimated to seek temporary shelter.

Hazus also estimates casualties due to the earthquake at three different times of day, including: 2:00 am representing a time when residential occupancy is at a maximum, 2:00 pm representing a time when business sectors are at a maximum, and 5:00 pm representing peak commute time. At 2:00 am, there is an estimated two casualties, both of these being injuries that require medical attention but no hospitalization. At 2:00 pm there is an estimated two casualties, also both of these being injuries that require medical attention but no hospitalization. At 5:00 pm there is also an estimated two casualties, both being injuries that require medical attention but no hospitalization. It should be noted that this analysis is based on the County's 2010 population. If an earthquake were to occur during peak tourism times (for example, summer weekends or holiday weekends), the potential for casualties would be much higher.

A number of variables are included in Hazus analyses in order to arrive at the estimated values of loss due to earthquake. For this reason, it is important to note that the Hazus loss estimates detailed above should not be used as a precise measure, but rather viewed from the perspective of the potential magnitudes of expected losses.

Additionally, mobile homes in the County are at a higher risk to damages from an earthquake. Ouray County contains 8.6% of its households as mobile homes, with the City of Ouray having 9.8% and the Town of Ridgway 0.5%.

Future Conditions

Land Use and Development

Any new construction built to code in the County should generally be able to withstand earthquakes, but the potential for nonstructural damage will increase with new development. The City of Ouray, Town of Ridgway, and unincorporated County have experienced population growth in the last decade, and are projected to grow through 2050. Continued growth of population in the County exposes more people and structures to earthquakes and their related hazards.

Climate Change

Climate change is not projected to impact the earthquake hazard in Ouray County.

Summary Risk Ranking

Hazards were ranked for each jurisdiction based on the results of this HIRA, LPC input, and public perception of risk. The overall ranks were derived by assigning each jurisdiction a value of 1 (low), 2 (medium), or 3 (high) for each hazard for: the probability of an event occurring, the potential impact of the hazard on property/structures/economy, and the potential impact of the hazard on people. The results were summed for each hazard and jurisdiction to create an overall rank. A summed score of four or less equates to a "low" ranking, five to six equates to a "medium" ranking, and seven or greater equates a "high" ranking. The results are shown in the following figures below.

Table 4-17 Earthquake Risk Ranking

	Probability (of losses)	Potential Impact (economic)	Potential Impact (people)	Score	Risk Rank
City of Ouray	1	2	2	5	**M**
Town of Ridgway	1	2	2	5	**M**
Unincorporated County	1	2	2	5	**M**

4.5.9. Extreme Temperatures

Description

Extreme temperature events, both cold and hot, can have severe impacts on human health and mortality, natural ecosystems, agriculture, and the economy. Temperature extremes cause more deaths every year than any other disaster, including hurricanes.[36] For this Plan, both extreme cold and extreme heat are profiled.

[36] Kevin A. Borden and Susan L. Cutter "Spatial Patterns of Natural Hazards Mortality in the United States." International Journal of Health Geographics 2008, 7:64. Available online at http://www.ij-healthgeographics.com/content/7/1/64 last accessed July 13, 2009.

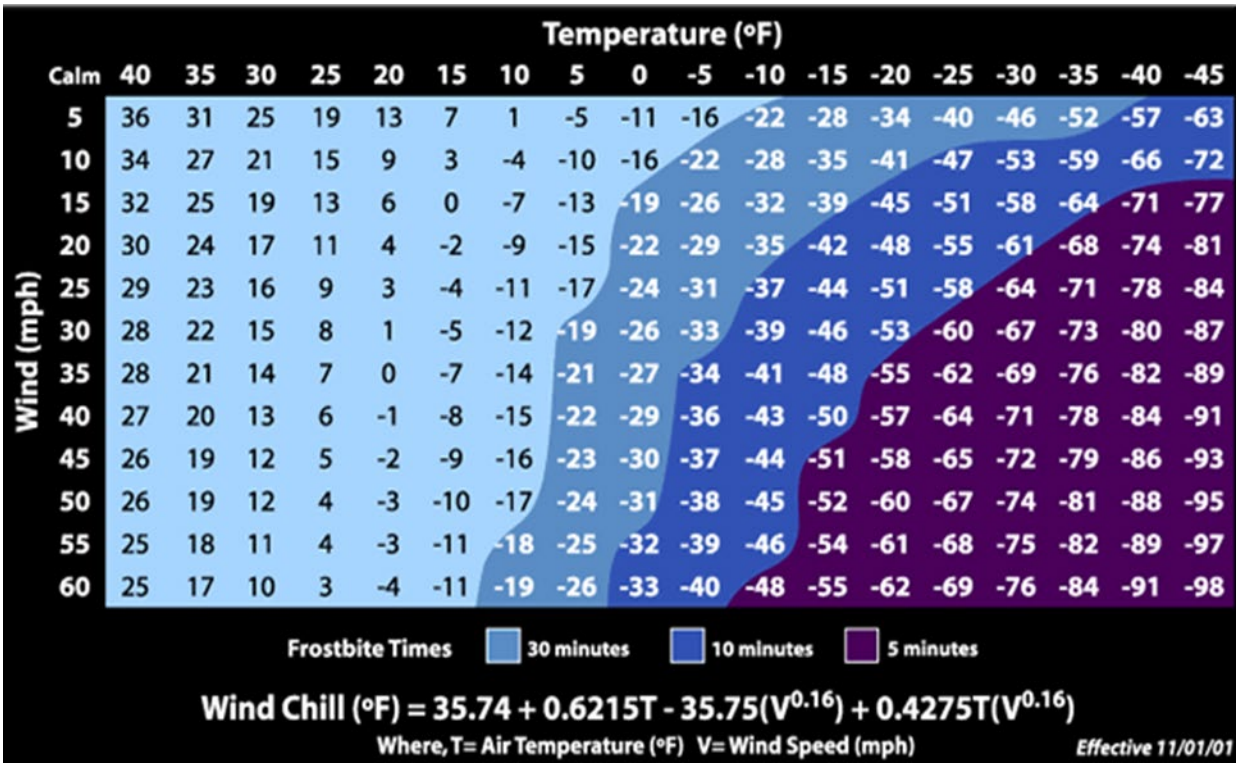
Extreme Cold

Extreme cold often accompanies a winter storm or is left in its wake. It is most likely to occur in the winter months of December, January, and February. On average, January is the coldest month. The average last freeze/frost day in Ouray County is May 29.

What constitutes extremely cold temperatures varies across different areas of the United States based on normal climate temperatures for the time of year. In Colorado, cold temperatures are normal during the winter. When temperatures drop at least 20 degrees below normal winter lows, the cold is considered extreme and begins to impact the daily operations of the County. Extreme cold/wind chill impacts inanimate objects, plants, animals, and water supplies.

The effects of extremely cold temperatures are amplified by strong to high winds that can accompany winter storms. Wind-chill measures how wind and cold feel on exposed skin and is not a direct measurement of temperature. As wind increases, heat is carried away from the body faster, driving down the body temperature, which in turn causes the constriction of blood vessels, and increases the likelihood of severe injury or death to exposed persons. Animals are also affected by wind-chill, however cars, buildings, and other objects are not. In 2001, the National Weather Service (NWS) implemented an updated Wind Chill Temperature Index (see Figure 4-24).[37] This index was developed to describe the relative discomfort/danger resulting from the combination of wind and temperature. Wind chill is based on the rate of heat loss from exposed skin caused by wind and cold.

Figure 4-24 National Weather Service Wind Chill Chart



[37] https://www.weather.gov/safety/cold-wind-chill-chart

Extreme Heat

According to information provided by FEMA, extreme heat is defined as temperatures that hover 10 degrees or more above the average high temperature for the County and last for several weeks. Extreme heat is most likely to occur in the summer months of June, July, and August. On average, July is the warmest month.

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

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

Extreme heat can impact livestock and pets, causing heat stress and possibly death. It can exacerbate droughts, which in turn depletes water supplies for livestock and crops. Droughts and extreme heat also increase wildfire risk. The combination of hot, dry weather and dry thunderstorms ignite wildfires that can quickly become devastating and overwhelm local firefighting capabilities.

Location

Extreme cold temperatures can impact the entire County. The Ridgway area is a known "cold sink," and can frequently experience extremely cold temperatures. Extreme heat can impact the lower elevations of the County and the municipalities, but generally the relatively high elevation of Ouray County is not prone to extreme heat. Figure 4-25 and Figure 4-26 shows the average high temperatures and low temperatures, as well as the extreme minimum and extreme maximum temperatures in the City of Ouray and Town of Ridgway, respectively.[38] It is evident that the extreme minimum has reached well below 0F and the extreme maximum above 90F for both Ouray and Ridgway.

[38]Western Regional Climate Center

Figure 4-25 Temperature Averages and Extremes for Ouray

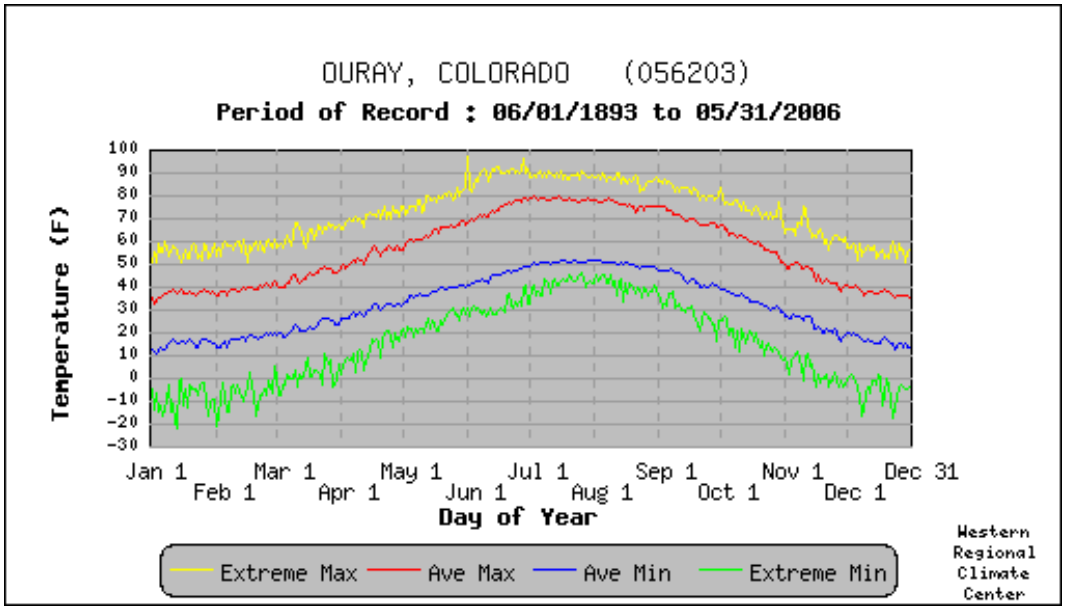
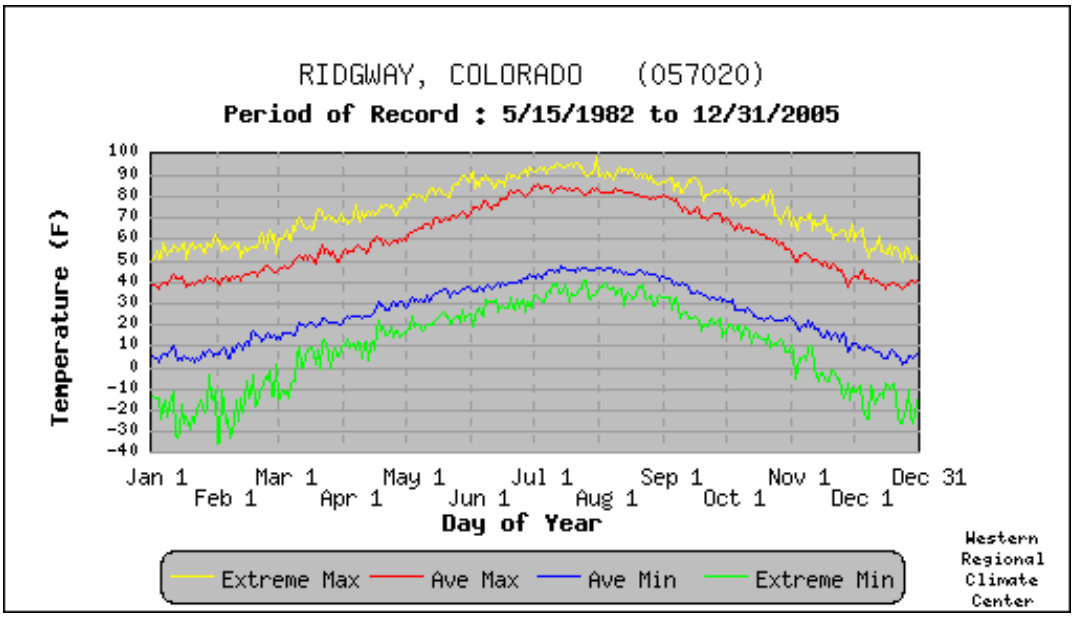


Figure 4-26 Temperature Averages and Extremes for Ridgway



Extent

Extreme Cold

Extreme cold events are typically predicable in advance of the event, and can have a duration of days. The NWS issues wind chill warning, watches, and advisories, as described below.[39]

- **Wind Chill Warning:** Take Action! NWS issues a wind chill warning when dangerously cold wind chill values are expected or occurring. If you are in an area with a wind chill warning, avoid going

[39] https://www.weather.gov/safety/cold-wind-chill-warning

outside during the coldest parts of the day. If you do go outside, dress in layers, cover exposed skin, and make sure at least one other person knows your whereabouts. Update them when you arrive safely at your destination.

- **Wind Chill Watch:** Be Prepared: NWS issues a wind chill watch when dangerously cold wind chill values are possible. As with a warning, adjust your plans to avoid being outside during the coldest parts of the day. Make sure your car has at least a half a tank of gas, and update your winter survival kit.
- **Wind Chill Advisory:** Be Aware: NWS issues a wind chill advisory when seasonably cold wind chill values but not extremely cold values are expected or occurring. Be sure you and your loved ones dress appropriately and cover exposed skin when venturing outdoors.

The NWS will issue a Wind Chill Advisory for Ouray County (valley locations) when wind and temperature combine to produce wind chill values of -18 to -24°F.

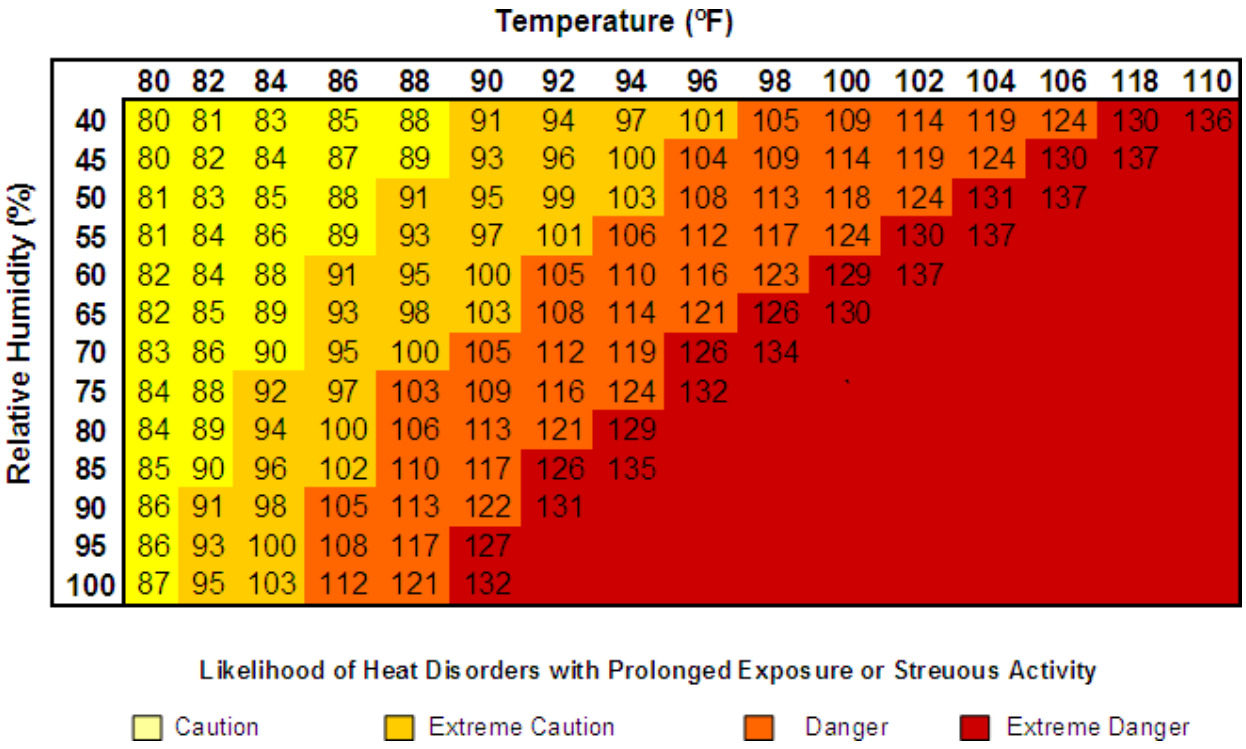
Extreme Heat

Figure 4-27 and Figure 4-28 show the Heat Index (HI) as a function of heat and relative humidity.[40] The Heat Index describes how hot the heat-humidity combination makes it feel. As relative humidity increases, the air seems warmer than it actually is because the body is less able to cool itself via evaporation of perspiration. As the HI rises, so do health risks.

- When the HI is 90°F, heat exhaustion is possible with prolonged exposure and/or physical activity.
- When it is 90°-105°F, heat exhaustion is probable with the possibility of sunstroke or heat cramps with prolonged exposure and/or physical activity.
- When it is 105°-129°F, sunstroke, heat cramps or heat exhaustion is likely, and heatstroke is possible with prolonged exposure and/or physical activity.
- When it is 130°F and higher, heatstroke and sunstroke are extremely likely with continued exposure. Physical activity and prolonged exposure to the heat increase the risks.

[40] National Weather Service

Figure 4-27 Heat Index



Note: Since HI values were devised for shady, light wind conditions, exposure to full sunshine can increase HI values by up to 15°F. Also, strong winds, particularly with very hot, dry air, can be extremely hazardous.

Figure 4-28 Possible Heat Disorders by Heat Index Level

Heat Index	Category	Possible heat disorders for people in high risk groups
130°F or higher	Extreme Danger	Heatstroke risk extremely high with continued exposure.
105° - 129°F	Danger	Sunstroke, Heat Cramps and Heat Exhaustion likely, Heatstroke possible with prolonged exposure and/or physical activity.
90° - 105°F	*Extreme Caution*	*Sunstroke, Heat Cramps and Heat Exhaustion possible with prolonged exposure and or physical activity.*
80° - 90 °F	Caution	Fatigue possible with prolonged exposure and/or physical activity.

Heat emergencies are often slower to develop, taking several days of continuous, oppressive heat before a significant or quantifiable impact is seen. Heat waves do not strike victims immediately, but rather their cumulative effects slowly impact populations.

The NWS has a system in place to initiate alert procedures (advisories or warnings) when the Heat Index is expected to have a significant impact on public safety. The expected severity of the heat determines whether advisories or warnings are issued. A common guideline for the issuance of excessive heat alerts

is when the maximum daytime high is expected to equal or exceed 105°F and a nighttime minimum high of 80°F or above is expected for two or more consecutive days. The NWS office in Grand Junction can issue the following heat-related advisory as conditions warrant.

- **Excessive Heat Warning/Advisory:** Issued when an excessive heat event is expected in the next 36 hours. These products are issued when an excessive heat event is occurring, is imminent, or has a very high probability of occurring. The warning is used for conditions posing a threat to life or property. An advisory is for less serious conditions that cause significant discomfort or inconvenience and, if caution is not taken, could lead to a threat to life and/or property.
- **Excessive Heat Watch:** Issued when conditions are favorable for an excessive heat event in the next 12 to 48 hours. A Watch is used when the risk of a heat wave has increased, but its occurrence and timing is still uncertain. A Watch provides enough lead time so those who need to prepare can do so, such as cities that have excessive heat event mitigation plans.
- **Excessive Heat Outlook:** Issued when the potential exists for an excessive heat event in the next 3-7 days. An Outlook provides information to Heat Index forecast map for the contiguous United States those who need considerable lead time to prepare for the event, such as public utilities, emergency management, and public health officials.

Previous Occurrences

Extreme Cold

According to the NCEI, there have been two reported cold/extreme cold/wind chill events in the County between 1950 and 2019 (no new events have occurred since the 2015 Ouray County Hazard Mitigation Plan). The first event occurred on December 4, 2005 and caused $100,000 in property damages. Arctic air spilled down mainly into the lower elevations of western Colorado in early December and remained trapped for about two weeks. Overnight low temperatures dropped below zero Fahrenheit throughout the area, with many locations breaking all-time record cold readings for particular days. Frozen water pipes burst in many areas resulting in water damage to numerous homes and businesses. The exact amount for the cost of repairing the damage likely exceeds $100,000. The second extreme cold event occurred on February 1, 2011. There were no damages or casualties reported with this event.

Additionally, water supply pipes on Log Hill Mesa have been known to freeze at the valves, despite being buried several feet underground.

Extreme Heat

There have not been any recorded extreme heat events in Ouray County since 1950.

Probability

NCEI data would indicate that the frequency of occurrence is unlikely, however, the LPC asserts that extreme temperatures, and extreme cold in particular, are highly likely to occur in any given year. The data in the NCEI database may represent a lack of reporting rather than a lack of occurrence. Ouray County's residents are accustomed to dealing with extreme temperatures and may be less likely to report events unless they cause significant damage. It would be more accurate to say that extreme temperature events are highly likely to occur in the County in any given year, but the frequency of damaging events is only likely.

Vulnerability Assessment

Inventory Exposed/Impacts

Extreme Cold

Extreme cold can occasionally cause problems with communications facilities and freeze-thaw cycles can severely damage roads as well as contribute to rockfall. Several parts of the County, including Ridgway, Ouray, Elk Meadows, and Log Hill Mesa, experience problems with frozen water lines. Water consumption in the City of Ouray can become excessive in wintertime as the City advises residents to leave water running to help prevent frozen pipes which are not buried deeply enough or not insulated properly. The Ridgway School District noted that extreme cold once caused the school to close as school buses would not start in temperatures of -37F.

Most of the population in Ouray County are accustomed to extreme cold temperatures and have adequate heating sources to combat the impacts of cold temperatures. However, residents in rural parts of the County rely on propane for heat. On December 24, 2018, Governor Hickenlooper issued a disaster emergency in response to an anticipated shortage of propane that could affect approximately 33,000 residents living in 20 counties that rely on propane for heating their home. The shortage was blamed on production issues and was determined that customers may not be able to receive enough propane to heat their homes. During this time, southern Colorado was expecting extremely cold temperatures accompanying a winter storm.[41] Ouray County was included in the emergency declaration. Without propane for heat, extreme cold could become deadly for Ouray County residents.

Overall, due to the presence of extreme cold throughout the entire County, all jurisdictions and the Ridgway School District are equally at risk to the impacts from extreme cold.

Extreme Heat

Typically, Ouray County does not experience extremely high temperatures. However, since residents are accustomed to more mild temperatures, days that are hotter than average in the summer months can impact residents who are not prepared or accustomed to these temperatures. Additionally, Ouray County experiences a large influx of tourists during the summer months, many who come to enjoy outdoor activities in the County. Tourists who are unprepared are vulnerable to extreme heat. Impacts of extreme heat on people include heat exhaustion and heat stroke. Heat exhaustion typically occurs before heat stroke. Symptoms include fatigue, nausea, headache, excessive thirst, muscle cramps, weakness, confusion or anxiety, drenching sweat followed by cold skin, slowed heartbeat, dizziness, and fainting. Heat stroke symptoms include nausea and vomiting, headache, vertigo, fatigue, hot and dry skin, rapid heart rate, shortness of breath, increased body temperature, confusion, and convulsions. Heat stroke can be fatal and should be treated immediately if these symptoms are experienced.[42]

Typically, factors such as age, chronic illness, weight, and medications increase people's vulnerability to this hazard. Overall, in Ouray County, 3.7% of residents are under the age of five years; 3.3% in the City of Ouray; and 3% in the Town of Ridgway. Additionally, the younger students in the Ridgway School District may be more vulnerable to impacts from extreme heat. In Ouray County, 26.1% of residents are 65 years or older; 32% in the City of Ouray; and 18% in the Town of Ridgway. These age groups are more vulnerable to the impacts of extreme heat. The City of Ouray has a notably larger portion of elderly residents and may be more at risk to extreme heat. Air conditioning helps combat the impacts on

[41] https://denver.cbslocal.com/2018/12/25/colorado-governor-propane-emergency-disaster-shortage/
[42] WebMD

extremely hot days, however, since many people come to Ouray County to enjoy the outdoors, they may be caught off guard and are vulnerable to extreme heat.

In addition to impacts to people, extreme heat can exacerbate other hazards, such as drought and wildfire.

Potential Losses

Extreme Cold

The only extreme cold event with reported impacts in Ouray County resulted in $100,000 in property damages from burst water pipes. This damage estimate may include other counties impacted by the event. There is not enough recorded damage data to include an annualized loss estimate for this hazard. Losses may include damages from frozen pipes as well as impacts to human health/loss of life due to extreme cold.

Extreme Heat

There is no recorded damage information for extreme heat in Ouray County. The most severe losses from extreme heat are related to human health from heat related illness. However, losses from secondary hazards, such as wildfire, could be significant.

Future Conditions

Land Use and Development

The City of Ouray, Town of Ridgway, and unincorporated County have experienced population growth over the last decade and are projected to continue to grow through 2050. This increases the number of people exposed to both extreme heat and extreme cold in the County. New developments should be adequately equipped with a heating and cooling source.

Climate Change

Colorado's temperatures have already increased by two degrees Fahrenheit from 1977 to 2006, and warming is likely to continue to increase. However, due to Ouray County's high elevation, it is unlikely that extreme heat will have severe impacts to public health the County due to climate change. However, increased temperatures can increase wildfire and drought risk, as well as cause changes in snowmelt and timing of streamflow runoff, impacting water supply planning in the County.

Extremely cold temperatures will continue to occur in Ouray County, despite rising temperatures due to climate change.

Summary Risk Ranking

Hazards were ranked for each jurisdiction based on the results of this HIRA, LPC input, and public perception of risk. The overall ranks were derived by assigning each jurisdiction a value of 1 (low), 2 (medium), or 3 (high) for each hazard for: the probability of an event occurring, the potential impact of the hazard on property/structures/economy, and the potential impact of the hazard on people. The results were summed for each hazard and jurisdiction to create an overall rank. A summed score of four or less equates to a "low" ranking, five to six equates to a "medium" ranking, and seven or greater equates a "high" ranking. The results are shown in the following figures below.

Table 4-18 Extreme Temperatures Risk Ranking

	Probability (of losses)	Potential Impact (economic)	Potential Impact (people)	Score	Risk Rank
City of Ouray	1	1	2	4	L
Town of Ridgway	1	1	2	4	L
Unincorporated County	1	1	2	4	L

4.5.10. Flooding

Description

Riverine flooding is defined as when a watercourse exceeds its "bank-full" capacity. Riverine flooding 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. In its common usage, "floodplain" most often refers to that area that is inundated by the 100-year flood, the flood that has a 1% chance in any given year of being equaled or exceeded. Other types of floods include general rain floods, thunderstorm generated flash floods, alluvial fan floods, snowmelt and rain on snow floods, dam failure floods, and local drainage floods. The 100-year flood is the national standard to which communities regulate their floodplains through the National Flood Insurance Program (NFIP).

The potential for flooding can change and increase through various land use changes and changes to land surface. A change in environment can create localized flooding problems inside and outside of natural floodplains by altering or confining watersheds or natural drainage channels. These changes are commonly created by human activities. These changes can also be created by other events such as wildfires. Wildfires create hydrophobic soils, a hardening or "glazing" of the earth's surface that prevents rainfall from being absorbed into the ground, thereby increasing runoff, erosion, and downstream sedimentation of channels.

Ouray County is susceptible to the following types of flooding:

- Rain in a general storm system
- Rain in a localized intense thunderstorm
- Melting snow
- Rain on melting snow
- Dam failure (covered in the Dam Failure hazard profile)
- Urban stormwater drainage
- Rain on fire damaged watersheds

The total annual precipitation in northern Ouray County (Colona-Ridgway) is approximately 13 inches, and the County experiences as much as 40 inches in the southern mountainous areas. Approximately 30 to 40% of the precipitation is snowfall. Generally, the flood season extends from late spring to fall. Much of the rainfall occurs with thunderstorms during April, May, June, July, and August. Ouray County is affected by a seasonal wind shift and moisture increase known as the "southwest monsoon." The monsoon typically begins every year in mid-July and ends by mid-August, but has been known to vary in duration and intensity. During La Nina years the monsoon can be particularly wet and enduring. This seasonal rainfall is the most common cause of flooding in Ouray County.

Location

Ouray County's flood events are typically flash floods from intense cloudburst storms over small and steep watersheds in the summer and fall and snowmelt driven floods in June.

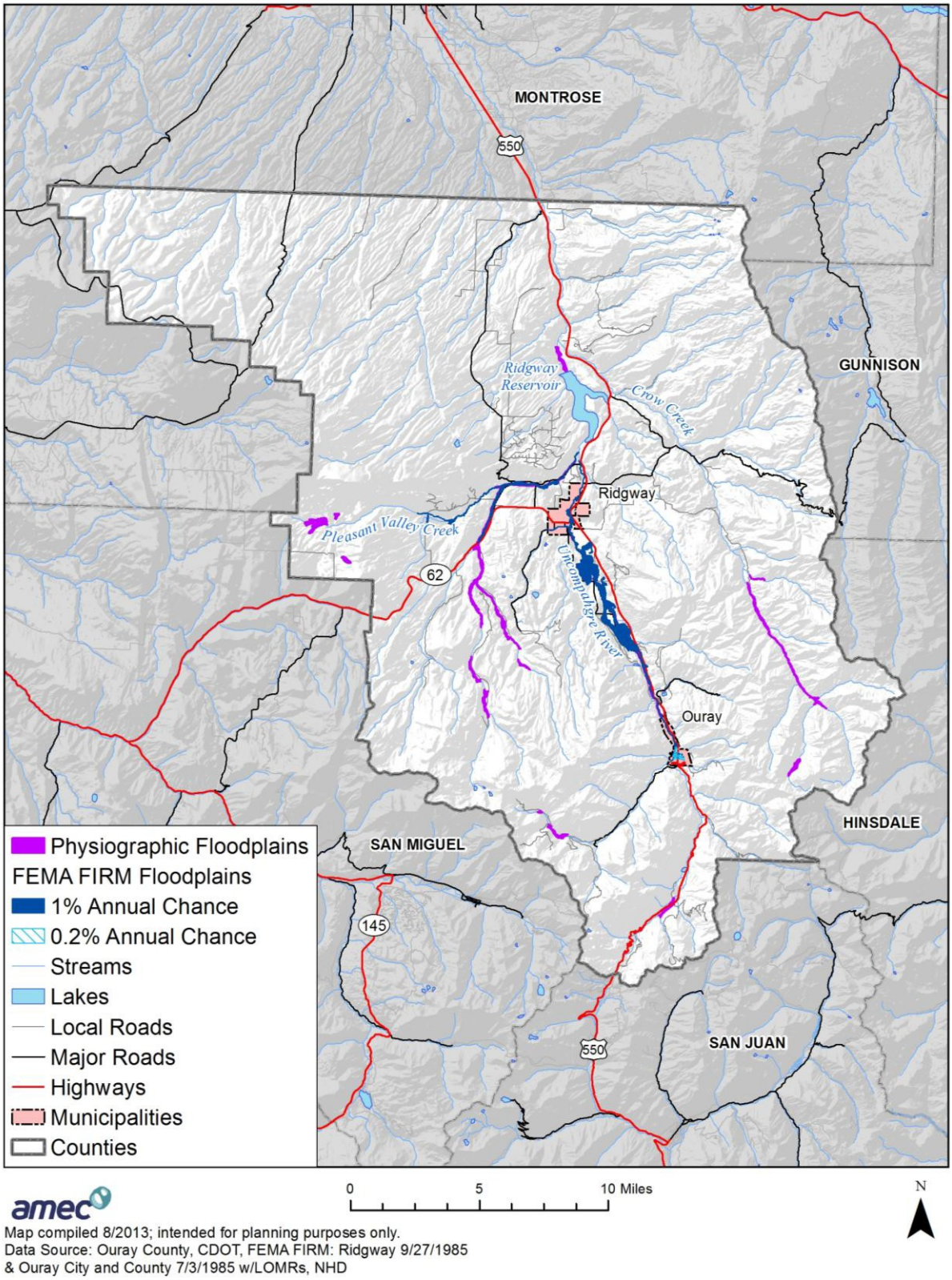
Additionally, sources of riverine flooding in the County include the Uncompahgre River, Dallas Creek, Cedar Creek, Cuddigan Gulch, Coal Creek, and Unnamed Creek. Steep, rocky tributaries of the Uncompahgre River draining relatively small confined basins flood frequently and intensely. These areas are notable in Portland, Cascade, Skyrocket, Corbett, Oak, Canyon, Cutler, Dexter, Forsman, Blowout, Plummer, Coal, Bridalveil, and Cottonwood creeks, and numerous other intermittent creeks and drainages. The Uncompahgre River's headwaters lie south of the City of Ouray in the high peaks of the San Juan Mountains. The river flows through an extremely narrow gorge just south of the City and then flattens into a broad and gentle floodplain between Ouray and Ridgway. This floodplain tends to absorb floodwaters and debris coming from floods on nearby tributaries. The area between the City of Ouray and Ridgway, known as Idlewild, is also at risk to flooding.

The City of Ouray has six very steep and rocky drainages that discharge in the immediate vicinity of the City. These drainages have a long history of intense and devastating floods. The primary problem drainages are Portland, Cascade, and Skyrocket creeks. Portland and Cascade creeks drain from the "Amphitheater," a dramatic confined drainage east of the City, and continue through the City toward the Uncompahgre River. Since the early 1900s, attempts have been made to confine these drainages to "flumes." These flumes channel the flow to prevent the natural wanderings over the cumulative alluvial fans on which much of the City of Ouray has been built. Originally constructed with wood, these flumes were replaced with concrete following a flood in 1906. These flumes have been repaired and altered over the years and often require maintenance to clean out debris. Often it is the debris more than the water that causes the most problems in the City of Ouray (see discussion on Debris Flow hazard). Debris clogging drainages following other hazard events such as debris flows, landslide/rockfall, and avalanches is a major concern and source of flooding for the City of Ouray. Additionally, recently there has been a push from utlitiy companies to clear cut areas around electric poles to mitigate their wildfire risk. However, during the second LPC meeting it was noted that this debris is a concern for clogging creeks and contributing to flooding.

The following figures show the 100-year floodplain in Ouray County, the City of Ouray, and the Town of Ridgway. It is important to note the various sources of flood hazard data shown in this plan. Flood hazards were first mapped in 1978 by A&S consultants in the report titled "Floodplain Information Report, Uncompahgre River-Ouray to Dallas Creek-Ouray County, Colorado." This formed the basis of the flood hazard that went into the development of the Flood Insurance Rate Map (FIRM) that became effective in 1985. This map was digitized into GIS by the Southwest Data Center and is represented on the maps created for the 2015 plan, though it is not an official Digital Flood Insurance Rate Map. The FIRM for the City of Ouray has changed considerably since the 1985 FIRM was published, and is reflected in two Letters of Map Revision (LOMR) dated December 9, 2005 and November 9, 1998. The original FIRM shows most of the City in an approximate A zone, or 100-year floodplain, and was also developed to represent an envelope of flood and debris flow hazard. The LOMR of 2005 removes much of the A zone from the City, confining it to the flumes for Portland and Cascade Creeks. The shaded area remaining is largely B zone, which is considered to be between the 100- and 500-year floodplain or where the average depth of flooding is less than one foot. This was based on improved topographic data, hydraulic and hydrology studies, and improvements to the flumes. This LOMR was digitized as part

of the 2015 update to improve the flood analysis. This data was not available in GIS format, so the maps from the 2015 Ouray County HMP are still the best available floodplain maps for the County. As of August 2019, a new FEMA floodplain study is underway for the County.

Figure 4-29 Ouray County Flood Hazard



Map compiled 8/2013; intended for planning purposes only.
Data Source: Ouray County, CDOT, FEMA FIRM: Ridgway 9/27/1985
& Ouray City and County 7/3/1985 w/LOMRs, NHD

Figure 4-30 City of Ouray Flood Hazards Based on 2005 Letter of Map Revision

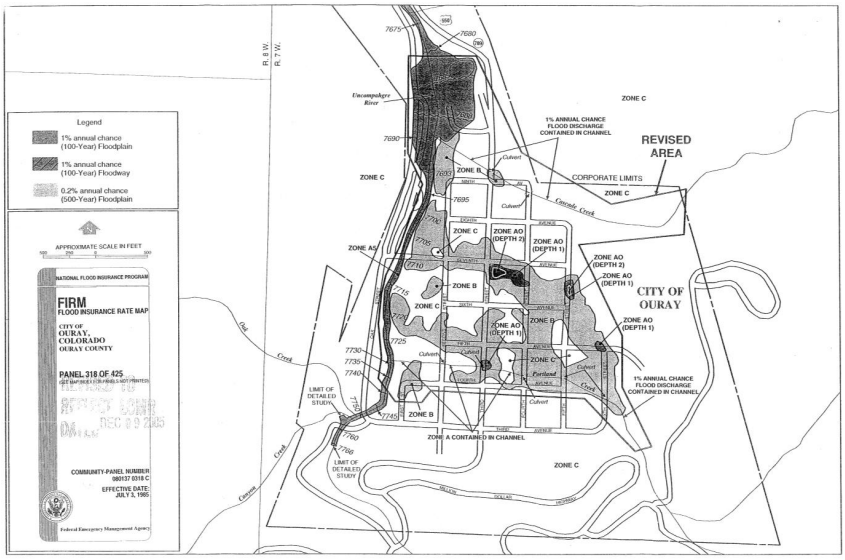


Figure 4-31 City of Ouray Flood Hazards Based on 1998 Letter of Map Revision

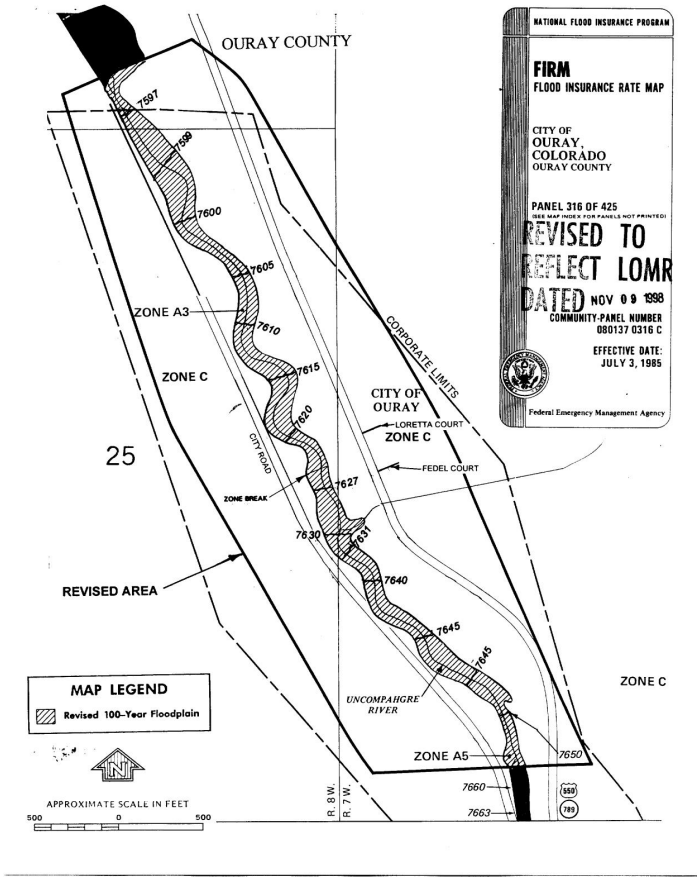
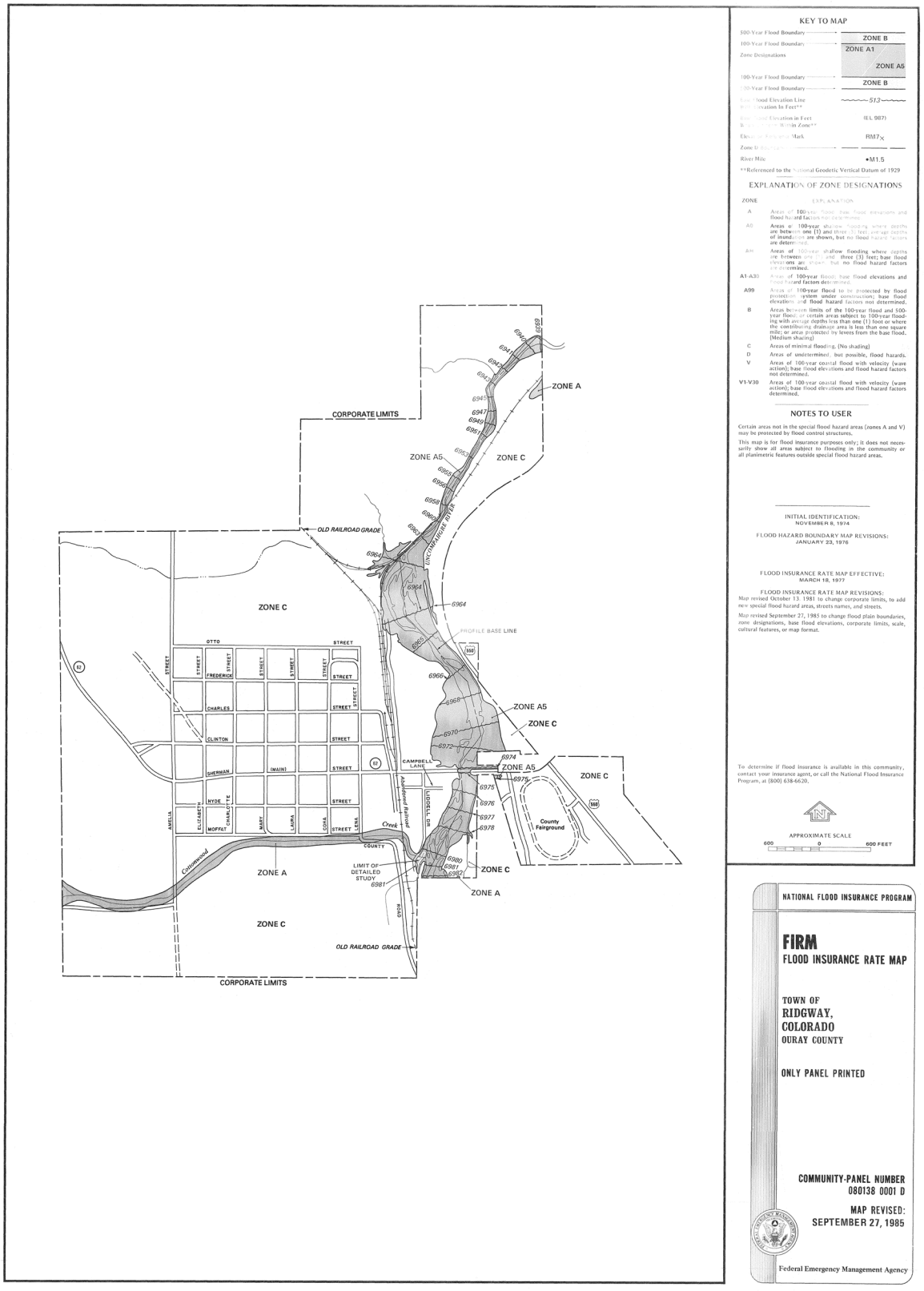


Figure 4-32 Town of Ridgway Flood Hazard Based on 1985 FEMA FIRM



Extent

Flood events are typically described based on their frequency, such as the 100-year or 500-year flood event. Frequencies are determined by plotting a graph of the size of all known floods for an area and determining how often floods of a particular size occur. Another way of expressing the flood frequency is the chance of occurrence in a given year, which is the percentage of the probability of flooding each year. For example, the 100-year flood has a 1% chance of occurring in any given year, and the 500-year flood drops to a 0.2% chance of occurring in any given year. Therefore, they are commonly referred to as the 1% annual chance flood and 0.2% annual flood, respectively. It should be noted that flooding is possible every year and even multiple times each year.

Additionally, flash floods are common in Ouray County, particularly during the summer monsoon season. Flash floods occur very suddenly but usually dissipate within hours. Flash floods are usually preceded with warning from the National Weather Service in terms of flash flood advisories, watches, and warnings. According to the National Weather Service, a Flash Flood Watch is issued when conditions are favorable for flash flooding. It does not mean that flash flooding will occur, but it is possible. A Flash Flood Warning is issued when flash flooding is imminent or occurring.[43]

Previous Occurrences

Ouray County and most notably the City of Ouray has witnessed several major floods on the Uncompahgre River and its tributaries, with the tributaries causing the most problems.

Overall, according to the NCEI, previous hazard mitigation plans, and the LPC, there have been 29 total flooding events from 1909 to April 2019. Nine of these events were flooding events and 20 flash floods, although some of the older records may not have indicated whether the event was a flood or flash flood. Twenty of these events were recorded in or near the City of Ouray, four in Ridgway, and five in unincorporated Ouray County (Red Mountain, Portland, and Campbird). These events totaled $1,956,596 in recorded property damages. Of these damages, $552,572 were recorded in the City of Ouray, $1,255,000 in Ridgway, and $149,024 in unincorporated County. These events are described in full detail in Appendix C – HIRA Appendix.

Documented flooding events since the 2015 Ouray County Hazard Mitigation Plan are described below.

- **August 28, 2013** - Oak Creek and Canyon Creek experienced flash floods due to heavy runoff from nearby mountains. Roads on the west side of Ouray were impassable due to the rising and fast-moving water.
- **July 20, 2017** - Heavy rainfall resulted in flash flooding and mudslides southwest of the town of Ouray. The costliest flash flood in the impacted area tore up a section of County Road 361 where new construction had just been completed. The crib wall, culverts, and other cement road structures were damaged beyond repair. Additionally, several culverts along County Road 361 became clogged by debris. Flash flooding with tons of debris deposits also occurred further down on Yankee Boy Road where 26 mudslides occurred. Additional mudslides and flooding also came down across Corkscrew Road. Radar estimated rainfall was between 0.50 to 1.00 inches at the time. An estimated $50,000 in damages occurred.

Since the 2015 Ouray County HMP, the Town of Ridgway has installed storm drains downtown. Much of the Town was built on a relatively flat area, making natural drainage insufficient. This has alleviated

[43] https://www.weather.gov/lwx/WarningsDefined#Flash%20Flood%20Watch

much of the flooding concerns in the downtown area of Ridgway. However, there are still undersized culverts in the Town with a project underway to improve these culverts.

The LPC noted that flash flood events on Canyon Creek or Weehawken Creek have repeatedly damaged the Weehawken Spring transmission line that delivers water to the City of Ouray's water storage tanks and water treatment facility. This line has also been damaged by landslide events (see Landslide/Rockfall profile for further details).

Despite the frequency and ferocity of the flood events, loss of life from flooding in Ouray County has been rare. Four incidents have been documented, three in 1906 and one in 1927. The 1906 incident involved a train engineer who died when his locomotive went over a chasm where the bridge was washed out. The other two were miners seeking shelter in a small tunnel that became filled with debris. The 1927 incident involved a rancher who was found in a field near his cabin following flooding on the Uncompahgre River.

Probability

Based on previous occurrences, Ouray County has experienced 29 flooding events from 1909 to 2019, equating to a 26% chance of annual occurrence, or a likely annual probability.

NFIP Participation

Table 4-19 provides detailed information on National Flood Insurance Program (NFIP) policies and claims in participating jurisdictions in Ouray County.

Table 4-19 Community Participation in the National Flood Insurance Program

Jurisdiction	Date Joined	Effective FIRM Date	Policies in Force	Insurance in Force ($)	Number of Claims	Claims Totals ($)
City of Ouray	7/3/1985	7/3/1985	19	$5,451,000	5	33,046
Town of Ridgway	9/27/85	9/27/1985	0	$0	0	0
Unincorporated County	7/3/1985	7/3/1985	32	$9,209,700	0	0

As of May 2019, there were 19 policies in force in the City of Ouray (down from 30 in 2013). Eight of the policies were for structures in A zones, and 11 were for structures in B, C, or X zones. Ridgway does not have any policies in force (down from four in 2013). There were 32 policies in force in unincorporated areas of Ouray County (down from 29 in 2013). Twenty-one of the policies were for structures in A zones and 11 were for structures in B, C, or X zones.

There were no repetitive losses anywhere in Ouray County at the time of the development of this Plan.

Vulnerability Assessment

Inventory Exposed/Impacts

Floods have the potential to damage the City of Ouray (significant areas), Town of Ridgway (minor areas), and the unincorporated areas along the Uncompahgre River and its tributaries. While the City of Ouray has mitigated much of the impact of the 1% annual chance flood, the less likely 0.2% annual chance event could still cause significant impacts. Many tourist facilities are located along this river and could be at risk during a flood event. It was also noted during an LPC workshop that there is a campground located in the floodplain in the City of Ouray. Damage to the Weehawken Spring water

transmission line can also have serious impacts to the City of Ouray given the City's limited supply of water in storage. Over the years the County has made bridge and drainage improvements in areas prone to flash flooding and debris flow. Cutler Creek could be a source of potential problems with new housing developed in vicinity of its debris fan. Additionally, there is concern that that debris can block Corbett Creek and contribute to flooding in Ouray. Ridgway frequently has drainage problems from thunderstorm runoff depositing shale and plugging culverts. Roads closed due to floods can result in serious transportation disruptions due to the limited number of roads in the County. Additionally, mud and debris flows often accompany floods, exacerbating the impacts.

Potential Losses

Planning level flood loss estimates were conducted by county for the 2018 Colorado State Hazard Mitigation Plan using Hazus-MH (Hazus) software. This data was utilized for incorporation into this Plan. Hazus is FEMA's GIS-based natural hazard loss estimation software. The Hazus flood model results include analysis for Ouray County, modeling streams draining a 10 square mile minimum drainage area, using 30 meter (1 arc second) Digital Elevation Models (DEM). Hydrology and hydraulic processes utilize the DEMs, along with flows from USGS regional regression equations and stream gauge data, to determine reach discharges and to model the floodplain. Losses are then calculated using Hazus national baseline inventories (buildings and population) at the census block level, in addition to critical infrastructure sited at the local level.

Hazus produces a flood polygon and flood-depth grid that represents the 100-year floodplain. The 100-year floodplain represents a flood that has a 1% chance of being equaled or exceeded in any single year. While not as accurate as official flood maps, these floodplain boundaries are available for use in GIS and could be valuable to Ouray County, given it has not been digitally mapped by the National Flood Insurance Program. Hazus generated damage estimates are directly related to depth of flooding and are based on FEMA's depth-damage functions. For example, a two-foot flood generally results in about 20% damage to a structure (which translates to 20% of the structure's replacement value). The Hazus flood analysis results provide 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. 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.

A number of variables are included in Hazus analyses in order to arrive at the estimated values of loss due to a flood. For this reason, it is important to note that the Hazus loss estimates detailed above should not be used as a precise measure, but rather viewed from the perspective of the potential magnitudes of expected losses. Hazus Enhanced (Level II) analyses based on local building inventory, higher resolution terrain models, and Digital Flood Insurance Rate Maps (DFIRMs) could be used in the future to refine and improve the accuracy of the results.

Maps and Results

According to the Hazus model output, at least 36 buildings would be at least moderately damaged by a county-wide 100-year flood. An estimated six buildings would be completely destroyed. All of these damages would be to residential buildings. Additionally, the model estimates 99 households (or 298 people) will be displaced due to the flood. Displacement includes households evacuated from within or

very near to the inundated area. Of these, 109 people (out of a total population of 4,436) will seek temporary shelter in public shelters.

The total economic loss estimated for the flood scenario is $30.3 million, which represents 9% of the total replacement value of the County's building stock. Total economic losses are a combination of direct building losses and business interruption losses.

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. Direct building losses were estimated to be $30.21 million. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood. The total business interruption losses were estimated to be $90,000. The residential occupancies made up 85% of the total loss.

Figure 4-33, Figure 4-34, and Figure 4-35 show the Hazus generated floodplain for a 1% annual chance flood event for the County, the City of Ouray, and the Town of Ridgway. Additionally, according to the Hazus analysis, the highest flood depths will occur through the City of Ouray, particularly on the southwest side of town. Figure 4-36, Figure 4-37, and Figure 4-38 show total losses from this event for the County, the City of Ouray, and the Town of Ridgway. The highest flood losses are projected to occur in the southwest portion of the City of Ouray. Ridgway is not estimated to experiences as much in losses as Ouray, but the highest amount of losses in Ridgway are projected to occur on the east side of town and through the central parts of town.

Figure 4-33 Ouray County Hazus 1% Annual Chance Floodplain

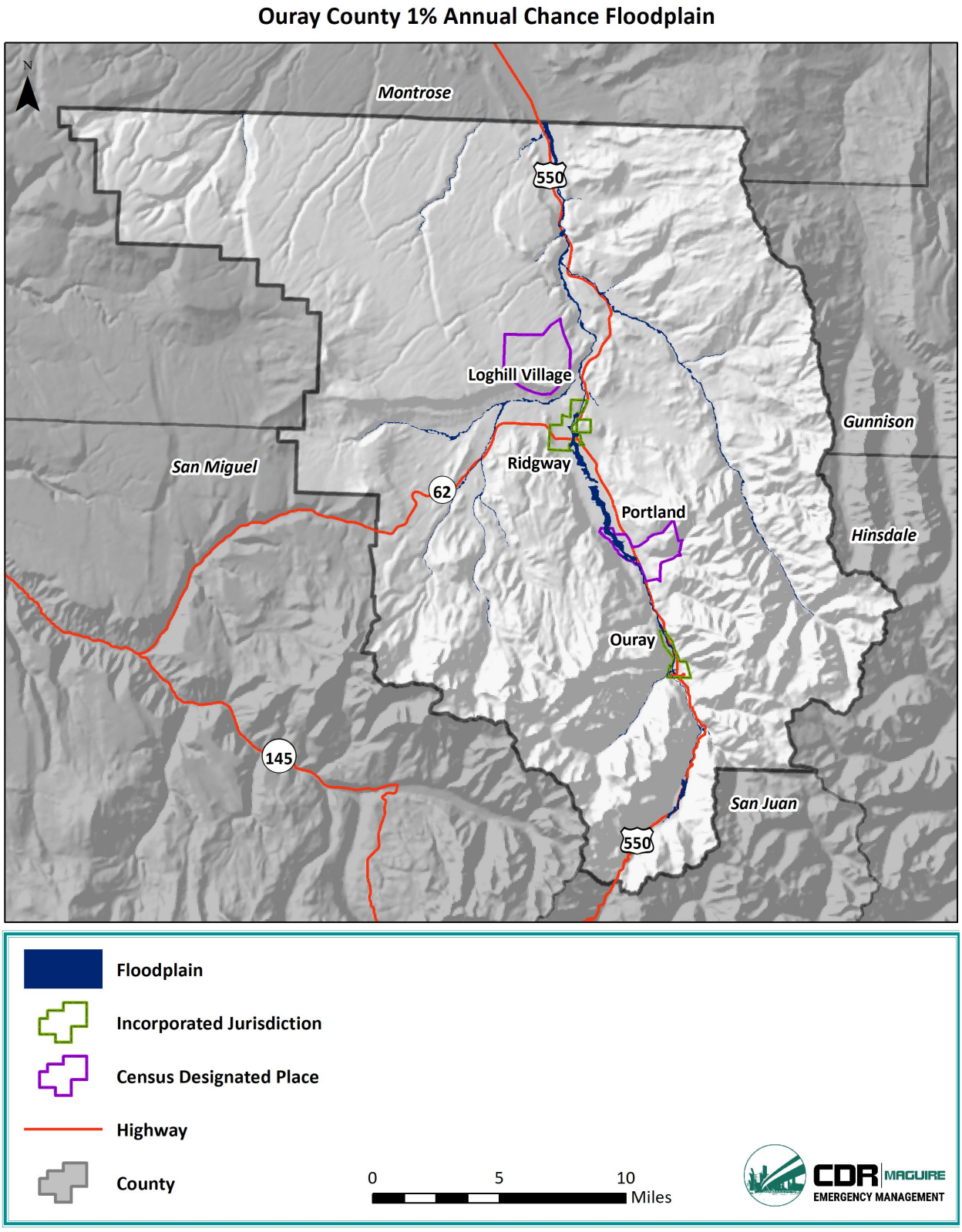


Figure 4-34 City of Ouray Hazus 1% Annual Chance Floodplain

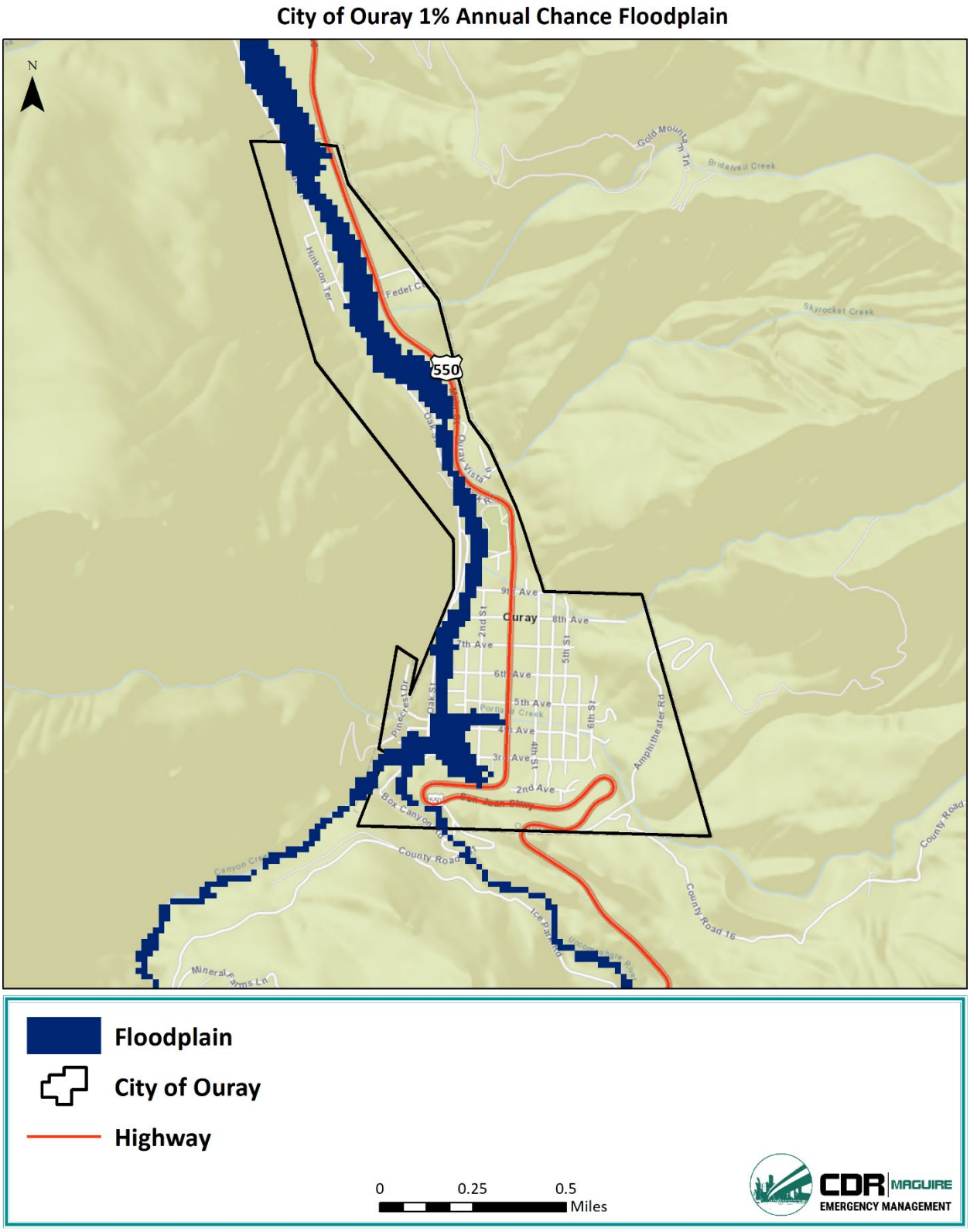


Figure 4-35 Town of Ridgway Hazus 1% Annual Chance Floodplain

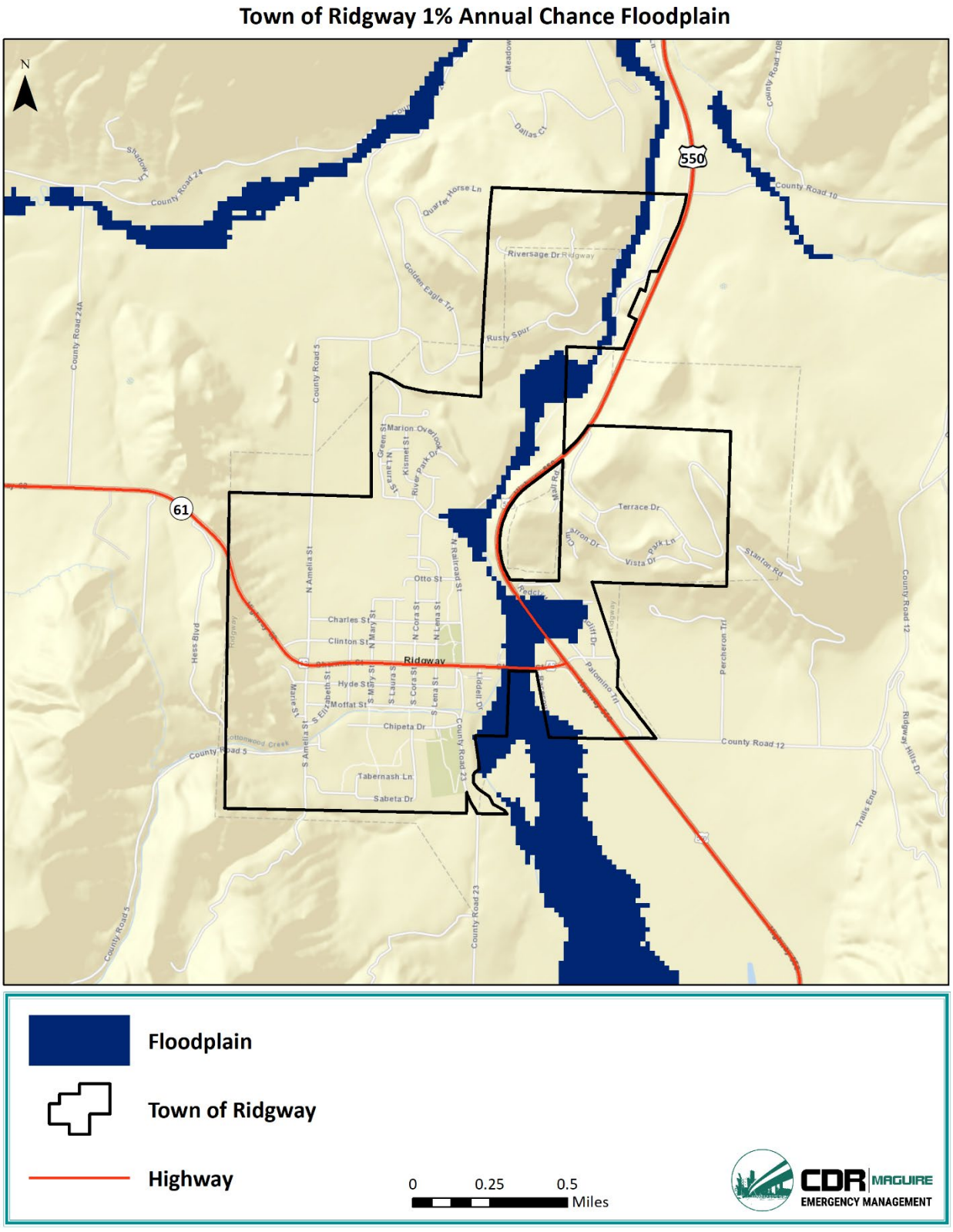


Figure 4-36 Ouray County 1% Annual Chance Flood Losses

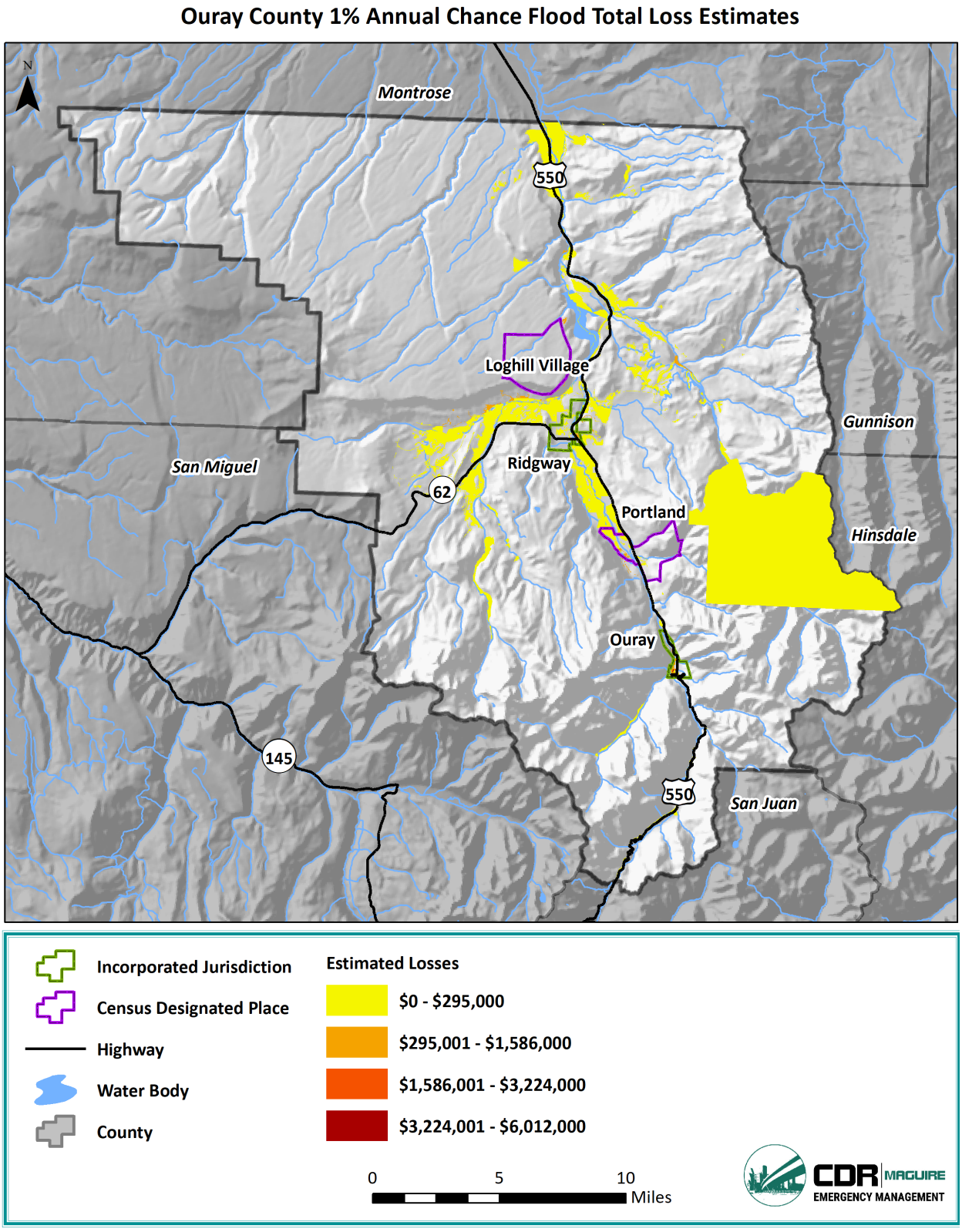


Figure 4-37 City of Ouray 1% Annual Chance Flood Losses

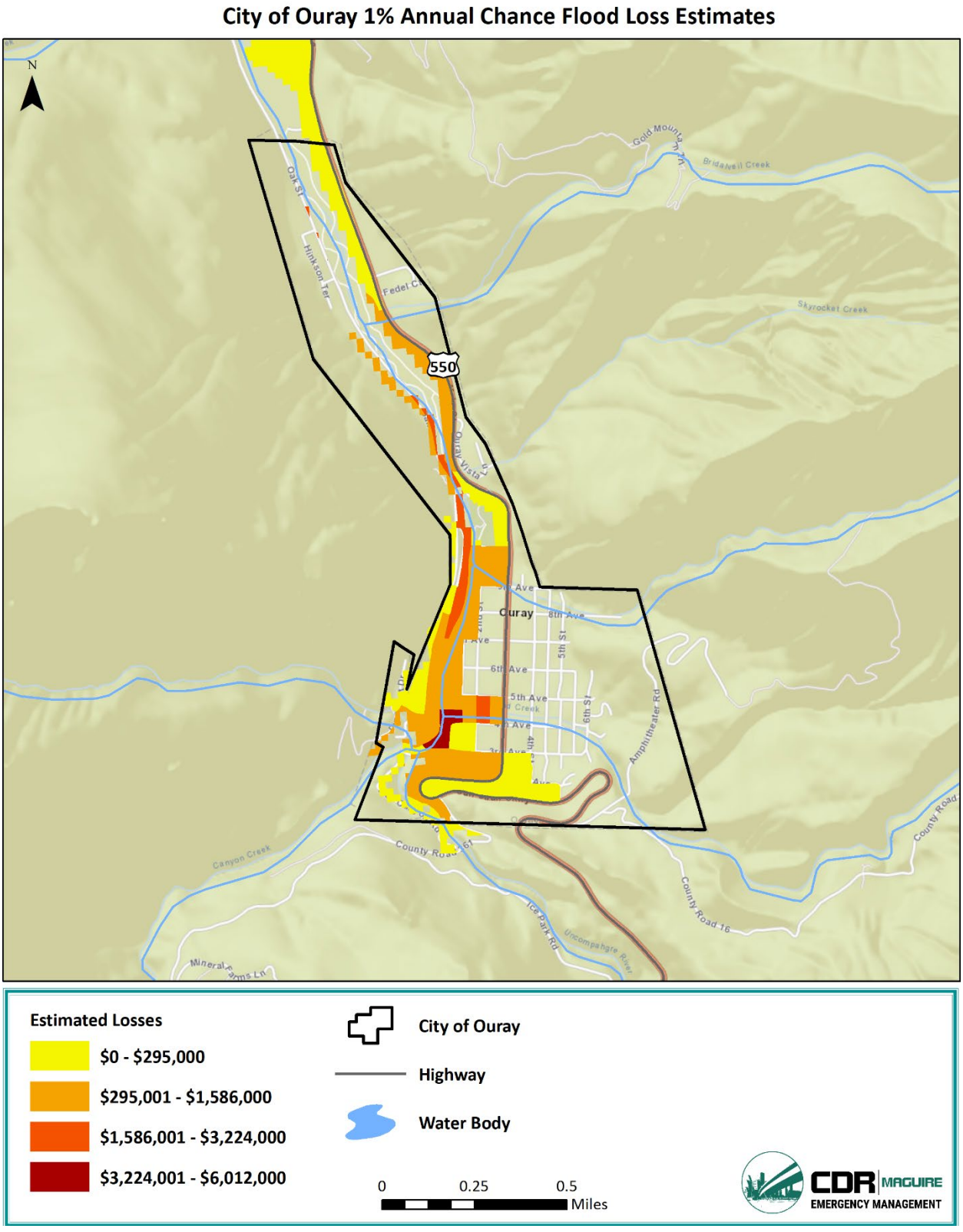
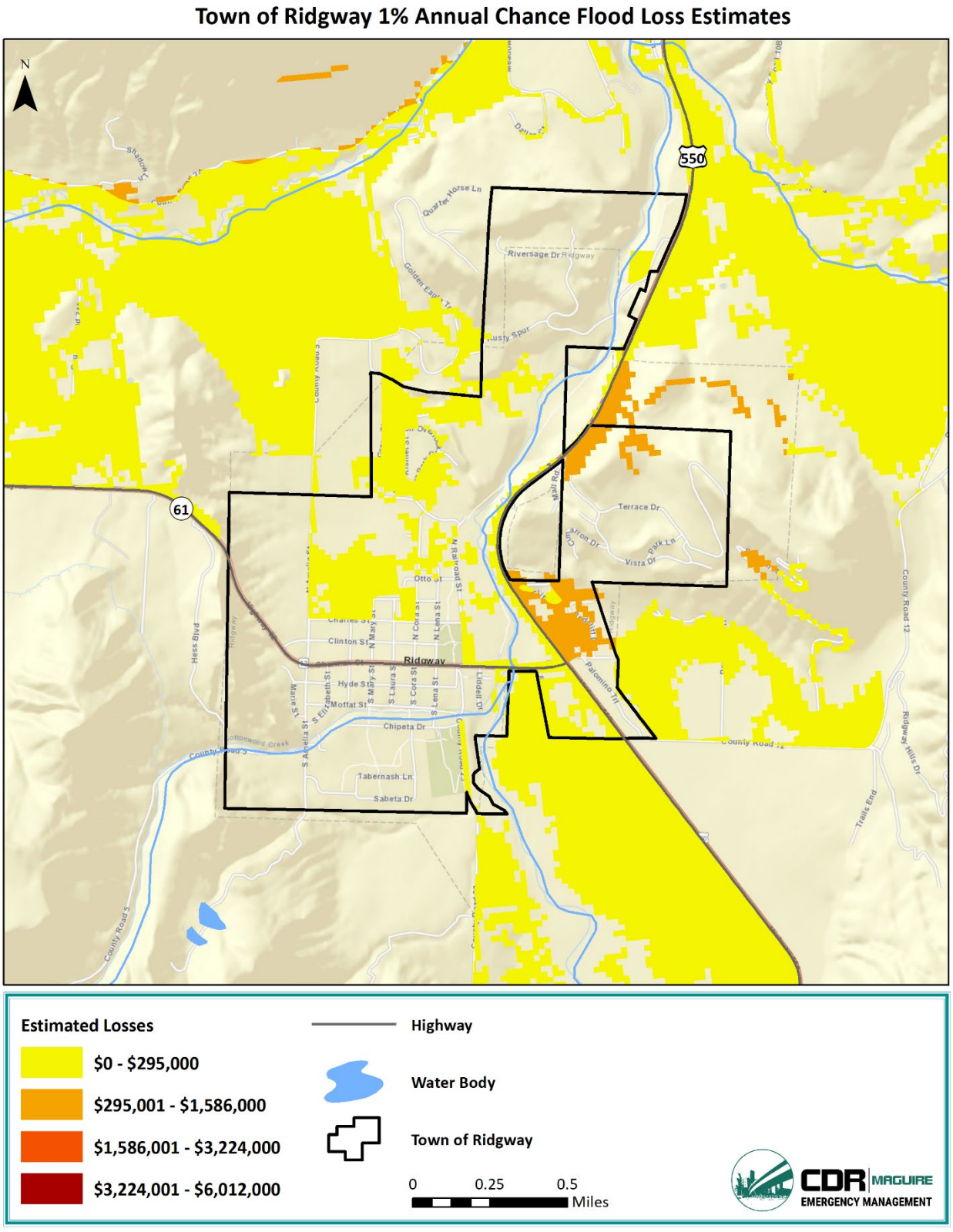


Figure 4-38 Town of Ridgway 1% Annual Chance Flood Losses



Additionally, SHELDUS reports a total of $3,925,983 in flooding damages from 1960 to 2017 (2017 dollars), which equates to $68,876 in annual damages from floods. Of these damages, $3,512,069 were property damages and $413,914 were crop damages.

Future Conditions

Land Use and Development

The only flood GIS data available were the results of the Hazus analysis. The Hazus results largely do not pass through any designated growth areas by the County. However, it does pass through both the City of Ouray and the Town of Ridgway. Both of these jurisdictions have experienced population growth over the last decade and are projected to continue to grow through 2050. The risk of flooding to future development should be minimized by the floodplain management programs of the County and its municipalities, if properly enforced. Risk could be further reduced by strengthening floodplain ordinances and floodplain management programs beyond minimum NFIP requirements.

Climate Change

Although there is no consensus that annual mean precipitation will increase in Colorado due to climate change, it is possible that precipitation may increasingly come in the form of extreme storms. These high-intensity rainfall events could lead to increased flash flood conditions, which are already a primary flooding concern for the County.

Additionally, the timing of peak runoff has shifted one to four weeks earlier in the State. This change in timing can impact Ouray County directly due to the high amounts of snowfall the County receives, and should be taken into consideration when mitigating against flooding from spring snowmelt.

Summary Risk Ranking

Hazards were ranked for each jurisdiction based on the results of this HIRA, LPC input, and public perception of risk. The overall ranks were derived by assigning each jurisdiction a value of 1 (low), 2 (medium), or 3 (high) for each hazard for: the probability of an event occurring, the potential impact of the hazard on property/structures/economy, and the potential impact of the hazard on people. The results were summed for each hazard and jurisdiction to create an overall rank. A summed score of four or less equates to a “low” ranking, five to six equates to a “medium” ranking, and seven or greater equates a “high” ranking. The results are shown in the following figures below.

Table 4-20 Flooding Risk Ranking

	Probability (of losses)	Potential Impact (economic)	Potential Impact (people)	Score	Risk Rank
City of Ouray	3	3	3	9	H
Town of Ridgway	2	3	2	7	H
Unincorporated County	3	3	3	9	H

4.5.11. Landslide/Rockfall

Description

Landslide

A landslide is a general term for a variety of mass-movement processes that generate a downslope movement of soil, rock, and vegetation under gravitational influence. Some of the natural causes of ground instability are stream and lakeshore erosion, heavy rainfall, and poor-quality natural materials. In addition, many human activities tend to make the earth materials less stable and, thus, increase the chance of ground failure. Human activities contribute to soil instability through grading of steep slopes or overloading them with artificial fill, by extensive irrigation, construction of impermeable surfaces, excessive groundwater withdrawal, and removal of stabilizing vegetation. Landslides typically have a slower onset and can be predicted to some extent by monitoring soil moisture levels and ground cracking or slumping in areas of previous landslide activity. Additionally, landslides become a hazard in areas burned by previous wildfires, although for the purposes of this Plan, the hazard post-wildfire aligns with the debris flow hazard profile.

Rockfall

A rockfall is the falling of a detached mass of rock from a cliff or down a very steep slope. Weathering and decomposition of geological materials produce conditions favorable to rockfalls. Rockfalls are caused by the loss of support from underneath through erosion or triggered by ice wedging, root growth, or ground shaking. Changes to an area or slope such as cutting and filling activities can also increase the risk of a rockfall. Rocks in a rockfall can be of any dimension, from the size of baseballs to houses. Rockfall occurs most frequently in mountains or other steep areas during the early spring when there is abundant moisture and repeated freezing and thawing. Rockfalls are a serious geological hazard that can threaten human life, impact transportation corridors and communication systems, and result in other property damage.

Spring is typically the landslide/rockfall season in Colorado as snow melts and saturates soils and temperatures enter into freeze/thaw cycles. Falling ice is sometimes a hazard on Highway 550 just north or south of Ouray. Rockfall and landslides are influenced by seasonal patterns, precipitation and temperature patterns. Additionally, an earthquake could trigger rockfalls and landslides.

Location

The CGS report “Debris-Flow Hazard in the Immediate Vicinity of Ouray, Colorado” contains a hardcopy map showing known landslide deposits near the City of Ouray. The deposits are limited and none of them affect developed areas or roads. A landslide has caused occasional problems to Highway 550 near Colona. Another landslide problem area includes the 11000 block of County Road 1 as it climbs the escarpment. The road is showing possible damage due to sliding of the foundation.

Rockfall hazard areas in Ouray County usually are marked by the presence of fist to boulder sized rocks that accumulate below cliff areas, steep slopes, or talus fields on mountainsides. Steep slopes in the southern half of the County are prone to this hazard, particularly around the City of Ouray, the Camp Bird Road area, and along Highway 550. Since the 2015 Plan, CDOT has shored up failing crib walls to mitigate rockfalls near mile post 89 on Highway 550 (Mother Cline area).

CDOT identified 756 sites throughout Colorado that have ongoing issues with rockfall. There are 14 such sites in Ouray County. CDOT identifies these areas using the Colorado Rockfall Hazard Rating System

(CRHRS) which combines traffic data, geology information, and slope measurements to determine a hazard ranking score. Table 4-21 below details the 14 rockfall hazards in the County by mile marker. Motorists should be particularly careful and aware of the rockfall hazards along that stretch of highway.

Table 4-21 Ouray County Rockfall Hazard Areas

Route	Segment ID	Beginning Mile Marker	Ending Mile Marker
550	US550-SB80.9A	80.901	80.963
550	US550-NB88.0A	88.058	88.116
550	US550-NB88.1B	88.131	88.239
550	US550-NB88.2C	88.250	88.424
550	US550-NB88.4D	88.424	88.588
550	US550-NB88.6E	88.641	88.749
550	US550-NB88.8F	88.816	88.881
550	US550-NB88.9G	88.890	89.257
550	US550-NB89.3A	89.350	89.415
550	US550-NB89.9B	89.907	90.264
550	US550-NB90.3A	90.290	90.341
550	US550-NB90.6B	90.600	90.630
550	US550-NB90.6C	90.653	90.692
550	US550-NB106.3A	106.250	106.381

Figure 4-39, Figure 4-40, and Figure 4-41 depict landslide and rockfall hazard areas in the County, the City of Ouray, and the Town of Ridgway based on a compendium of landslide GIS databases developed by CGS for the 2018 Colorado State Hazard Mitigation Plan. Based on this data, the southern, eastern, and western portions of the County are more susceptible to this hazard. It should be noted these GIS layers were derived from geologic maps at 24K, 48-100K, and 250K resolutions; as well as HB1041 data, and should be used for planning purposes only.

Figure 4-39 Landslide and Rockfall Hazards in Ouray County

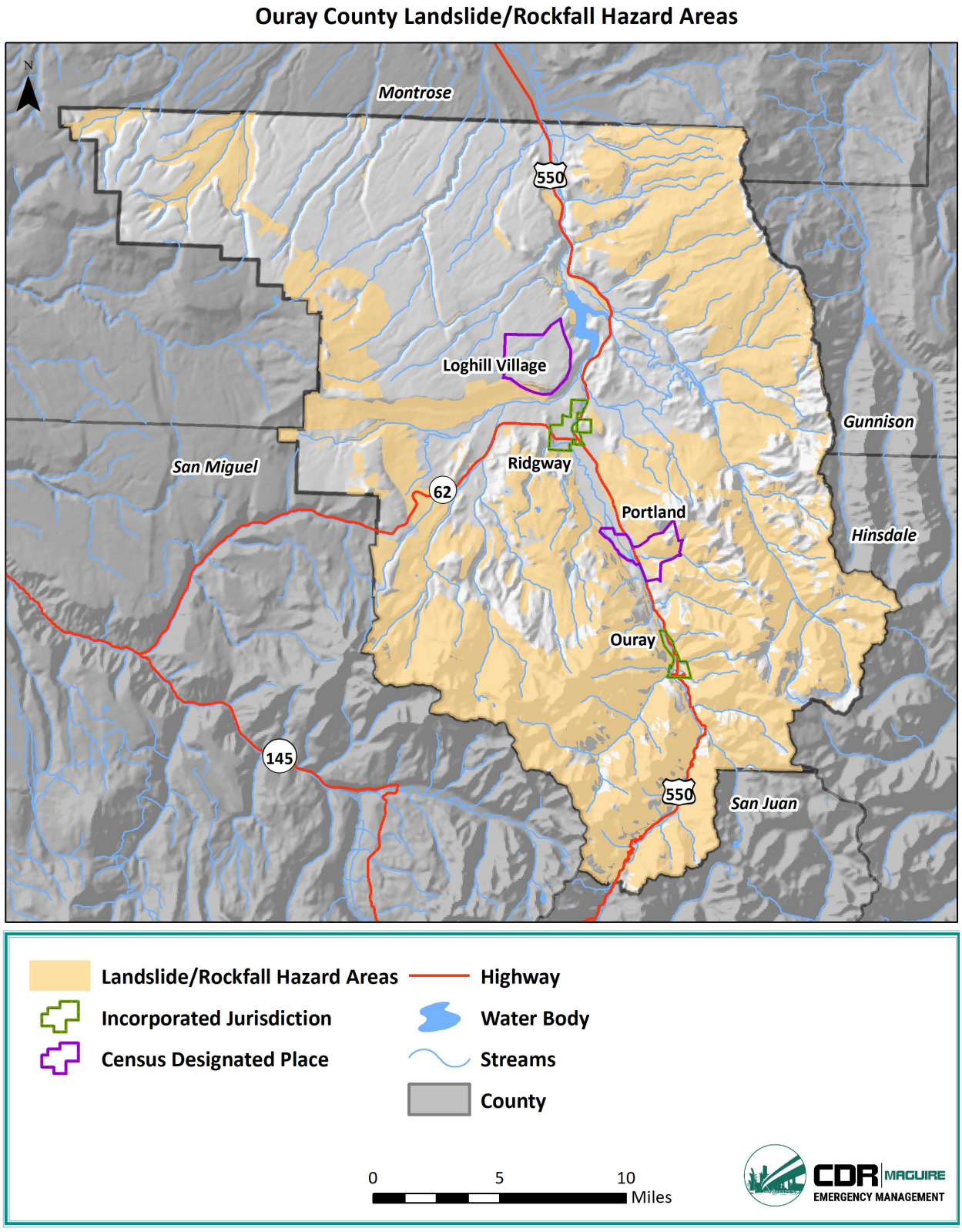


Figure 4-40 Landslide and Rockfall Hazards in the City of Ouray

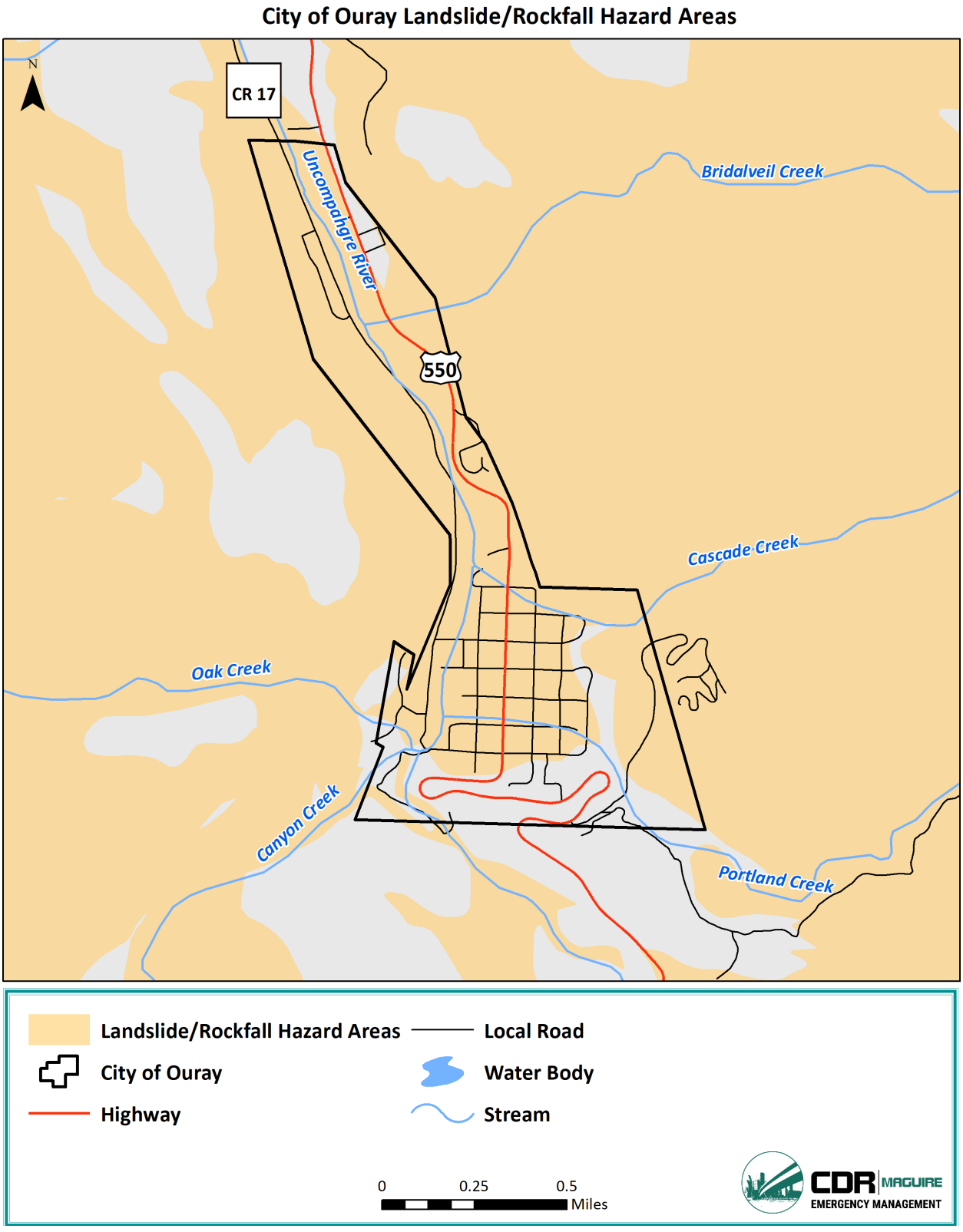
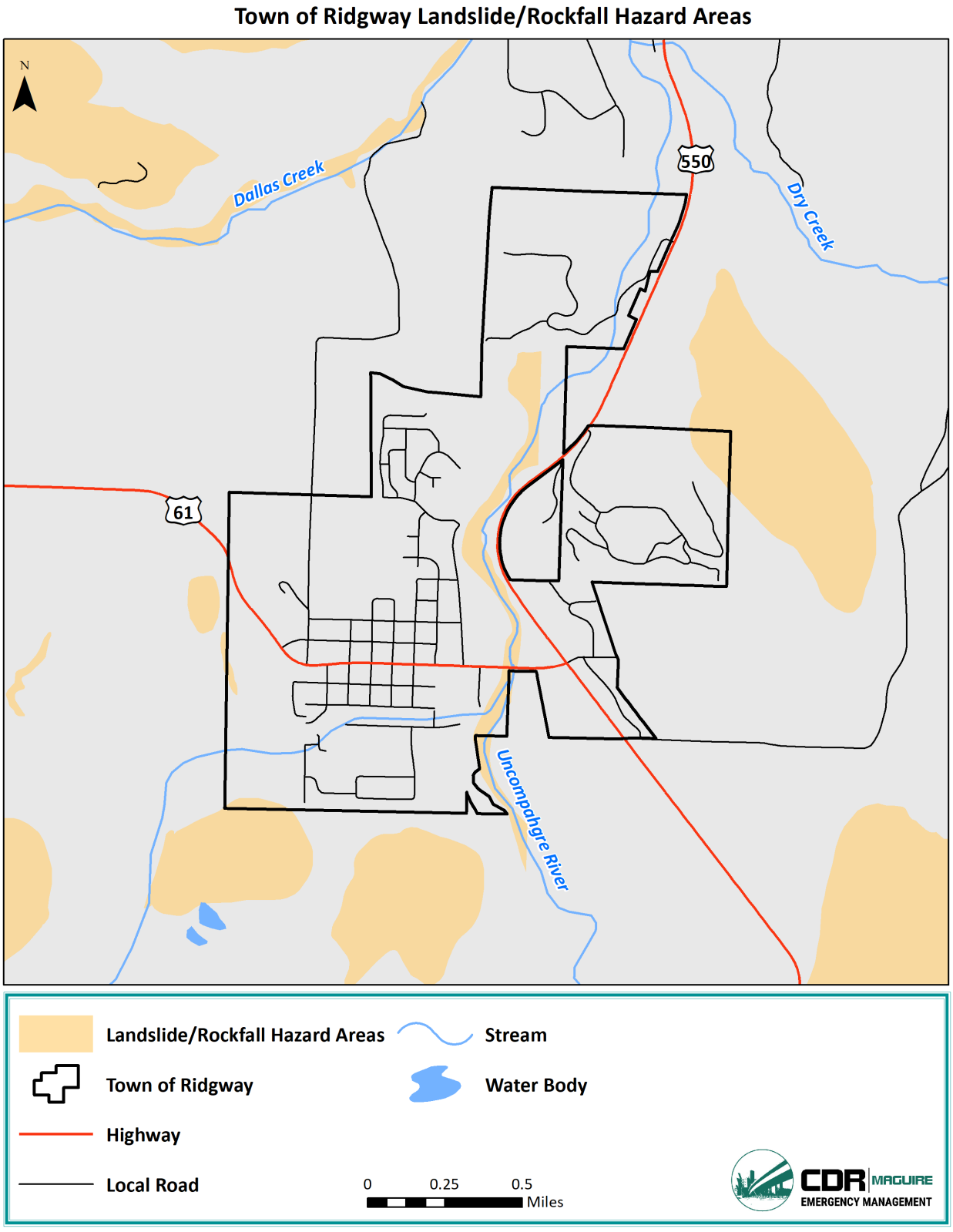


Figure 4-41 Landslide and Rockfall Hazards in the Town of Ridgway



Extent

There is not a formal scale to measure landslide extent. Factors such as volume and size can be used to determine landslide extent. Characteristics determining extent can vary widely between the different landslide types. Some landslides are slow moving (for example, a "creep" landslide), while others occur suddenly and quickly.

Additionally, there is not a formal scale to measure rockfall extent. However, rockfalls typically occur suddenly, with little to no warning time. Rockfalls can vary from smaller rocks to large boulders.

Previous Occurrences

There have been 12 recorded significant rockfall or landslide events recorded since 1984. It should be noted that these are not the only rockfall/landslide events to occur in the County, only ones with documented impacts. Of these events, 11 were rockfall events and one landslide. Three events occurred in the City of Ouray, one in Ridgway, and the rest in unincorporated County, including Camp Bird Road, County Road 17, East Riverside Slide, and Red Mountain Pass. These events equated to $1,035,000 in damages, although this is likely a low estimate. Events occurring since the 2015 Ouray County Hazard Mitigation Plan are described below. Full details of previous occurrences can be found in Appendix C – HIRA Appendix.

In March 2016, a rockfall totaled a house in the City of Ouray.

According to Ouray County Emergency Manager, a rockfall occurred in the City of Ouray in November 2018 that impacted a home and caused flooding concerns in a drainage ditch. Two boulders each "the size of a Volkswagen" came down the cliff that the couple's log home has been sitting on since 1975, one on each side of their home, narrowly missing on both sides. One boulder hit their motor home, turning it on its side while tearing a giant hole "just like a rocket" all the way through it as it came to rest further down the hill. The other boulder rushed down the other side of the home, taking with it large trees split from about waist-high and completely eradicating the snow shed built against the house. It also damaged the electric tram and stairs used to access the home.[44]

Additionally, on March 8, 2019 a massive rockslide caused significant damage to County Road 17, approximately three miles north of the City of Ouray. Rocks the size of two large SUVs landed on the surface of the road above the gas main that supplies the City of Ouray and Whispering Pines neighborhood. The current gas line is suspected to be damaged; however, there are no leaks or disruption of service identified at this time.[45] As of April 2019, the road remains closed until further notice. County Officials, emergency officials, and Black Hills Energy have been working to determine the best solution to re-open County Road 17 in a safe manner. County Road 17 is the only alternative access north out of Ouray. As of March 30, 2019, a cost of about $27,000 was estimated for strictly the engineering work to be done in the area, which doesn't include any costs related to rock removal and mitigation. Additionally, it was determined that this rockfall occurred in a geologically active debris field, which will be impacted again in the future, although the recurrence interval is unknown.[46] Figure 4-42 shows the rockfall.

[44] https://www.ouraynews.com/articles/2018/11/09/massive-boulders-rockslide-narrowly-miss-home
[45] Ouray County Government
[46] Colorado Geological Survey

Figure 4-42 Rockfall on CR 17



In August 2019, a rockfall landed on the catwalk and geothermal line that supplies the Ouray Hot Springs pool. An initial damage assessment is a little over $8,000 in damage. Figure 4-43 shows the event.

Figure 4-43 Rockfall Impacting the Ouray Hot Springs



Additionally, rockfall incidents on Highway 550 have dropped rocks large enough to force vehicles into the opposing traffic lane in order to proceed. Slippage events on Forest Service property and along County Road 361 have damaged the Weehawken Spring water transmission line. This transmission line delivers water to the City of Ouray's water storage tanks and water treatment facility. The City has a limited supply of water in storage, so damage to the Weehawken Spring transmission line can quickly become serious.

Probability

According to the recorded previous occurrences of 12 landslides/rockfalls from 1984 to 2019 and discussions with the LPC, landslides and rockfalls have a likely probability of occurring every year. There is between a 10 and 100% chance of occurrence in any year.

Vulnerability Assessment

Inventory Exposed/Impacts

Impacts from landslides and rockfalls are typically isolated to the direct area, and many of the issues can be mitigated with proper awareness and engineering design. Landslides could create flood hazards by blocking up rivers or by contributing to dam failures. Landslides and rockfall hazards threaten several transportation corridors in the County. Rockfall can cause severe injuries and fatalities. If a landslide event were to cut off a major roadway, people could become stranded, deliveries of supplies could be delayed, emergency response could be hindered, etc. Landslides within and outside of the County also pose a threat to power lines and infrastructure. A landslide could impact power line infrastructure and thus contribute to extended power outages. Increased backcountry recreation in the County also exposes people to rockslide and landslide events. For example, the Camp Bird Road area is subject to rockfall, which is a popular location for residents and tourists to recreate. This area has continued to experience increased use over the last several years. Additionally, it was noted rockfalls commonly originate from USFS owned lands in the County, and it is important to identify these hazard areas to help mitigate.

Based on previous occurrences and the hazard maps, it is evident that the City of Ouray, Highway 550 in southern Ouray County, and County Road 17 are susceptible to landslides and rockfalls. These roads provide important access to and from the County, and the closure of these roads hurt businesses in Ouray County. Based on analysis from the March 2019 rockfall event, from a geological perspective there is a high risk of rockfall to the residences on North Pine Crest Drive, and other similar locations along the base of the cliffs along County Road 17.[47] A water line for the City of Ouray is threatened by a landslide near County Road 361. One other landslide problem area includes the 11000 block of County Road 1 as it climbs the escarpment. The road is showing possible damage due to the sliding foundation. Landslides and rockfalls have little impact on the Town of Ridgway or the Ridgway School District.

Potential Losses

According to the previous occurrences data, landslides/rockfall have caused $1,035,000 in damages in the County from 1984 to 2019. This equates to $29,571 in annual damages. This may still be a low estimate for damages from landslides and rockfalls in the County. For example, repairs alone to Highway 550 from the January 2014 rockfall costed over $1 million. This does not include the economic impacts of the road closure, which was reported to be 60% of revenue lost by local businesses during the closure. Local businesses in the City of Ouray experience significant revenue during the summer months from tourism. If access is prohibited due to closures on Highway 550 or County Road 17 during this time, businesses are particularly vulnerable to loss of income. As of the writing of this Plan, County Road 17 has been closed for several months due to that recent rockslide. Total damages due to this event are still unknown.

[47] Colorado Geological Survey

A GIS analysis was performed with the CGS landslide/rockfall hazard layer utilized in the 2018 Colorado State Hazard Mitigation Plan. Due to the resolution of this layer, this analysis is intended to highlight geographic areas with highest potential losses due to this hazard, rather than smaller scale or parcel-level losses. According to this analysis, there are 4,636 total parcels in landslide/rockfall hazard areas in the County, with a total exposure value of $883,877,220. In the City of Ouray, 911 parcels are in landslide/rockfall hazard areas (out of 997 total parcels) with an exposure of $299,065,995. The majority of the City parcels are in this hazard area, with the exclusion of the very southern boundary. In the Town of Ridgway, 27 parcels are exposed, with a value of $19,611,480. The majority of these parcels lie along the Uncompahgre River. Table 4-22 shows the exposure by jurisdiction. It is evident the City of Ouray and unincorporated County have significant exposure and potential losses to this hazard.

Table 4-22 Parcels in Landslide/Rockfall Hazard Areas

Jurisdiction	# Parcels	Total Exposure
City of Ouray	911	$299,065,995
Town of Ridgway	27	$19,611,480
Unincorporated County	3,698	$565,199,745
Total	**4,636**	**$883,877,220**

Future Conditions

Land Use and Development

The City of Ouray, Town of Ridgway, and unincorporated County have experienced population growth over the last decade and are projected to continue to grow through 2050. Development in areas identified in the "Location" section of this profile has increased vulnerability to this hazard. The severity of landslide problems is directly related to the extent of human activity in hazard areas. Adverse effects can be mitigated by early recognition and avoiding incompatible land uses in these areas or by corrective engineering. The mountainous topography of the County presents considerable constraints to development, most commonly in the form of steep sloped areas. These areas are vulnerable to disturbance and can become unstable. Landslide risk is considered during the permitting and construction per the County's development regulations.

The southern portions of the County which are more susceptible to landslides/rockfall are not very suitable for growth due to topography. However, these areas are popular for outdoor recreation, and continue to grow in popularity. This increase in visitors can expose more people to this hazard in the County.

Climate Change

Climate change can impact landslides and rockfall similarly to debris flow in the County. Increased heavy precipitation can increase the landslide and rockfall risk. Additionally, changes in freeze/thaw cycles associated with changes in temperature/precipitation may impact rockfall events, particularly in the spring when rockfall events are more common.

An increase an increased frequency of high-intensity wildfires can increase the risk of landslides or rockfall in burn scar areas during a rain event.

Summary Risk Ranking

Hazards were ranked for each jurisdiction based on the results of this HIRA, LPC input, and public perception of risk. The overall ranks were derived by assigning each jurisdiction a value of 1 (low), 2 (medium), or 3 (high) for each hazard for: the probability of an event occurring, the potential impact of the hazard on property/structures/economy, and the potential impact of the hazard on people. The results were summed for each hazard and jurisdiction to create an overall rank. A summed score of four or less equates to a "low" ranking, five to six equates to a "medium" ranking, and seven or greater equates a "high" ranking. The results are shown in the following figures below.

Table 4-23 Landslide / Rockfall Risk Ranking

	Probability (of losses)	Potential Impact (economic)	Potential Impact (people)	Score	Risk Rank
City of Ouray	3	3	2	8	H
Town of Ridgway	2	2	2	6	M
Unincorporated County	3	3	2	8	H

4.5.12. Lightning

Description

Lightning is a discharge of electrical energy resulting from the buildup of positive and negative charges within a thunderstorm, creating a "bolt" when the buildup of charges becomes strong enough. This flash of light usually occurs within the clouds or between the clouds and the ground. A bolt of lightning can reach temperatures approaching 50,000 degrees Fahrenheit. Lightning rapidly heats the sky as it flashes but the surrounding air cools following the bolt. This rapid heating and cooling of the surrounding air causes the thunder which often accompanies lightning strikes. While most often affiliated with severe thunderstorms, lightning may also strike outside of heavy rain and might occur as far as 10 miles away from any rainfall.

Lightning is one of the more dangerous weather hazards in the United States and in Colorado. Each year, lightning is responsible for deaths, injuries, and millions of dollars in property damage, including damage to buildings, communications systems, power lines, and electrical systems. Lightning also causes forest and brush fires, as well as deaths and injuries to livestock and other animals. According to the National Lightning Safety Institute, lightning causes more than 26,000 fires in the United States each year.

U.S. lightning statistics compiled by the National Oceanic and Atmospheric Administration between 1959 and 1994 indicate that most lightning incidents occur during the summer months of June, July, and August and during the afternoon hours from between 2 and 6 p.m.

Location

The entire County is susceptible to lightning. Figure 4-44 shows the flash density of lightning strikes across the United States from 2007 to 2016.[48] Figure 4-45 shows this information for Colorado.[49] It is evident that Ouray County has lower flash density than much of the United States and eastern Colorado.

[48] Vaisala; https://my.vaisala.net/en/services/dataservicesandsolutions/lightningdata/Pages/NLDN.aspx
[49] https://www.weather.gov/pub/lightningFlashDensityMaps

However, the exposed, mountainous terrain and high amount of people recreating in the high country makes the County vulnerable to lightning strikes impacting people.

Figure 4-44 Lightning Flash Density Across the United States 2007 to 2016

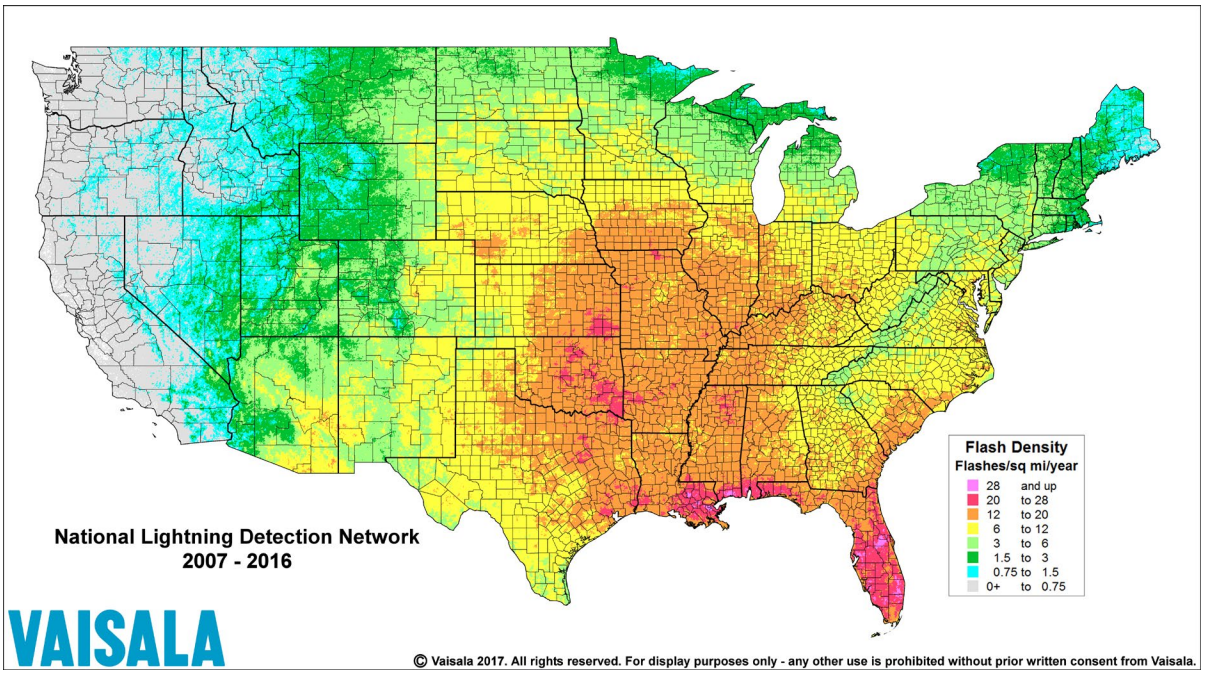
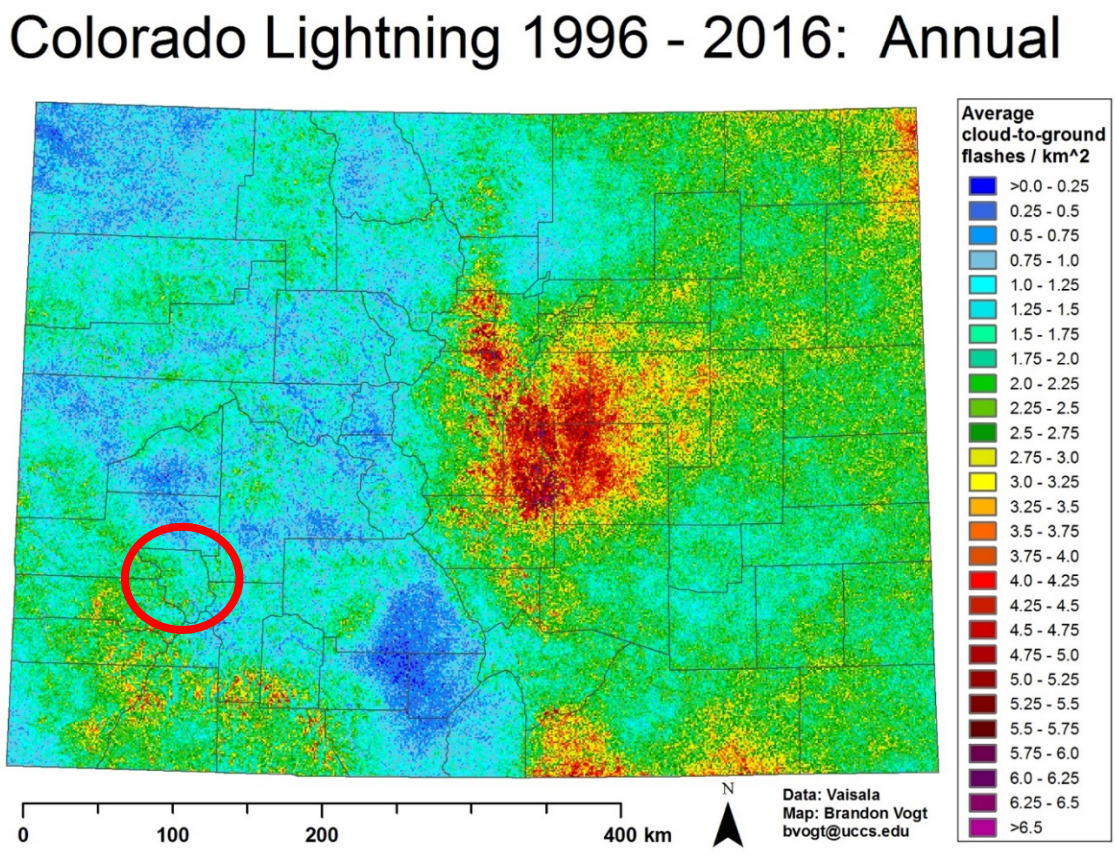


Figure 4-45 Lightning Flash Density Across Colorado 1996 to 2016



Extent

In Ouray County, lightning is most frequent during the summer monsoon season, typically July and August, which produces afternoon thunderstorms nearly daily. These storms can arrive very quickly, making them particularly dangerous and leaving people outdoors vulnerable to lightning.

Previous Occurrences

From 1997 to 2012, Colorado experienced an average of 506,131 lightning flashes per year, ranking it 32nd in the nation for number of flashes during this time period.[50] Ouray County has an average 2,400 flashes per year.[51]

In terms of lightning fatalities, Colorado has experienced 146 fatalities from 1959 to 2016, ranking it 5th in number of fatalities (behind Florida, Texas, North Carolina, and Ohio). While lightning is a regular occurrence in Ouray County, damaging lightning is not. According to the National Climatic Data Center Storm Event Database, there were two notable lightning events in Ouray County between 1993 and 2018:

[50] Vaisala; https://www.weather.gov/media/iln/97-12Flash_DensitybyState.pdf
[51] https://www.weather.gov/pub/lightningCgCountyColorado

- **August 17, 1999**—Lightning struck a power substation. Insulators were destroyed and fuses were blown on a transformer, which resulted in a power outage to the entire community for about one hour. Damage was estimated at $1,000.
- **June 13, 1996**—A man was struck and killed by lightning while hiking near the summit of Mt. Sneffles. Shortly before the lightning strike he was warned of the potential lightning danger from other hikers who were coming down from the summit.

Probability

There is a 100% chance of occurrence of lightning every year in Ouray County, equating to a highly likely probability. However, damaging lightning happens much less frequently.

Vulnerability Assessment

Inventory Exposed/Impacts

Lightning can cause deaths, injuries, and property damage, including damage to buildings, communications systems, power lines, and electrical systems. It also causes wildland and structural fires. Damage from lightning occurs in four ways:

- Electrocution, severe electrical shock, and burns of humans and animals
- Vaporization of materials in the path of the strike
- Fire caused by the high temperatures associated with lightning
- Power surges that can damage electrical and electronic equipment

When people are struck by lightning, the result is deep burns at the point of contact (usually on the head, neck, and shoulders). Approximately 70% of lightning survivors experience residual effects such as vision and hearing loss or neuropsychiatric issues. These effects may develop slowly and only become apparent much later. Death occurs in 20% of lightning strike victims.

Aside from wildfire ignition, lightning strikes cause intense but localized damage. In contrast to other hazards, lightning does not cause widespread disruptions with the community. Structural fires, localized damage to buildings, damage to electronics and electrical appliances, and electrical power and communications outages are typical consequences of a lightning strike. Additionally, indirect fatalities may result via electrocution when a person steps from a vehicle into standing water that was previously “charged” by a live power-line that was knocked loose by a lightning strike.

The indirect social and economic impacts of lightning damage are typically associated with the loss of electrical power. Since society relies heavily on electric power, any disruption in the supply, even for a short time period, can have significant consequences. Wildland fires can also be an indirect result of a lightning strike.

Overall, all jurisdictions and the Ridgway School District are at equal risk to the impacts of lightning. People recreating outside are at the highest risk to a lightning strike. Large influxes of people visiting Ouray County during the summer months exposes many people to lightning during the peak of the monsoon season, when most lightning strikes occur. Many people visit Ouray County for the outdoor beauty, and if they are not prepared for the risks associated with lightning in the high country, tourists can be particularly vulnerable to lightning strikes.

Potential Losses

Historically, lightning has not caused extensive losses to Ouray County. SHELDUS reports $2,856 in damages from lightning from 1960 to 2017 (2017 dollars). This equates to approximately $50 in annual damages. Loss of life can also occur from lightning strikes. Ouray County has only experienced one death from lightning through 2018.

Future Conditions

Land Use and Development

The City of Ouray, Town of Ridgway, and unincorporated Ouray County have all experienced population growth in the last decade and are projected to continue to grow in population through 2050. This exposes more people across the County to lightning. Many people living in Ouray County take advantage of the ample alpine recreation opportunities, however, new residents may not be aware of the dangers associated with lightning while recreating, which can lead to an increase in injuries or deaths from lightning.

Climate Change

The impacts of climate change on lightning-producing thunderstorms is unclear for the State of Colorado. More research is needed to determine if climate change is impacting the warm-season convective thunderstorms across the State.

Summary Risk Ranking

Hazards were ranked for each jurisdiction based on the results of this HIRA, LPC input, and public perception of risk. The overall ranks were derived by assigning each jurisdiction a value of 1 (low), 2 (medium), or 3 (high) for each hazard for: the probability of an event occurring, the potential impact of the hazard on property/structures/economy, and the potential impact of the hazard on people. The results were summed for each hazard and jurisdiction to create an overall rank. A summed score of four or less equates to a "low" ranking, five to six equates to a "medium" ranking, and seven or greater equates a "high" ranking. The results are shown in the following figures below.

Table 4-24 Lightning Risk Ranking

	Probability (of losses)	Potential Impact (economic)	Potential Impact (people)	Score	Risk Rank
City of Ouray	1	2	2	5	**M**
Town of Ridgway	1	2	2	5	**M**
Unincorporated County	1	2	2	5	**M**

4.5.13. Public Health Emergencies

Description

For this Plan pandemic flu; the West Nile Virus; and radon, Carbon Monoxide (CO), and methane seeps are profiled as public health emergencies.

Pandemic Influenza

A pandemic is a global disease outbreak. A pandemic flu is a virulent human flu that causes a global outbreak, or pandemic, of serious illness. A flu pandemic occurs when a new influenza virus emerges for which people have little or no immunity, and for which there is no vaccine. This disease spreads easily person-to-person, causes serious illness, and can sweep across the country and around the world in very short time. The U.S. Centers for Disease Control and Prevention has been working closely with other countries and the World Health Organization to strengthen systems to detect outbreaks of influenza that might cause a pandemic and to assist with pandemic planning and preparation.

An especially severe influenza pandemic could lead to high levels of illness, death, social disruption, and economic loss. Impacts could range from school and business closings to the interruption of basic services such as public transportation, health care, and the delivery of food and essential medicines.

West Nile Virus

The impact to human health that wildlife, and more notably, insects, can have on an area can be substantial. Mosquitoes transmit the potentially deadly West Nile virus to livestock and humans alike. West Nile virus first struck the western hemisphere in Queens, New York, in 1999 and killed four people. Since then, the disease has spread across the United States. The West Nile virus has now been reported in all 50 states.

Most humans infected by the virus have no symptoms. A small proportion develops mild symptoms that include fever, headache, body aches, skin rash, and swollen lymph glands. Less than 1% of those infected develop more severe illness such as meningitis or encephalitis, symptoms of which include headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, and paralysis. Of the few people who develop encephalitis, fewer than 1 out of 1,000 infections die as a result.

There is no specific treatment for the infection or a vaccine to prevent it. Treatment of severe illness includes hospitalization, use of intravenous fluids and nutrition, respiratory support, prevention of secondary infections, and good nursing care. Medical care should be sought as soon as possible for persons who have symptoms suggesting severe illness. People over 50 years of age appear to be at high risk for the severe aspects of the disease.

Radon, Carbon Monoxide, and Methane Seeps

Radon is a naturally occurring colorless, odorless, radioactive gas that forms when uranium in the soil breaks down. Radon can then seep into homes and workplaces through cracks and openings in floors and crawlspaces, and become part of the atmosphere. Radon gas decays into radioactive particles that can get trapped in the lungs when inhaled. Radon exposure does not create an acute or immediate hazard, however, long-term exposure can significantly increase the risk of lung cancer. Radon is the second-leading cause of lung cancer in the United States (behind smoking) and is the leading cause of lung cancer in nonsmokers. Each year, about 21,000 deaths in the United States are attributed to radon-caused lung cancer. Lung cancer typically occurs 5-25 years after exposure.

Carbon monoxide is an invisible and odorless gas produced by the incomplete burning of various fuels, including coal, wood, charcoal, oil, kerosene, propane, and natural gas. Carbon monoxide is also produced by internal combustion engine-powered equipment such as portable generators, cars, and lawn mowers. Breathing in high levels can lead to severe illness or death.

Methane is a colorless, odorless gas, and is the main component of natural gas. It is associated with fossil fuels, primarily coal beds, and is also created by microorganisms in marshes, bogs, and landfills. Methane is not a toxic human health hazard; it is not considered a carcinogen and does not cause adverse health effects from ingestion, inhalation, or adsorption. However, if methane accumulates in a confined or poorly ventilated space, an explosion hazard can be created, and because oxygen is displaced, an asphyxiation hazard may also be created. High levels of methane gas in groundwater have also been known to create a flammability hazard. Note that this section only addresses naturally occurring methane seeps.

Location

Pandemic Influenza

The entire population of the County could potentially be affected by a pandemic flu outbreak.

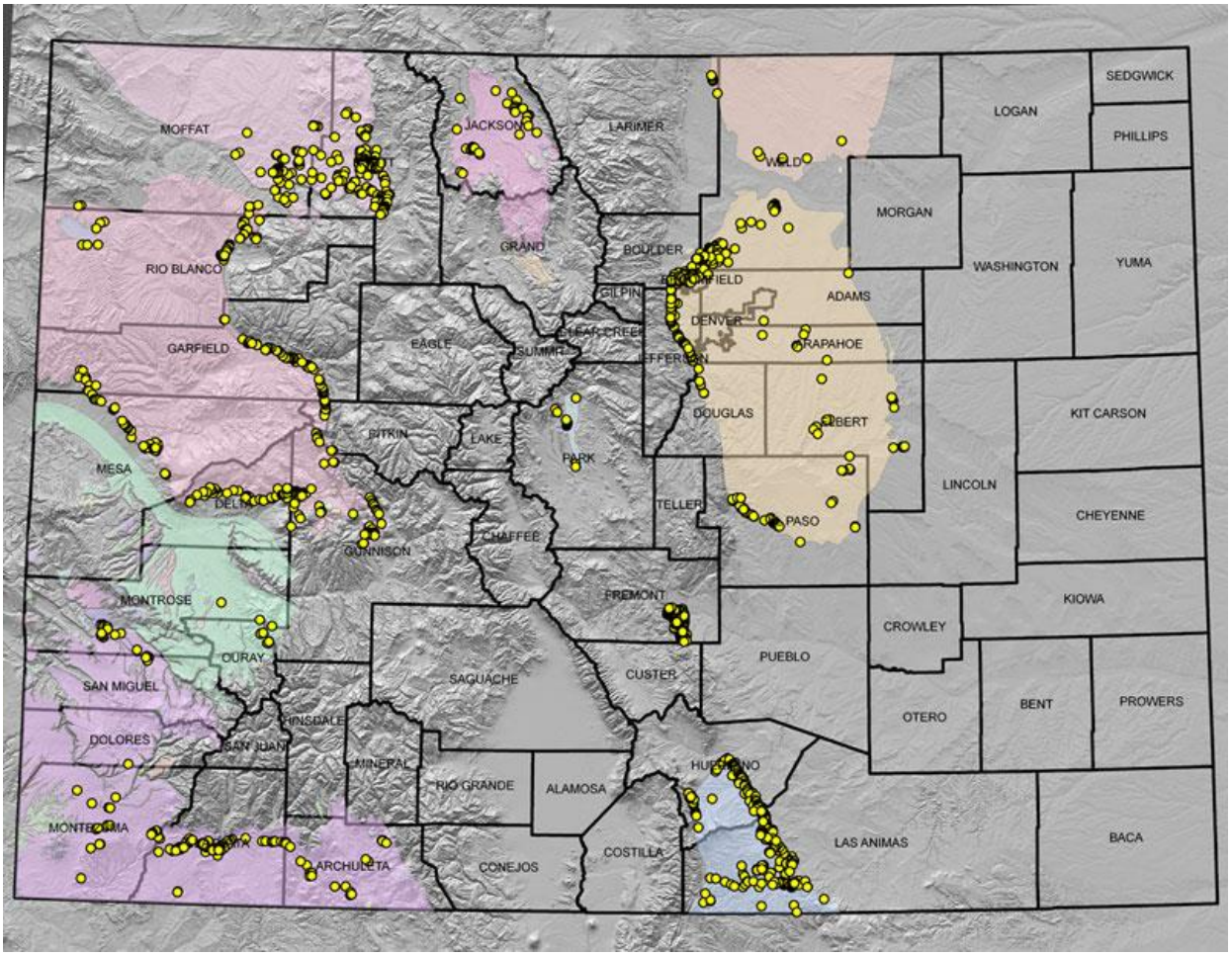
West Nile Virus

According to the LPC, the relatively higher elevations of the County are less prone to have the mosquito that carries West Nile. Thus, the lower elevations in the northern County are possibly more prone this hazard.

Radon, Carbon Monoxide, and Methane Seeps

The entire County is exposed to radon. The exact level varies for each individual building, and at this time building-level data is not available to determine areas that may experience higher levels of radon throughout the County. Additionally, carbon monoxide exposure is possible across the entire County. Methane seepage is typically associated with coal bed areas in Colorado. According to the Colorado Geological Survey, the northern and central portions of Ouray County contain a coal bed and may be more susceptible to methane seeps (Figure 4-46).

Figure 4-46 Coal Beds in Colorado



Extent

Pandemic Influenza

According to the Colorado Department of Public Health and Environment (CDPHE) 2018 Pandemic Influenza Plan, Influenza pandemics are unpredictable, but expected, and may arrive with very little warning. Certain conditions make pandemic influenza more likely:

- A novel influenza A virus emerges when two or more different strains or different viruses combine to form a new subtype, with some characteristics of the original viruses. This process is called “antigenic shift”.
- The population is susceptible with little or no immunity to the new virus.
- The virus is highly contagious.
- The virus is virulent with the capacity to cause serious illness and death.[52]

West Nile Virus

The West Nile virus is most commonly spread by infected mosquitos. Mosquito season in Colorado lasts from approximately June through August.

[52] CDPHE Pandemic Influenza Plan, 2018

Radon, Carbon Monoxide, and Methane Seeps

Radon levels in all Colorado counties are rated by the US Environmental Protection Agency (EPA) as having predicted indoor radon levels greater than two picocuries per liter (pCi/L), well above the national average of 1.3 pCi/L. According to the 2018 Colorado State Hazard Mitigation Plan, Ouray County has a predicted indoor radon level greater than four pCi/L, which is the level at which the EPA recommends radon mitigation. The exact level varies for each individual home in the County. Typically, radon exposure occurs over a long time span (such as in an individual's home) and affects from this exposure occur years later. Among people exposed to radon above four pCi/L, 62 out of every 1,000 smokers and seven out of 1,000 nonsmokers could get lung cancer. For nonsmokers, the lifetime risk of dying from this level of radon exposure is comparable to the risk of dying in a car crash; for smokers, the risk is comparable to five times the risk of dying in a car accident.

Carbon monoxide is an odorless gas, so exposure can be sudden and without warning. This can occur at a small scale, such as an individual in a house or vehicle, or at a larger scale such as an indoor event.

Similarly to carbon monoxide, methane is also a colorless and odorless gas, leading to sudden exposure with little warning.

Previous Occurrences

Pandemic Influenza

There were three acknowledged pandemics in the twentieth century and one in the twenty-first century:

- **1918-19 Spanish flu (H1N1)**—This flu is estimated to have sickened 20-40% of the world's population. Over 20 million people lost their lives. Between September 1918 and April 1919, 500,000 Americans died. The flu spread rapidly; many died within a few days of infection, others from secondary complications. The attack rate and mortality were highest among adults 20-50 years old; the reasons for this are uncertain. This flu impacted Ouray County. There is evidence that 15 persons or more died during this outbreak. The far-reaching effects of this pandemic were significant, considering the remoteness of Ouray at this point in time.
- **1957-58 Asian flu (H2N2)**—This virus was quickly identified due to advances in technology, and a vaccine was produced. Infection rates were highest among school children, young adults, and pregnant women. The elderly had the highest rates of death. A second wave developed in 1958. In total, there were about 70,000 deaths in the United States. Worldwide deaths were estimated between 1 and 2 million.
- **1968-69 Hong Kong flu (H3N2)**—This strain caused approximately 34,000 deaths in the United States and more than 700,000 deaths worldwide. It was first detected in Hong Kong in early 1968 and spread to the United States later that year. Those over age 65 were most likely to die. This virus returned in 1970 and 1972 and still circulates today.
- **2009-2010 Swine flu (H1N1)**—This flu strain was first detected in the U.S. in California in April 2009. It was identified as H1N1 but was not the exact strain that appeared in 1918. Worldwide health response quickly ramped up in April in preparation for a pandemic. All 50 U.S. states reported cases of 2009 H1N1 by June 19, 2009. This strain caused 14,286 deaths worldwide and 2,117 laboratory-confirmed deaths in the U.S. according to the CDC.

West Nile Virus

From 2002 to 2018, there have not been any reported West Nile virus cases in Ouray County. However, there have been reported cases every year in Colorado since 2002. Table 4-25 shows the number of cases over time.[53]

Table 4-25 West Nile Virus Cases in Colorado from 2002 to 2017

Year	Cases	Deaths
2002	14	0
2003	2,947	63
2004	291	0
2005	106	0
2006	345	7
2007	555	6
2008	71	1
2009	103	3
2010	81	4
2011	7	0
2012	131	5
2013	322	7
2014	118	5
2015	101	3
2016	149	8
2017	68	4
Total	**5,409**	**116**

Although no cases of West Nile virus have been reported in Ouray County, several surrounding counties have experienced the virus. From 2002 to 2018, Montrose County has experienced 68 cases, San Miguel County 1 case, and Gunnison County 2 cases.[54] This indicates it is possible that Ouray County will experience cases of West Nile virus.

The Town of Ridgway and Ouray County have had an aggressive mosquito program in place for several years which includes mitigation, education, and tracking. The control methods used emphasize treatments with minimal environmental impact but proven effectiveness.

Radon, Carbon Monoxide, and Methane Seeps

Radon: Overall, Colorado's incidence rate of lung cancer is 43.3 cancers per 100,000 residents; this is well below the national average of 60.2, due primarily to Colorado's low smoking rates. According to this data, Ouray County experienced too few lung cancer cases (three or fewer) to calculate an incidence rate.[55]

[53] https://www.cdc.gov/westnile/statsmaps/finalmapsdata/index.html
[54] https://www.colorado.gov/pacific/cdphe/west-nile-virus-data
[55] https://statecancerprofiles.cancer.gov/incidencerates/

Nevertheless, from 1990 through 2015 more than 51,000 Coloradans died from lung cancer, an average of 1,970 deaths a year. While it is not possible to state definitively which of those cancers were due to radon exposure, the US Centers for Disease Control and Prevention (CDC) estimate that 13 percent of lung cancers are attributable to radon exposure; this equates to an estimated 255 deaths a year from radon-induced lung cancer in Colorado. The number of lung cancer deaths for Ouray County was not available during this Plan update.

Carbon Monoxide: From 1999 to 2009, an average of 11 Coloradans died every year due to accidental carbon monoxide poisoning not related to a fire, and more than twice that number were hospitalized. In 2009 Colorado passed a law requiring the installation of carbon monoxide alarms in most homes. Since 2010, the number of deaths has dropped slightly to 9.4 per year. No data for deaths in Ouray County was available at the time of this Plan update. In Ouray County, from 2011 to 2017, there have been nine unintended carbon monoxide poisoning emergency department visits. Seven of these visits occurred in 2013, which led to an incident rate of 174.16 per 100,000 people, which was significantly higher than the statewide rate. The other two occurred in 2016, but did not lead to an incident rate significantly higher than the statewide rate.[56]

In November 2013, two miners died in the Revenue-Virginius gold and silver mine and at least 19 others were injured from carbon monoxide poisoning in Ouray County. However, it was noted during the first LPC meeting that the County does not have jurisdiction over mines and does not mitigate against hazards for them, therefore, for this profile carbon monoxide events do not include mine accidents.

Methane: There have not been any previous occurrences of methane seepage incidents in Ouray County. However, with the presence of coal beds in the County, it remains a concern.

Probability

Pandemic Influenza

Based on four previous worldwide pandemic flu outbreaks in that affected the United States between 1918 and 2019, there is an estimated 4% chance of occurrence in any year. This equates to a possible probability. Although there is a low chance of occurrence, a pandemic flu outbreak would have serious impacts on human health and the economy.

West Nile Virus

There have not been any recorded West Nile virus cases in Ouray County. This leads to an unlikely probability of occurrence. However, as noted previously, cases have been reported in several neighboring counties, so Ouray County must be prepared for cases in the County in the future.

Radon, Carbon Monoxide, and Methane Seeps

Based on few to no recorded previous occurrences of radon, carbon monoxide, or methane seeps in the County, there is an unlikely probability of occurrence.

Vulnerability Assessment

Inventory Exposed/Impacts

Pandemic Influenza

[56] https://www.colorado.gov/pacific/coepht/carbon-monoxide-poisoning-data

The total County population of 4,783 could potentially be exposed to a pandemic flu outbreak. According to the Colorado Department of Public Health and Environment's Internal Emergency Response Implementation Plan, susceptibility to the pandemic influenza virus strain will be universal, and the disease affect approximately 30% of the State's overall population.

Illness rates will be highest among school-age children (about 40%) and decline with age. Among working adults, an average of 20% will become ill during a community outbreak. In a severe pandemic, it is expected that absenteeism may reach 40% due to illness, the need to care for ill family members, and fear of infection. According to Ouray County Public Health, the County has a lower than average vaccination rate, making residents potentially more vulnerable to contracting the influenza virus.

The number of hospitalizations and deaths will depend on the virulence of the virus. Risk groups cannot be predicted with certainty. During the annual influenza season, infants, the elderly, the chronically ill, and pregnant women are usually at higher risk. But, in contrast, in the 1918 pandemic, most deaths occurred among young, previously healthy adults.

If a pandemic event affected 30% of the Ouray population, approximately 1,435 people in the County could become ill. Local medical staff and resources would be quickly overwhelmed. Public fear and anxiety could cause some panic behaviors. The more densely populated areas of the County, such as the City of Ouray, Town of Ridgway, and Loghill Mesa would likely be more susceptible to the spread of the flu. The Ridgway School District would be negatively impacted during a flu pandemic. The flu can spread quickly in schools due to the increased density of people.

West Nile Virus

People who work or recreate outside are at a higher risk to West Nile virus, although the whole population of the County is at risk. According to the CDPHE, people of any age can get West Nile virus. However, the elderly are at the greatest risk for severe disease. People with certain medical conditions such as cancer, diabetes, hypertension, kidney disease, and people who have received organ transplants are also at greater risk for serious illness.

In Ouray County, 26.1% of residents are 65 years or older; 32% in the City of Ouray; and 18% in the Town of Ridgway. These age groups are more vulnerable to the severe impacts of West Nile virus. Due to the larger portion of elderly residents in the City of Ouray, it may be more at risk to the impacts from West Nile virus than other parts of the County.

Radon, Carbon Monoxide, and Methane Seeps

Radon, carbon monoxide, and methane seeps all impact human health and safety. As mentioned previously, radon is a leading cause of lung cancer in the United States. Radon induced lung cancer impacts both children and adults alike, with all age groups having similar risk levels. Radon exposure has not been linked to other respiratory diseases, such as asthma. Radon can be tested for and mitigated in buildings to lower the risk of exposure in populations. Due to the widespread exposure to radon in Colorado, all jurisdictions have similar risk from radon exposure in Ouray County. Colorado statute requires all schools to test for radon and to maintain records of the test results for disclosure upon request. However, the statute does not require schools to mitigate high radon levels; it is up to the school district and its constituents to decide how to address mitigation issues. The City of Ouray Schools

mitigates and has a mitigation plan for Radon and Asbestos. The Ridgway school does not have a mitigation project, nor do they know the last time they tested for Radon.

The health effects of carbon monoxide depend on the concentration of carbon monoxide in the air, how long a person is exposed, and the health status of the person exposed. Unborn babies, infants, and people with respiratory problems, chronic heart disease, or anemia are most susceptible to the effects of carbon monoxide poisoning. At low concentrations carbon monoxide can cause fatigue and other flu-like symptoms. It can also cause chest pain in people with heart disease. At higher concentrations, carbon monoxide can cause impaired vision and coordination, headaches, dizziness, confusion, and nausea. Very high concentrations of carbon monoxide can lead to loss of consciousness and death within minutes. The health effects of long-term exposure to low levels of carbon monoxide are not well understood, but exposure to high carbon monoxide levels during pregnancy is known to be associated with birth defects and fetal death. Exposure to moderate or high levels of carbon monoxide over long periods of time has also been linked to an increased risk of cardiovascular disease. Survivors of severe carbon monoxide poisoning may suffer from heart and brain damage, learning and memory impairment, emotional and personal changes, and sensory and motor disorders. All jurisdictions have similar risk to impacts from carbon monoxide exposure.

Methane seepages can cause sudden explosions which may cause injuries and fatalities as well as severe damages to structures. Additionally, if methane is contained in groundwater, it can make water unsafe to drink or in some cases, flammable. All jurisdictions in the County are at risk to the impacts of methane seeps. However, there is documented coal bed areas in the northern/central portions of the County, putting those areas at a higher risk. This would include the Town of Ridgway and the Ridgway School District.

Potential Losses

Losses associated with all public health emergencies in this profile are primarily the impact to people, causing sickness and death. Additionally, pandemic flu can have a direct economic impact through costs such as response costs (hospitalizations, drug costs, etc.) and an indirect economic impact such as loss of productivity at work/school. Methane seepages can also cause explosions damaging infrastructure. With a lack of recorded losses from a public health emergency in the County, it is assumed all jurisdictions are at equal risk to losses.

Future Conditions

Land Use and Development

The City of Ouray, Town of Ridgway, and unincorporated Ouray County have all experienced population growth in the last decade and are projected to continue to grow in population through 2050. This exposes more people across the County to all hazards associated with public health emergencies. Additionally, as population density increases, influenza can spread more quickly amongst the population. For radon and carbon monoxide, as new development occurs, radon testing and mitigation systems as well as carbon monoxide alarms should be installed to decrease the risk of these hazards.

Climate Change

Further research is needed to determine the impacts of climate change on pandemic flu and radon, carbon monoxide, and methane seeps.

According to the EPA, climate change may raise the risk of human exposure to West Nile virus. Studies show that warmer temperatures associated with climate change can speed up mosquito development, biting rates, and the incubation of the disease within a mosquito. Climate change's effects on birds may also contribute to changes in long-range virus movement, as the timing of migration and breeding patterns are driven by climate. Mild winters and drought have been associated with West Nile virus disease outbreaks, while rainfall can also contribute by creating breeding sites for mosquitoes.[57] More research is needed to determine impacts to Ouray County directly. Lack of long-term reporting is a difficulty when studying the impact of climate change on West Nile virus.

Summary Risk Ranking

Hazards were ranked for each jurisdiction based on the results of this HIRA, LPC input, and public perception of risk. The overall ranks were derived by assigning each jurisdiction a value of 1 (low), 2 (medium), or 3 (high) for each hazard for: the probability of an event occurring, the potential impact of the hazard on property/structures/economy, and the potential impact of the hazard on people. The results were summed for each hazard and jurisdiction to create an overall rank. A summed score of four or less equates to a "low" ranking, five to six equates to a "medium" ranking, and seven or greater equates a "high" ranking. The results are shown in the following figures below.

Table 4-26 Public Health Emergencies Risk Ranking

	Probability (of losses)	Potential Impact (economic)	Potential Impact (people)	Score	Risk Rank
City of Ouray	1	1	2	4	L
Town of Ridgway	1	1	2	4	L
Unincorporated County	1	1	1	3	L

4.5.14. Severe Winter Storm

Description

A winter storm is an event in which varieties of precipitation are formed that only occur at low temperatures, such as snow, sleet, freezing rain or ice. Snowstorms generally occur with the clash of different types of air masses, with differences in temperature, moisture, and pressure; specifically, when warm moist air interacts with cold dry air. Snow storms that produce a lot of snow require an outside source of moisture, such as the Gulf of Mexico or the Pacific Ocean. Blizzards are severe snow storms with winds in excess of 35 mph and visibility of less than a 1/4 mile for more than 3 hours. Freezing rain occurs when a layer of warm air hovers over a region, but the ground ambient temperature is sub-freezing.

Heavy snowfall during winter can also lead to flooding or landslides during the spring if the area snowpack melts too quickly. Avalanche danger is greatly increased during and immediately after heavy snowfall.

[57] https://www.epa.gov/climate-indicators/climate-change-indicators-west-nile-virus

Location

With its high elevation and surrounding mountain peaks, Ouray County is accustomed to winter storms that bring large snow totals. The southern County high country area and City of Ouray are susceptible to the heaviest snow. The City of Ouray averages 138 inches of snow per year, and Ridgway, sitting at a lower elevation, averages 85 inches per year.[58] For both areas, the highest snow totals fall between November and March, with March historically being the snowiest month.

Extent

Winter storms are defined differently in various parts of the country relevant to their standard weather. Two inches of snow may create serious disruptions to traffic in areas where snowfall is not expected, however this may be considered a light dusting in regions where snowfall is typical, such as Ouray County. Therefore, there are multiple ways in which to measure a winter storm, based on snowfall, temperatures, wind speeds, societal impact, etc.

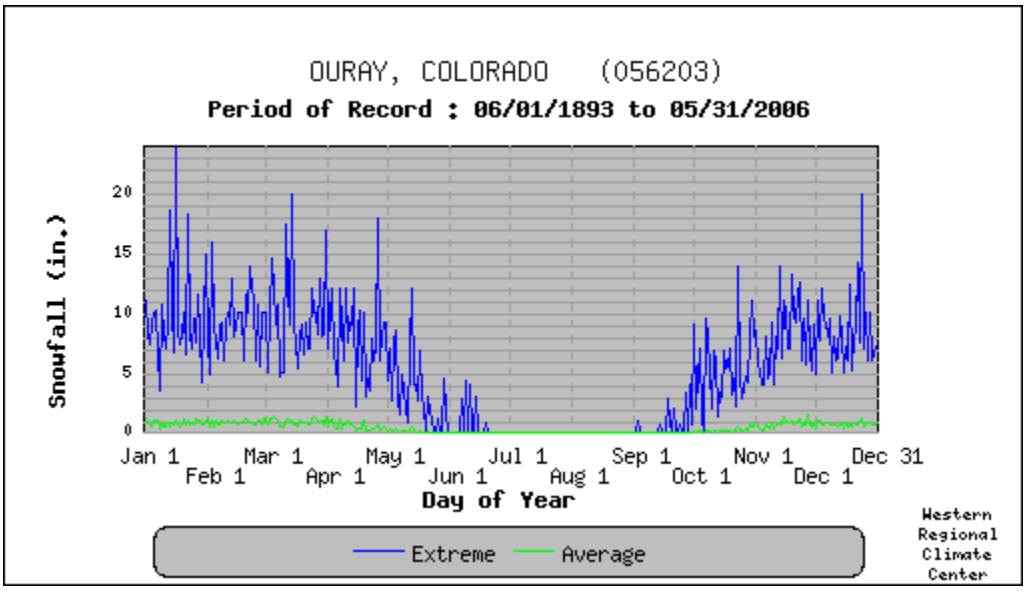
The National Weather Service specifies the following criteria for a blizzard:

- Sustained win or frequent gust of 16 meter per second (35 miles per hour) or greater,
- Sustained winds accompanied by falling or blowing snow
- Frequently reduced visibility to less than 400 meters (0.25 miles) for 3 hours or longer.

Previous Occurrences

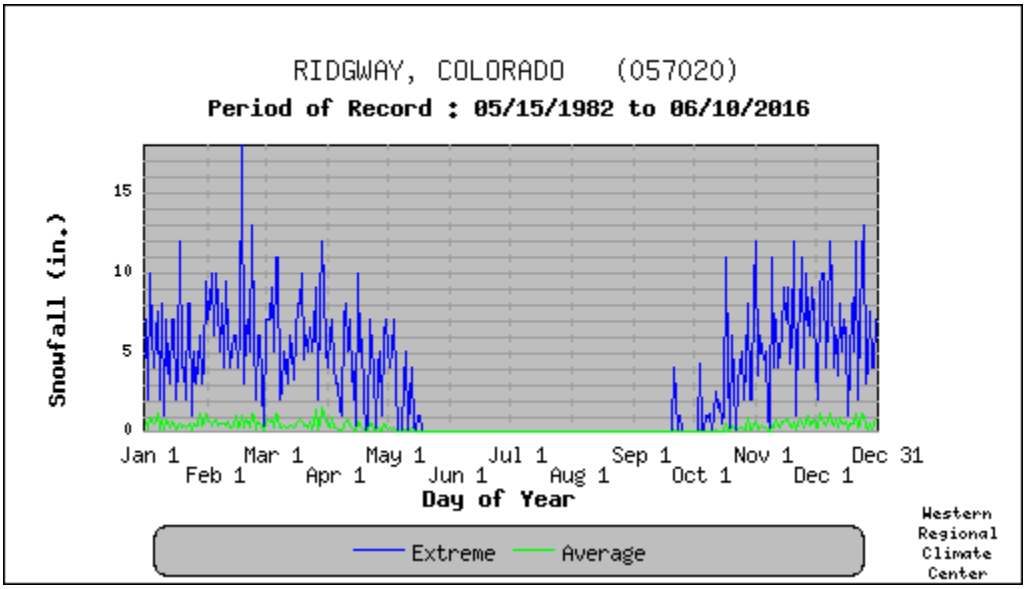
Figure 4-47 and Figure 4-48 show the daily snowfall averages and extremes from 1893 to 2006 in Ouray and Ridgway, respectively.[59] It is evident that the County can experience extreme snowfall events that exceed the average snowfall totals almost any month of the year.

Figure 4-47 Ouray Daily Snowfall Averages and Extremes, 1893 to 2006



[58] Western Regional Climate Center
[59] Western Regional Climate Center

Figure 4-48 Ridgway Daily Snowfall Averages and Extremes, 1893 to 2006



According to the NCEI database, there were 855 blizzard, heavy snow, winter storm, and winter weather events from January 1996 to January 2019. Of these, 11 were blizzards, 111 heavy snow, 300 winter storm, and 433 winter weather. The NCEI data reports by NWS forecasting zones, so it is not possible to determine events by jurisdiction. However, 517 of these events occurred in the Northwestern San Juan Mountains Zone, 24 in the Northwestern San Juan Mountains / E Ouray / X SW Gunnison / N Hinsdale / Se San Miguel Zone, 25 in the Uncompahgre Plateau Zone, 8 in the Uncompahgre Plateau / S Mesa Except X SW / X Ne San Miguel / C Montrose / NW Ouray Zone, and 281 in the Uncompahgre Plateau And Dallas Divide Zone. These events yielded $35,000 in damages, with no deaths or injuries.

However, SHELDUS reports 36 notable winter weather events from 1960 to 2017, causing $5,319,473 in crop damages, $2,462,414 in property damages, for a total of $7,781,887 in damages (all in 2017 dollars). Winter weather events caused the highest total damages out of all SHELDUS-reported hazards by a significant margin. Due to the aggregated nature of the SHELDUS data, there is not further detail about these events.

Research yielded little in details about specific damage and impacts. In 1984, part of the roof of the then defunct Beaumont Hotel collapsed in a snow storm and caused extensive interior damage. It is not known how much of the state of disrepair of the hotel may have contributed to the damage. A March 1992 event dumped 30 inches of snow in Ouray and closed Highway 550 for several days. A snow plow operator was killed by an avalanche on Highway 550 and another was buried for 18 hours before digging himself out from next to his snow plow (see Avalanche hazard profile).

The 2018-2019 winter brought high snow totals in the County, particularly the southern portions of the County and Highway 550. Multiple storms in a row bringing high snow totals caused extreme avalanche danger on Red Mountain Pass on Highway 550, causing closures from March 3rd to March 22nd. Closing the highway essentially cuts southern access to Ouray County off, isolating travelers and impacting local businesses. According to SNOTEL data on Red Mountain Pass, much of the month of March had recorded snow depths over 100 inches. The snowfall combined with avalanches on the Pass caused 40

to 60 feet of snow and debris on the roadway. As of April 2019, the damage estimates from this closure are still unknown.

Probability

Based on previous occurrences, there is a 100% annual chance of occurrence of a severe winter storm in Ouray County, equating to a highly likely probability. However, Ouray County residents are accustomed to winter weather, and damaging events are less frequent.

Vulnerability Assessment

Inventory Exposed/Impacts

The threat to public safety is typically the greatest concern when it comes to impacts of winter storms. These storms can also impact the local economy by disrupting transportation and commercial activities. Winter storms are occasionally severe enough to overwhelm snow removal efforts, transportation, livestock management, and business and commercial activities. Travelers on highways in Ouray County, particularly along remote stretches of road, can become stranded, requiring search and rescue assistance and shelter provisions. The County can experience high winds and drifting snow during winter storms that can occasionally isolate individuals and entire communities and lead to serious damage to livestock populations and crops. Winter storms also have the potential to disrupt the delivery of food and fuel into the County. Winter storms contribute directly to three other hazards in this plan: avalanche, extreme temperatures (cold), and mass transportation accident. Limited phone and cell phone service in parts of the County mean that emergency reporting may be impossible during severe winter storm events.

Structural damage from winter storms in southwest Colorado can result from severe snow loads on rooftops. Older buildings are more at risk, as are buildings with large flat rooftops (often found in public buildings such as schools). With the historic structures in Ridgway and the City of Ouray, the potential for damage exists, but information to quantify the amount and extent is currently not available. The LPC noted that a greenhouse on CR 3 had structural damage during a winter storm event in 2008 or 2009. The City has inventoried 74 unreinforced masonry buildings, most of which are historic structures that could be vulnerable to heavy snow loads. Impacts that are associated with extremely cold temperatures often associated with severe winter storms are discussed in the Extreme Temperatures hazard profile.

Overall, the southern portion of the County and the City of Ouray experience higher snow totals and more winter weather events than the northern portion, but all parts of the County experience severe winter weather every year and are vulnerable to its impacts. Additionally, as people continue to travel to Ouray County for backcountry recreation, they will continue to be vulnerable to the impacts of these winter storms.

Potential Losses

The NCEI data provided little detail about damages from previous severe winter storm events in the County. However, according to SHELDUS, a total of $7,781,887 in damages has occurred from 1960 to 2017 (2017 dollars), equating to an annual damage estimate of $136,524. This is the highest amount of damages across all hazards reported by SHELDUS. It is evident winter storms have the ability to cause significant damages.

The southern portion of the County typically experiences the most extreme winter weather due to its high elevation, however, the entire County is susceptible to damages. Backcountry travelers that are

caught in a winter storm in the isolated parts of the San Juan Mountains could be at a high risk for injury or death.

Future Conditions

Land Use and Development

The City of Ouray, Town of Ridgway, and unincorporated Ouray County have all experienced population growth in the last decade and are projected to continue to grow in population through 2050. This exposes more people across the County to impacts from severe winter storms. Future residential or commercial buildings built to code should be able to withstand snow loads from severe winter storms. Population growth in the County and growth in visitors has the potential to increase problems with road, business, and school closures and increase the need for snow removal and emergency services related to severe winter weather events.

Climate Change

According to the 2018 Colorado State Hazard Mitigation Plan, climate change may increase the frequency of winter precipitation events, which could increase lead to increased heavy snowfall events in the County.

Summary Risk Ranking

Hazards were ranked for each jurisdiction based on the results of this HIRA, LPC input, and public perception of risk. The overall ranks were derived by assigning each jurisdiction a value of 1 (low), 2 (medium), or 3 (high) for each hazard for: the probability of an event occurring, the potential impact of the hazard on property/structures/economy, and the potential impact of the hazard on people. The results were summed for each hazard and jurisdiction to create an overall rank. A summed score of four or less equates to a "low" ranking, five to six equates to a "medium" ranking, and seven or greater equates a "high" ranking. The results are shown in the following figures below.

Table 4-27 Severe Winter Storms Risk Ranking

	Probability (of losses)	Potential Impact (economic)	Potential Impact (people)	Score	Risk Rank
City of Ouray	2	2	3	7	H
Town of Ridgway	2	2	3	7	H
Unincorporated County	2	2	3	7	H

4.5.15. Wildfire

Description

Wildfires are an ongoing concern for Ouray County. Fire conditions arise from a combination of hot weather, an accumulation of vegetation, and low moisture content in the air. These conditions increase the potential for a wildfire to occur. Additionally, when combined with high winds, years of drought, and beetle killed trees, fire conditions are exacerbated. A fire along the urban/rural interface can result in major losses of property and structures. The Wildland-Urban Interface (WUI) is defined as any area where man-made improvements are built close to, or within, natural terrain and flammable

vegetation.[60] Limited access in some parts of the County complicates evacuation and control options and constitutes serious life risk to residents and firefighters alike.

In wildland fire vernacular, hazard is defined as the physical situation with potential for causing damage to resources or assets, measured by burn probability and fire intensity. Risk is overall measure of the possibility for loss or harm caused by wildfire. Risk is the combination of wildfire hazard and vulnerability. Fire danger refers to a combination of fuel moisture and weather conditions that combine with topography and other fuel characteristics to determine fire behavior as manifested in fire intensity and rate of spread. Fireline intensity is a function of rate of spread and heat per unit area; it is directly related to flame length and relates to the heat felt by a person standing next to the flames. Factors that contribute to fire risk are described below.

- **Fuel**— Vegetative fuels are characterized by size, continuity, and quantity and are often classified in terms of fire behavior fuel models (FBFM). These fuel characteristics determine responsiveness to weather conditions and ignition. Fuel sources are diverse and include ground fuels (roots, duff), surface fuels (forest litter, dead and down twigs and branches, grass, shrubs), and aerial fuels (the canopies of forest and brush). Structures and other associated combustibles are also considered fuel sources. Light surface and canopy fuels, such as cured grasses and drought stressed tree crowns, burn quickly and serve as a catalyst for rapid fire spread.
- **Topography**—An area's terrain and land slopes affect its susceptibility to wildland fire spread. Fire intensities and rates of spread increase as slope increases due to the tendency of heat from a fire to rise via convection. The natural arrangement of vegetation throughout a hillside can also contribute to increased fire activity on slopes.
- **Weather**—Weather components such as temperature, relative humidity, wind, and lightning also affect the potential for wildland fire. High temperatures and low relative humidity dry out the fuels that feed the wildland fire, creating a situation where fuel will more readily ignite and burn more intensely. Wind is the most influential weather factor for fire intensity and the direction and rate of fire spread. Winds can be significant at times in Ouray County. In addition to high winds, wind shifts can occur suddenly due to frontal passage, temperature changes, or the interaction of wind with topographical features such as slopes or steep hillsides. Seasonal and episodic drought affects fuels' susceptibility for combustion.
- **Ignitions**—Wildland fires are ignited by natural causes, predominately lightning, or human causes. Federal agencies categorize human caused fires based on their source including equipment, smoking, campfires, debris burning, railroads, and arson. Human caused ignitions are associated with travel corridors, population centers, recreational use, and commercial activities. A concern in Ouray County is that structure fires in rural areas may actually be sources of wildland fires, as response times can be significant in the more remote areas of the County.

Additionally, factors such as drought conditions, development, aircraft accidents, increase in outdoor activity, and forest health/management practices all contribute to wildfire risk in Ouray County. The impacts of the fir engraver beetle on the health of white fir trees in Ouray County has been an ongoing concern. The beetle leaves stands of dead trees that may increase fuel for wildfires throughout the County.

[60] https://csfs.colostate.edu/wildfire-mitigation/colorados-wildland-urban-interface/

Location

For the purposes of this Plan, the location of the wildfire hazard is analyzed in three ways based on the 2017 Colorado Wildfire Risk Assessment (CO-WRA), including

1. Wildfire burn probability, defined as the probability of a wildfire burning a specified point or area. Burn probability is the combination of numerous individual fire growth potential simulations to create an overall fire growth potential map.
2. Wildfire intensity, defined as a quantitative measure of the potential level of intensity of a wildfire. Conventional fire behavior analysis outputs include two measures of fire intensity; flame length and fireline intensity. Both are used in the CO-WRA.
3. Location of the WUI.[61]

Burn probability for the County is mapped in Figure 4-49, Figure 4-50, Figure 4-51, and Figure 4-52. Based on burn probability, the northern/central regions of the County have the highest probability, while the southern portion of the County, particularly the areas above alpine, have the lowest burn probability (non-burnable). In general, the areas around Ridgway have a higher burn probability than the areas around the City of Ouray. Additionally, areas near the Log Hill FPD have a moderate to high burn probability.

[61] CSFS, 2017 CO-WRA Final Report

Figure 4-49 Ouray County Burn Probability

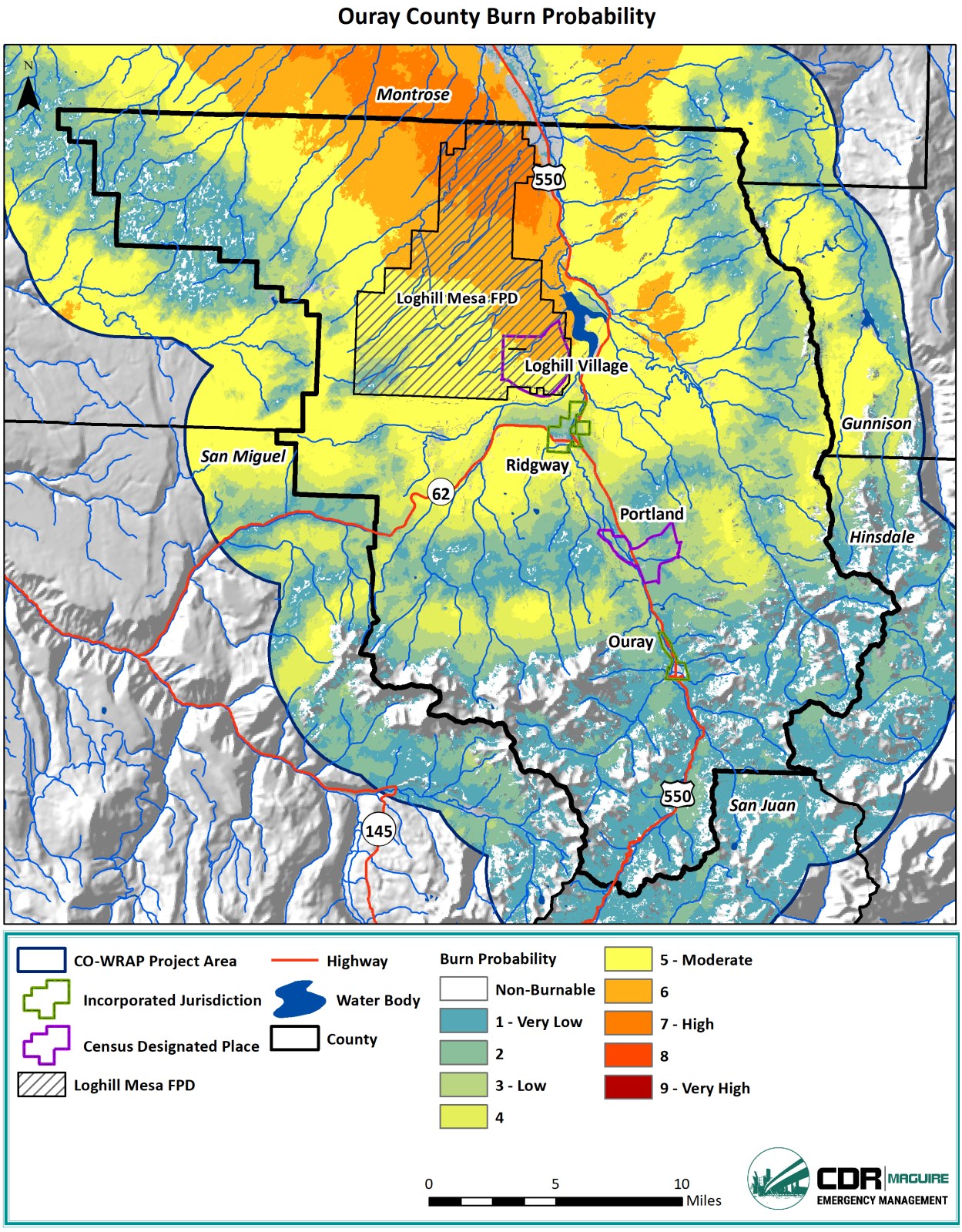


Figure 4-50 City of Ouray Burn Probability

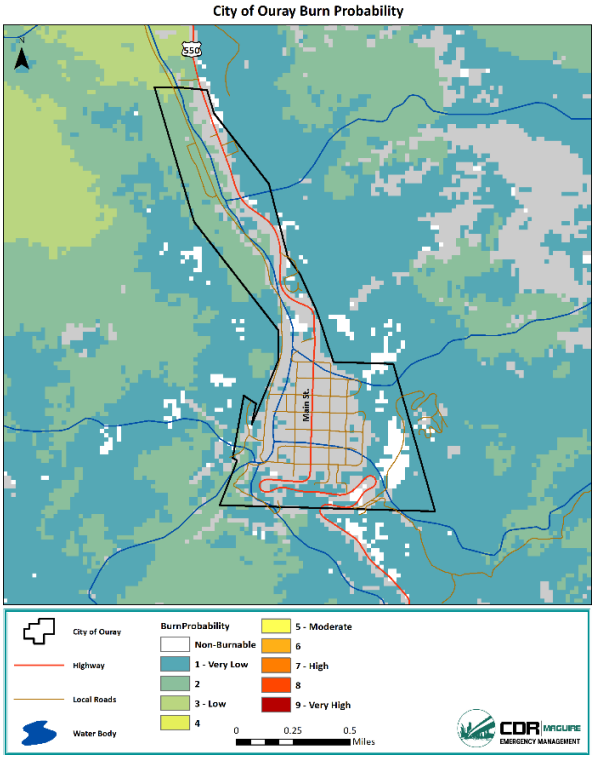


Figure 4-51 Town of Ridgway Burn Probability

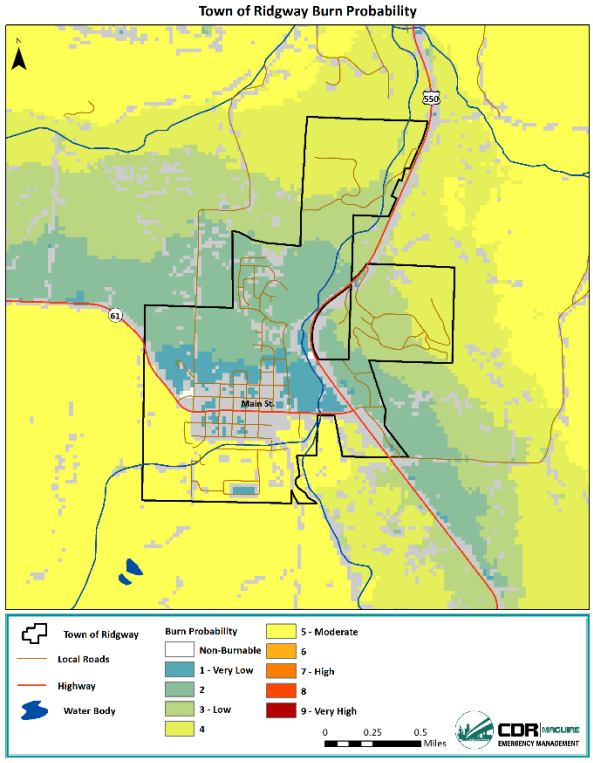
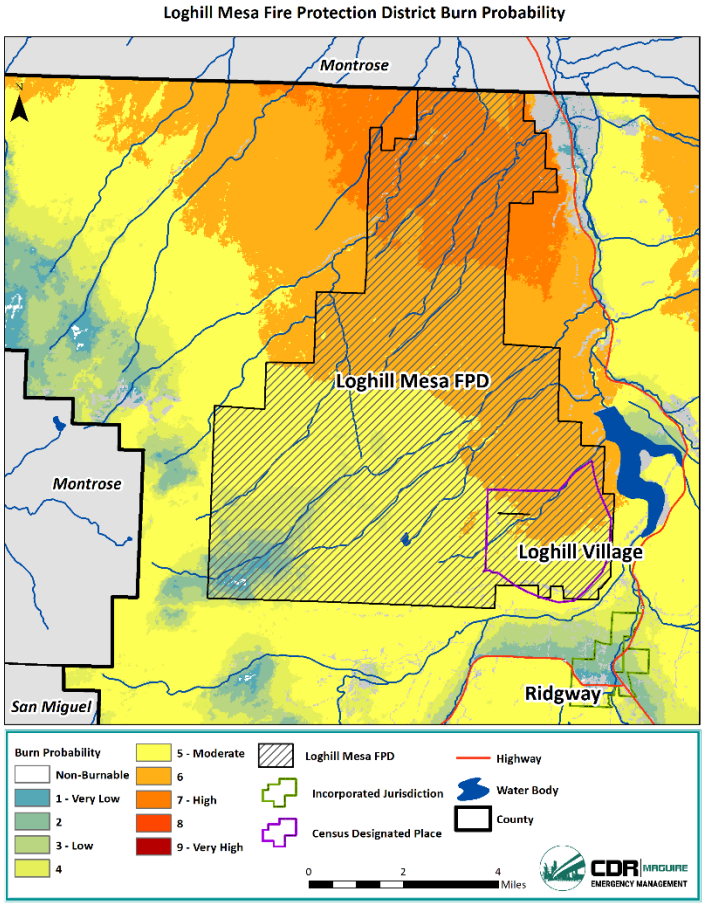


Figure 4-52 Loghill Mesa FPD Burn Probability



Much of the County has moderate to highest wildfire intensity, highlighting the potential for high-intensity fires. Again, the above-alpine regions of the County experience the lowest wildfire intensity. Generally, the jurisdictions do not have high wildfire intensity within the core of the jurisdiction, but moving outward towards unincorporated County, wildfire intensity increases quickly. Nearly all of the Loghill Mesa FPD has the highest fire intensity. These values are shown in Figure 4-53, Figure 4-54, Figure 4-55, and Figure 4-56.

Figure 4-53 Ouray County Fire Intensity

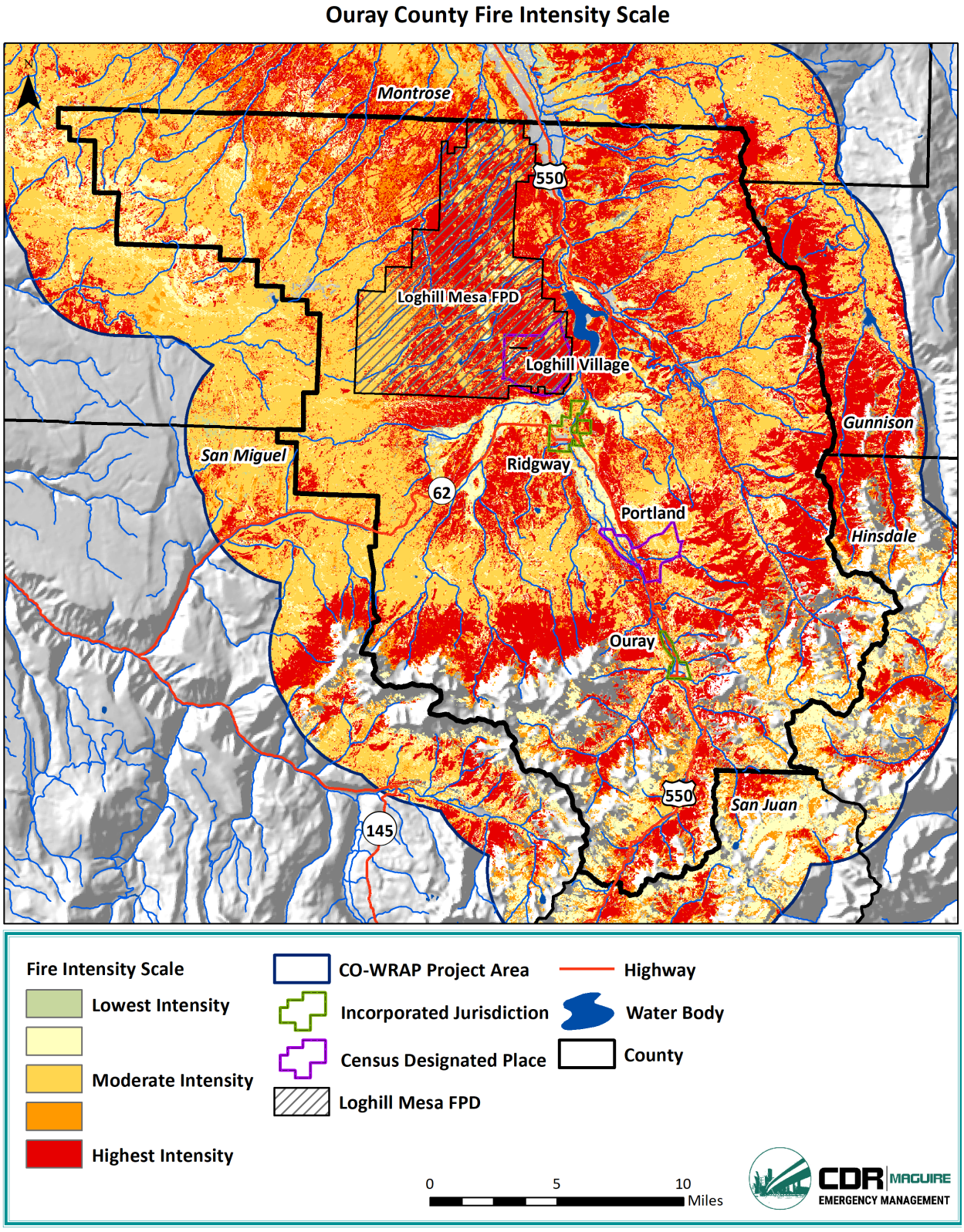


Figure 4-54 City of Ouray Fire Intensity

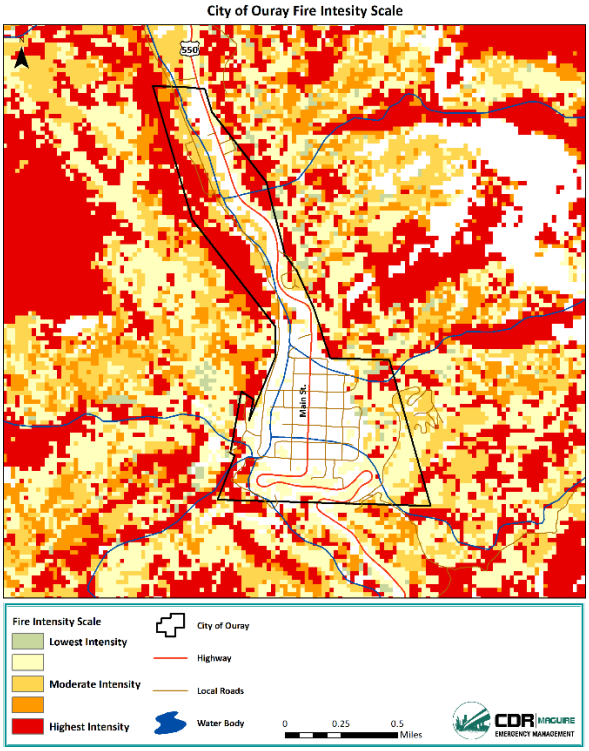


Figure 4-55 Town of Ridgway Fire Intensity

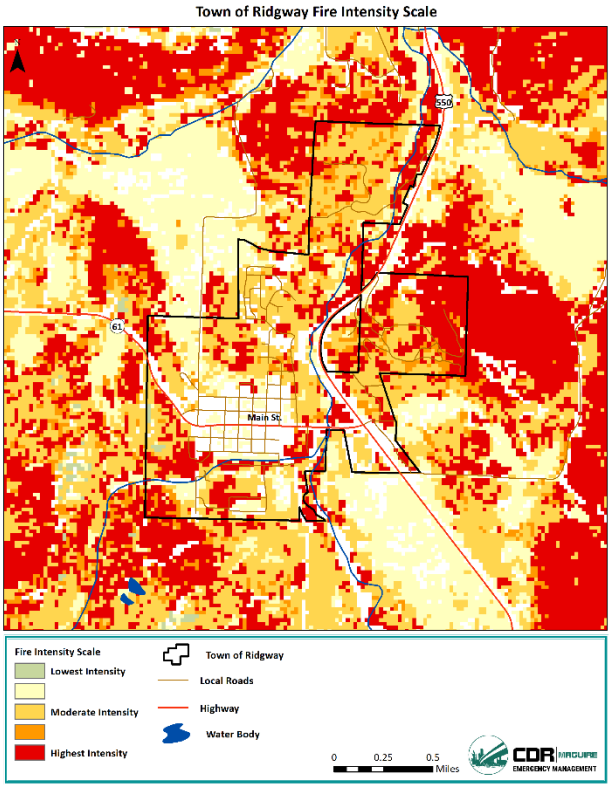
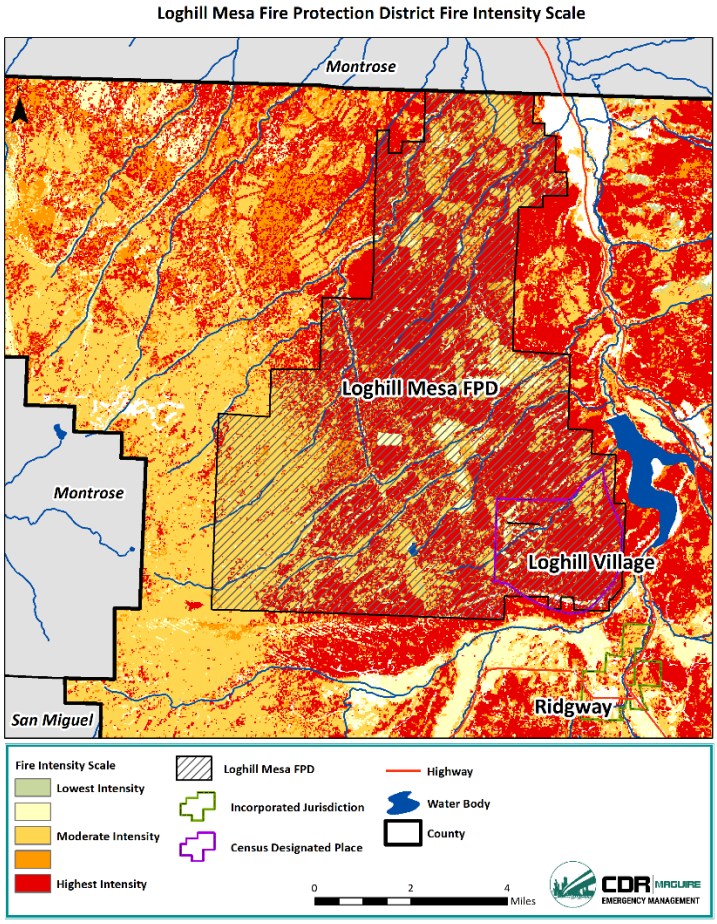


Figure 4-56 Loghill Mesa FPD Fire Intensity



There are WUI locations largely located through the central parts of the County and the southwest portions of the County. The City of Ouray contains a high density of structures in the WUI within the entire jurisdiction. Additionally, Ridgway contains higher density of structures in the WUI towards the main street portion of the town. Most of the higher densities of structures in the WUI in Loghill Mesa FPD are in the Census Designated Place of Loghill Village, just north of Ridgway. This information is shown in Figure 4-57, Figure 4-58, Figure 4-59, and Figure 4-60.

Figure 4-57 Ouray County WUI

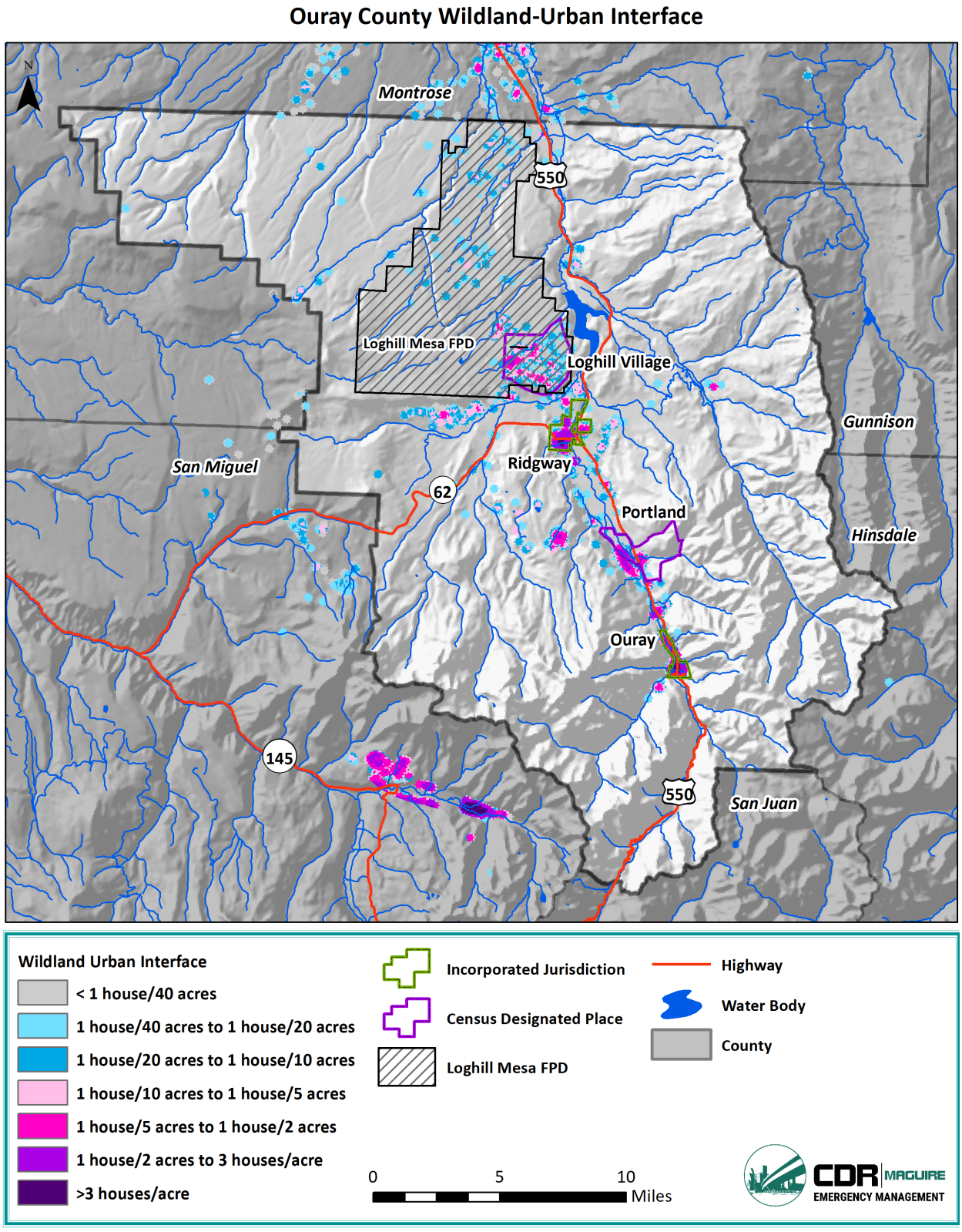


Figure 4-58 City of Ouray WUI

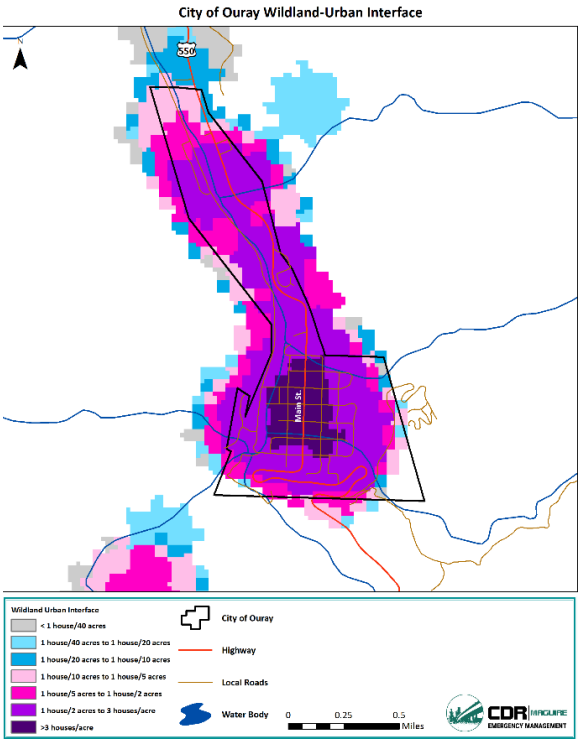


Figure 4-59 Town of Ridgway WUI

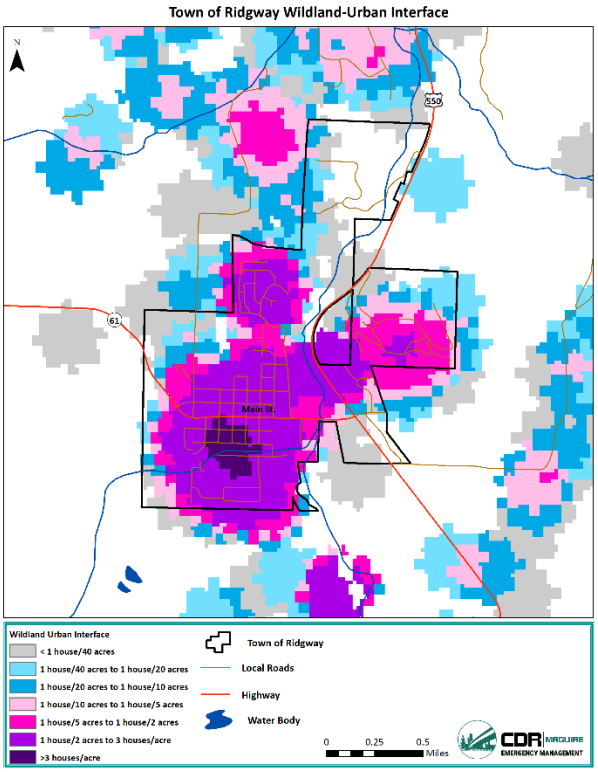
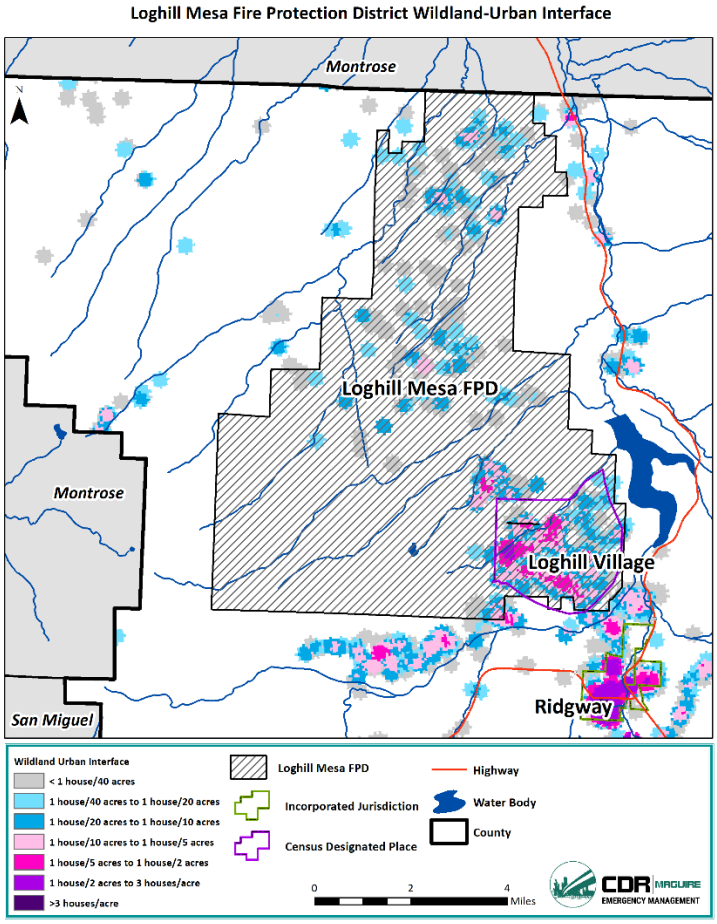


Figure 4-60 Loghill Mesa FPD WUI



Based on these three characteristics of burn probability, fire intensity, and locations of the WUI, it is evident that much of the County is vulnerable to wildfires. Areas of lower elevation, which are mainly associated with the northern/central portions of the County, have higher burn probability and fire intensities. The WUI is largely located within the jurisdictions or Census Designated Places within the County, however there are WUI areas of low-density housing throughout the County that are in areas of higher burn probabilities and intensities.

Extent

In Ouray County, small fires can grow rapidly when adequate fuels coincide with weather and topography favorable to fire. Wildfires can last from several hours to several months. Generally, the fire season extends from early spring to late fall.

The CO-WRA created a Fire Intensity Scale (FIS) to quantify potential fire intensity based on high to extreme weather, fuels, and topography (see Figure 4-53-Location). It is similar to the Richter scale for earthquakes, providing a standard scale to measure potential wildfire intensity by magnitude. The FIS consists of five classes where the order of magnitude between classes is ten-fold.[62] Table 4-28 describes the FIS.

[62] CSFS, 2017 CO-WRA Final Report

Table 4-28 CSFS Fire Intensity Scale

Class 1 – lowest intensity	Class 2 – low	Class 3 – moderate	Class 4 – high	Class 5 – highest intensity

The extent of wildfires can also be described by their size. According to the National Wildfire Coordinating Group, there are seven classes of wildfire sizes, categorized from A-G:[63]

- Class A - one-fourth acre or less;
- Class B - more than one-fourth acre, but less than 10 acres;
- Class C - 10 acres or more, but less than 100 acres;
- Class D - 100 acres or more, but less than 300 acres;
- Class E - 300 acres or more, but less than 1,000 acres;
- Class F - 1,000 acres or more, but less than 5,000 acres;
- Class G - 5,000 acres or more.

Previous Occurrences

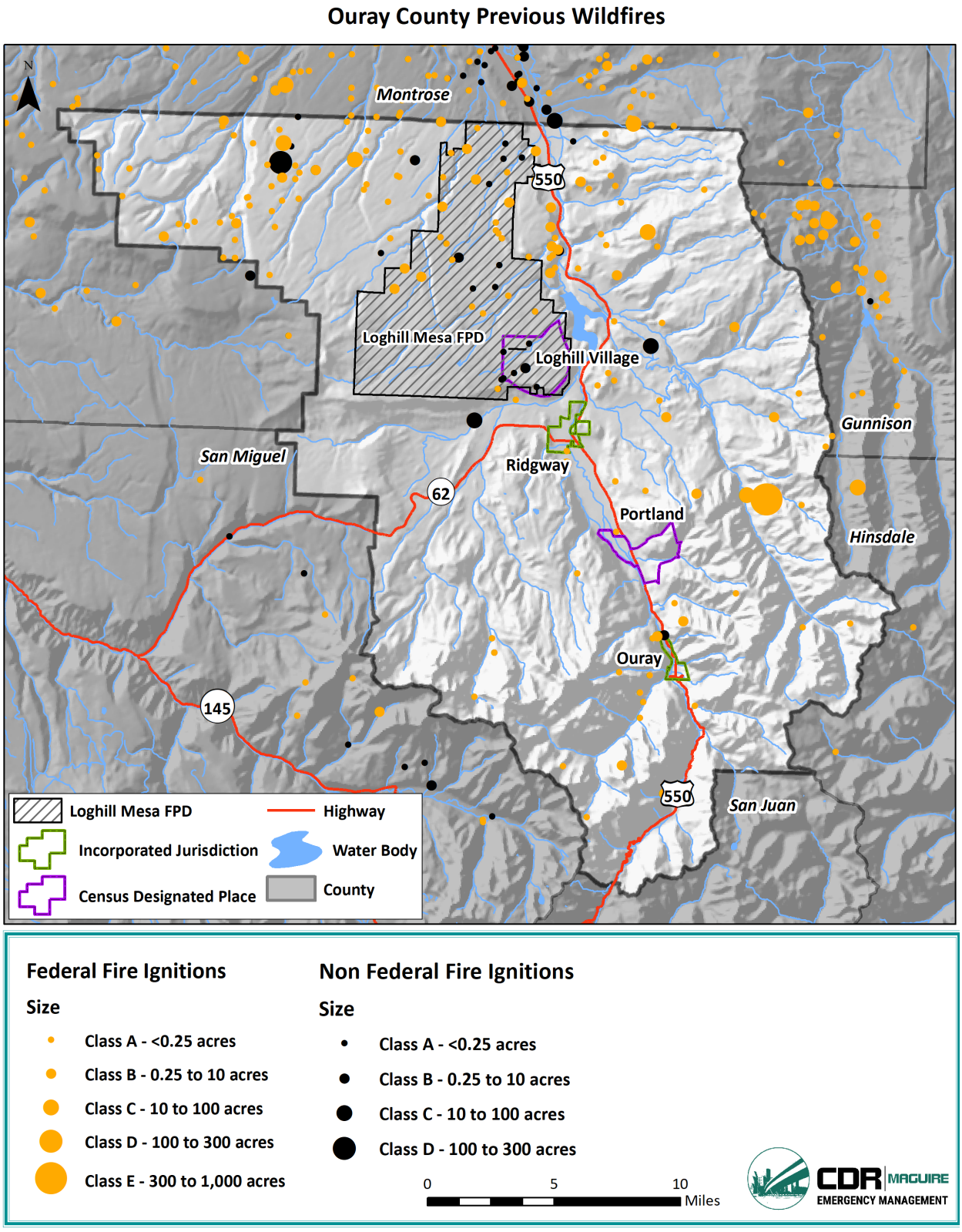
According to the CO-WRA data, there have been 156 wildfires on federal lands from 1992 to 2015. Of these fires, 120 have been Class A (one-fourth acre or less), 31 Class B (1/4 to 10 acres), 4 Class C (10 to 100 acres), and 1 Class E (300 to 1,000 acres). Additionally, of these wildfires, 94 have been lightning-caused, 34 human-caused (including campfire, debris burning, equipment use, and smoking), 10 miscellaneous, and 18 missing or unidentified. According to the 2015 Ouray County Hazard Mitigation Plan, the largest wildland fire in Ouray County was the May 1999 Baldy fire at 1,326 acres. However, this fire is not included in the CO-WRA database and is therefore not mapped. The largest fire included in the CO-WRA database in the County was the Red Creek Fire in eastern unincorporated County, which was a lightning-caused fire burning 401 acres in June 2006.

Additionally, there have been 42 non-federal wildfires from 2009 to 2017. Of these fires, 32 have been Class A, 7 Class B, 2 Class C, and 1 Class D. Information regarding the cause of the wildfire is not available for non-federal fires.

Figure 4-61 shows previous wildfires within Ouray County as well as fires just outside the County boundaries on a map. It is evident the northern portion of the County has experienced the most previous wildfires, although wildfire occurrence is still prevalent in the southern portion of the County as well.

[63] https://www.nwcg.gov/term/glossary/size-class-of-fire%C2%A0

Figure 4-61 Ouray County Previous Wildfires



Since the previous Plan, there have been two small wildfires on federal lands. The first was the Rim Road fire located in northwest unincorporated County, discovered on 6/21/2015. This fire was human-caused (campfire) and burned approximately 0.1 acres. The second was the Dew Drop fire located just south of the Rim Road fire near the County boundary, discovered on 10/17/2015. This fire was lightning-caused and also burned approximately 0.1 acres. No damages were reported from these fires.

Additionally, there have been 20 small wildfires on non-federal land since the previous Plan, all of which have been located in the northern portion of the County. None of these fires were named. The 10/15/2015 fire did have one reported injury, but no other details are available. Table 4-29 describes these fires.

Table 4-29 Non-federal Fires from 2014 to 2017

Discovery Date	Acres	Injuries
7/13/2014	0.1	0
7/20/2014	2	0
7/22/2014	0.1	0
4/21/2015	0.01	0
2/14/2015	20	0
3/29/2015	20	0
8/11/2015	0.01	0
8/16/2015	0.01	0
10/15/2015	0.01	1
4/10/2015	0.01	0
7/20/2016	0.01	0
7/22/2016	0.01	0
7/23/2016	0.01	0
9/21/2016	0.01	0
10/20/2016	0.01	0
7/20/2016	0.01	0
3/11/2016	0.01	0
7/22/2017	0.01	0
7/22/2017	0.01	0
8/13/2017	0.01	0

The 2018 fire season brought devastating wildfires to southwestern Colorado, particularly the 416 fire, which burned 54,000 acres north of Durango. Although the 416 fire did not impact Ouray County directly, smoke impacted the County. Additionally, the news of the fire impacted tourism to southwest Colorado, which contributes heavily to Ouray County's economy in the summer months.

In October of 2019, the Cow Creek fire burned 859 acres in the Uncompahgre Wilderness, nine miles south of Ridgway.

Detailed descriptions of wildfires previous to 2014 are provided in Appendix C – HIRA Appendix.

Probability

According to the CO-WRA data, from 1992 to 2017, there have been 198 wildfires in Ouray County. This equates to a 100% chance of annual occurrence, or a highly likely probability. The number, extent, and severity of these fires are subject to numerous climatic, weather, and stochastic factors. Historic trends and the condition of the local forests indicate that the occurrence of a large fire is a matter of time.

Vulnerability Assessment

Inventory Exposed/Impacts

Although wildfires are a natural part of forested ecosystems, they present a major threat to people and property in Ouray County. A wildfire can cause evacuations, injuries, and loss of life. Additionally, wildfires can cause severe damage to buildings and infrastructure in the County. Damages to homes and businesses can impact the livelihood of County residents. A major wildfire can also impact visitors to the County in the summer months, when tourism is at its peak. Life safety and human health are serious concerns due to the limited evacuation routes and high influx of visitors to the County during summer festivals. Additionally, smoke from wildfires can have negative impacts on human health. Wildfire smoke is a contributor to particulate matter, which is dangerous because it becomes lodged deep in the lungs and can enter the bloodstream, triggering asthma attacks, heart attacks and strokes, and, in some cases, causing lung cancer. Ouray County can be impacted by smoke from fires originating outside of the County boundaries, as experienced with the 2018 416 fire.

Although a natural process, wildfires can mar scenic view-sheds and watersheds, potentially reducing property values and negatively impacting the tourism-based economy that much of the southern half of the County depends on. Fires can be intensified by drought, as was observed during the 2002 and 2018 fire seasons. Fires can also contribute to higher risk of debris flows by destroying vegetation that anchors the soil. Fires can destroy wildlife habitat, potentially leading to more human-wildlife vehicle collisions as wildlife migrates during or after wildfires.

Wildfire risk and potential for losses has been exacerbated by the increase in high-intensity wildfires that the western United States has experienced. In order to reduce the risk of a catastrophic wildfire, mitigation measures must be comprehensive, and balance different needs such as forest health, access to recreation, and development.

Figure 4-62, Figure 4-63, Figure 4-64, and Figure 4-65 show the WUI risk in the County. The WUI risk indicates a rating of the potential impact of a wildfire on people and their homes in the WUI.[64] It is evident Ridgway and Loghill Village have high-risk WUI areas. There is an additional cluster of high-risk WUI areas just south of the Loghill Mesa FPD and in the CDP of Portland. The City of Ouray also contains high-risk WUI areas on the outskirts of the City boundaries.

[64] 2017 CO-WRA

Figure 4-62 Ouray County WUI Risk

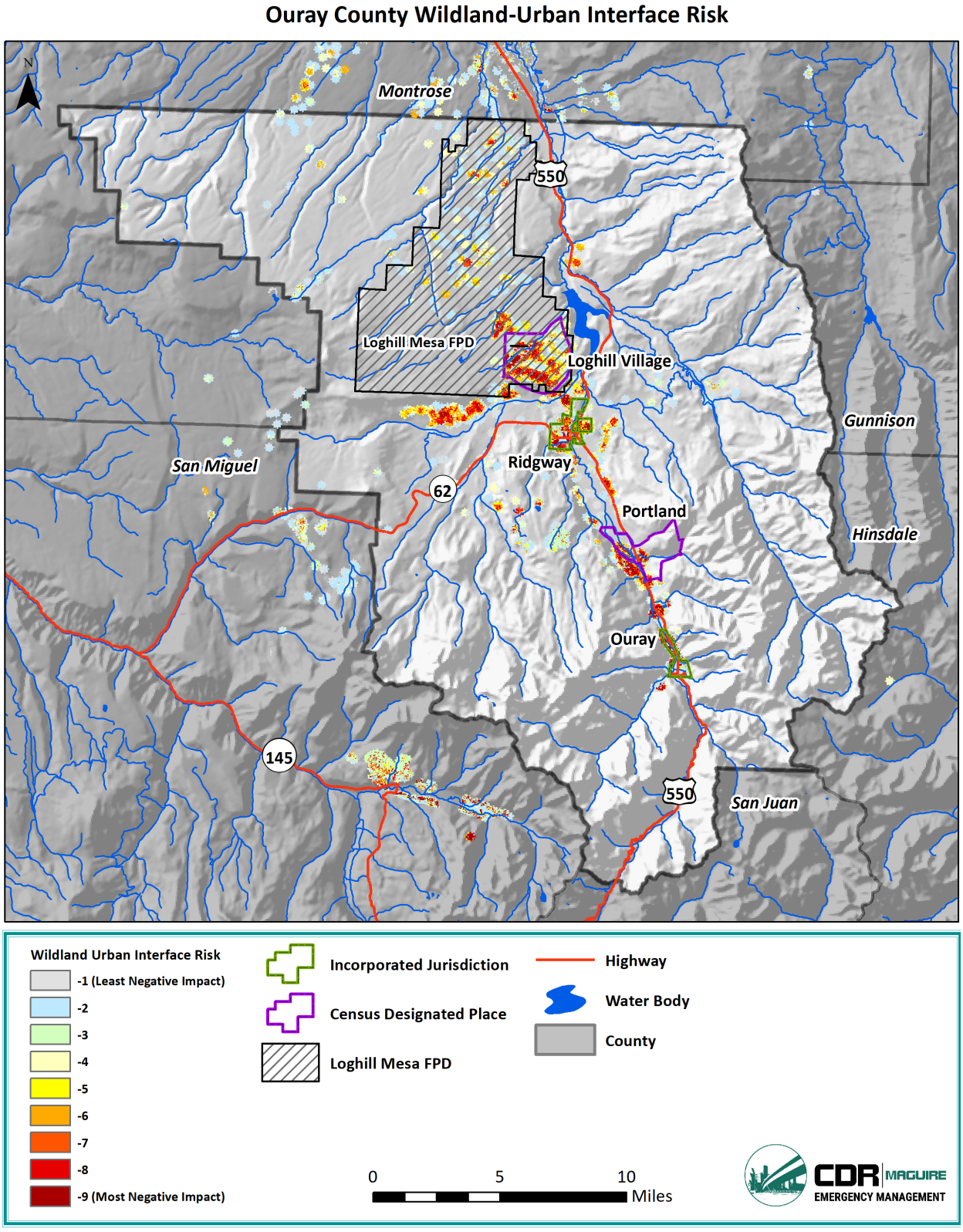


Figure 4-63 City of Ouray WUI Risk

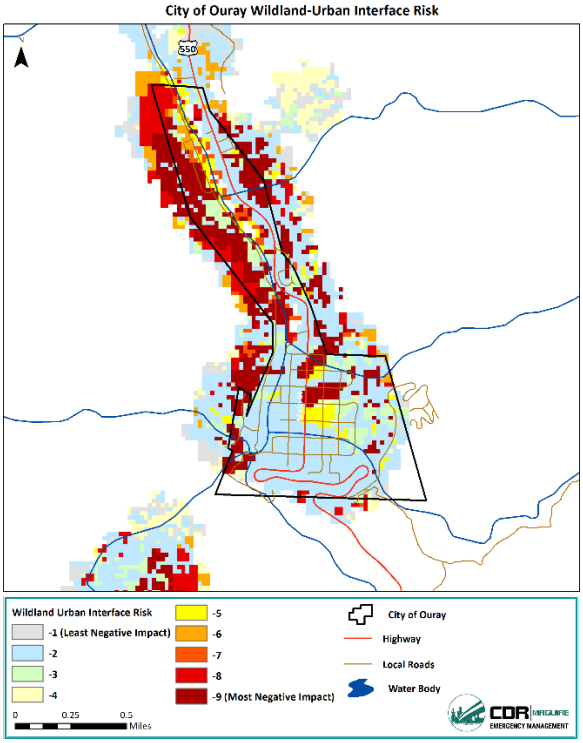


Figure 4-64 Town of Ridgway WUI Risk

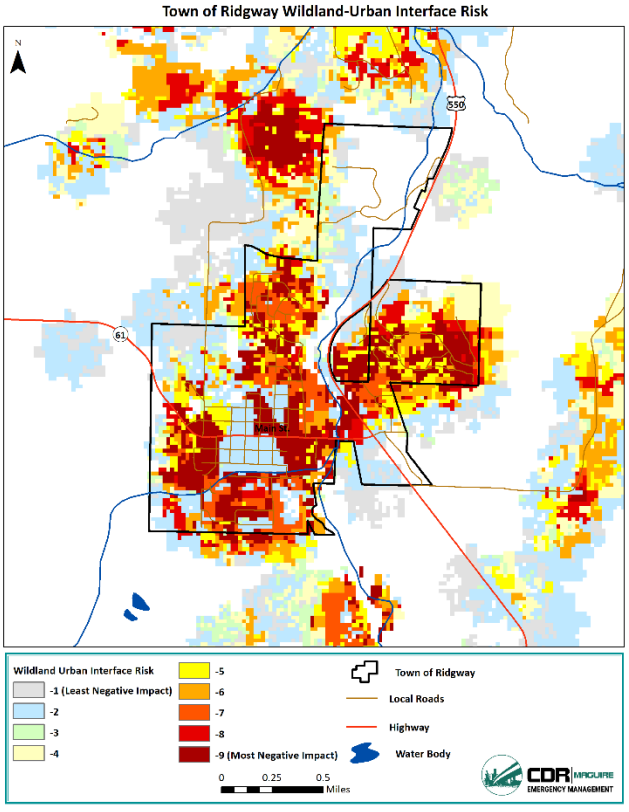
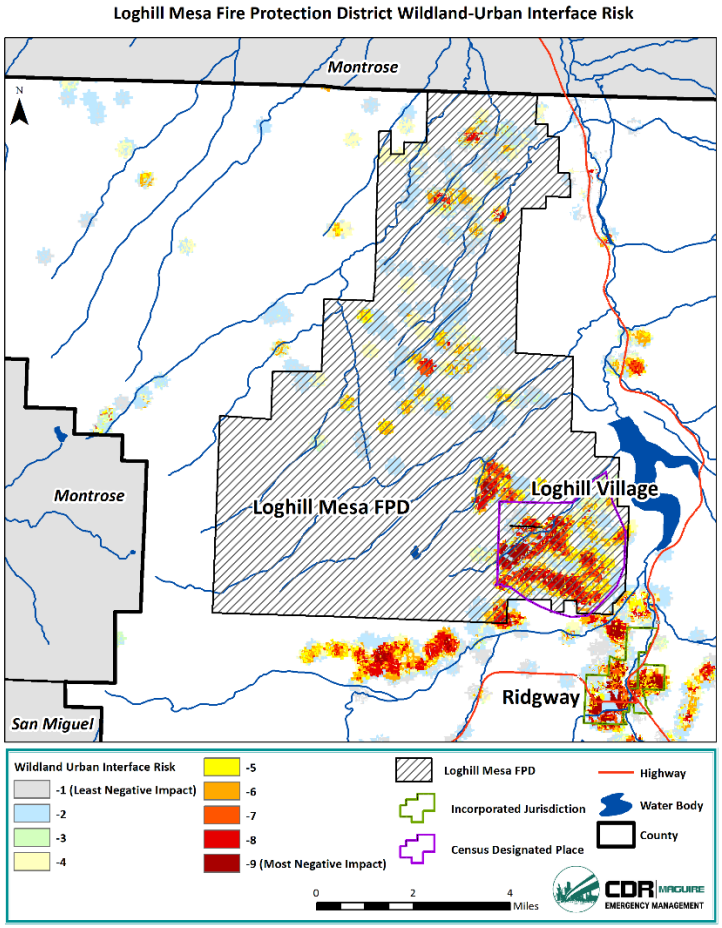


Figure 4-65 Loghill Mesa FPD WUI Risk



In addition to people and structures in the WUI, other assets at risk to wildfire in the County include drinking water, forest assets, and riparian assets. Based on the 2017 CO-WRA data, drinking water assets are measured by quality and quantity of public surface drinking water categorized by watershed. Forest assets are described as forested lands characterized by height, cover, and susceptibility/response to fire. Riparian assets are described as forested riparian areas characterized by functions of water quantity, quality, and ecology. Risk of each of these assets to wildfire was calculated during the CO-WRA. Overall, the risk to drinking water increases moving south through the County, although within the County itself the risk only reaches moderate levels. The risk to forest assets is also highest in the southern portion of the County, largely in the Grand Mesa Uncompahgre National Forest. Wildfires in the National Forest may also directly affect tourism within the County, since many people travel to recreate in the forest. Higher riparian asset risks are found along streams and rivers throughout the County.

Overall wildfire risk for the CO-WRA was calculated based on the factors such as burn probability, fire intensity, WUI risk, drinking water asset risk, forest asset risk, and riparian asset risk.[65] Overall, the highest risk in the County is in the north-central areas, within the Loghill Mesa FPD. There are also areas of high risk within Loghill Village CDP, just north of Ridgway. It was noted during the second LPC meeting that although the alpine forests surrounding the City of Ouray are typically considered lower wildfire

[65] 2017 CO-WRA

risk, one wildfire in this area could cause major impacts. As demonstrated by the 416 fire in the nearby San Juan National Forest, a large wildfire in the Uncompahgre National Forest surrounding the City of Ouray could significantly impact tourism to the City, cause smoke related health impacts, impact roads and access in and out of the City, and possibly impact structures. Additionally, as demonstrated in Figure 4-63, the City has significant structures in the WUI that are at a high risk to wildfire. Due to these factors, the wildfire risk to the City of Ouray is considered high.

In recognition of its high risk to wildfire, Ouray County is home to half of West Region Wildfire Council (WRWC) 2017 Firewise sites. Pleasant Valley Vista, Fisher Canyon South and Log Hill Mesa, all near Ridgway, are three of the more than 1,400 National Fire Protection Association's (NFPA) Firewise sites recognized nationwide. Firewise sites meet the standards recommended for reducing wildfire risk through community mitigation efforts. Loghill Mesa has done extensive wildfire mitigation work, such as an annual chipping program for slash, a rapid curbside assessment of residents, and surveys to homeowners to understand and reduce wildfire risk.[66] These efforts help mitigate the elevated risk to wildfire in the community.

Additionally, the County, in partnership with the CSFS and USFS, have treated Douglas fir trees around the City of Ouray to mitigate against beetles using pheromone packets. The pheromone packets were placed in high-use areas, such as trees around the Ouray Amphitheater and campground, Cascade Falls, and other popular trails and recreation areas near Ouray and Telluride. In addition to pheromones, active management is utilized to cut down dead and diseased trees and remove dead trees from the forest floor. Additionally, improving forest health by diversifying the age of trees as well as the species of trees will help to reduce the risk of the fir beetle decimating entire forests, and also overall reduce wildfire risk. Challenges arise due to forests being managed by multiple agencies as well as the remoteness and rugged terrain of forests in the County.[67]

Details on individual communities' risk to wildfire can be found in the 2011 Ouray County CWPP.

Potential Losses

Wildland fire poses a major public safety hazard in Ouray County. Life safety and human health are serious concerns, and there is a high influx of visitors during the prime wildland fire months that exacerbate these concerns. Wildfire has the potential to cause widespread and severe damage to watersheds and property in the planning area.

To determine potential losses on parcels from wildfire in Ouray County, GIS was used to calculate the count and value of parcels in high and moderate WUI risk areas, as defined by the CO-WRA data. Moderate WUI risk areas are equivalent to a WUI risk value of four, five, and six; and high WUI risk areas are equivalent to a WUI risk value of seven, eight, and nine. WUI risk was used because it was determined by the LPC to most accurately portray the wildfire risk in the County. It should be noted that the CO-WRA was conducted at a 30-meter resolution, therefore, for the purposes of this Plan, is best utilized as a community-scale or higher analysis. This is not intended to be a precise determination of potential losses at the parcel-level, but to recognize trends in order to focus mitigation efforts. Neighborhood-level risk can be further evaluated in the 2011 Ouray County CWPP.

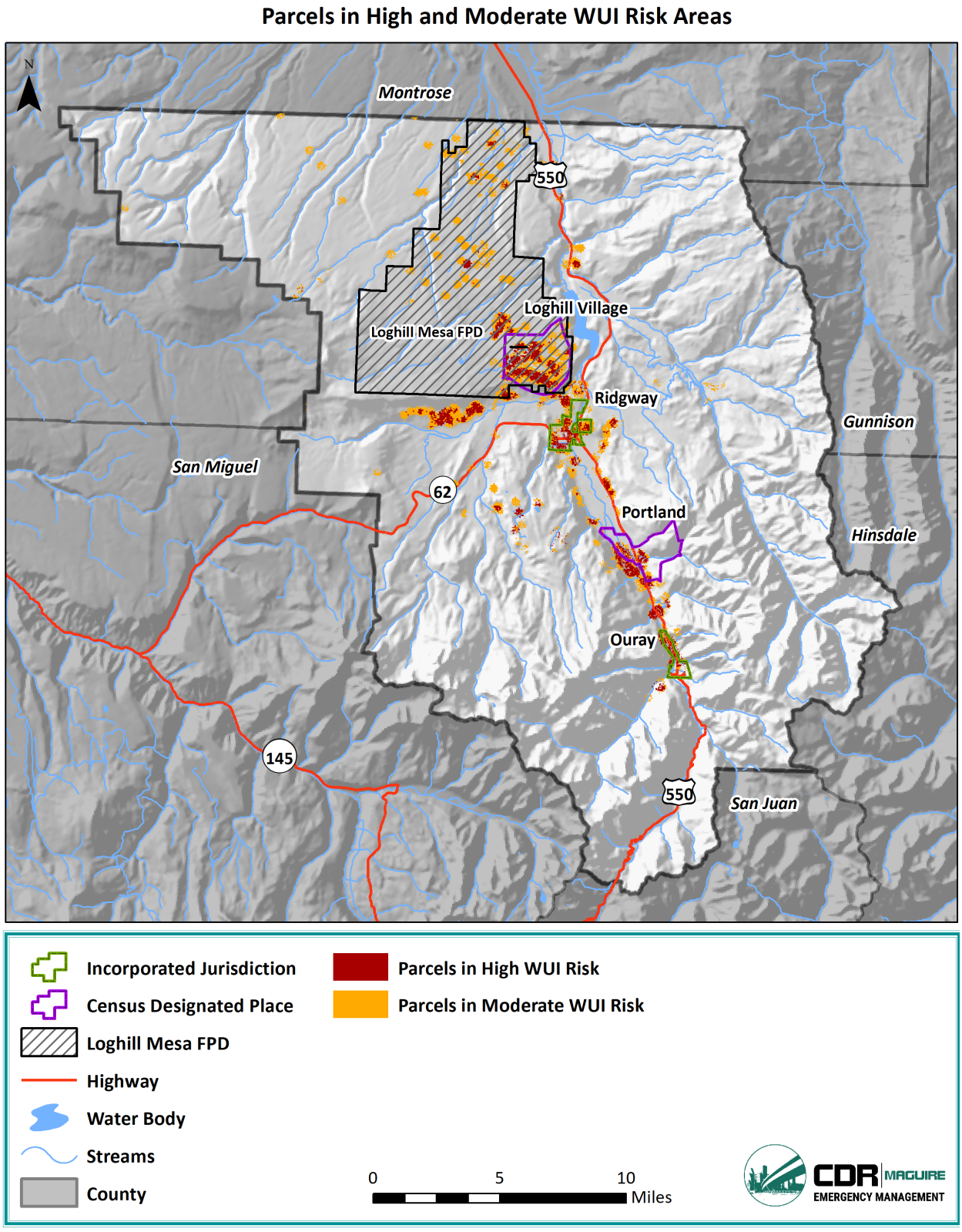
[66] https://www.ouraynews.com/articles/2018/01/20/ouray-county-%E2%80%9Cmodel%E2%80%9D-wildfire-mitigation
[67] https://coloradosun.com/2019/05/27/pheromones-save-douglas-firs-ouray/; https://sjindependent.org/report/ourays-beetle-scourge-and-its-silver-lining/999

Overall, there are a total of 5,404 parcels in high or moderate WUI risk areas in the County, with 2,815 in high risk areas and 2,589 in moderate risk areas. This equates to $1,796,943,875 in total exposure (improvement value plus estimated contents value). All jurisdictions in the County have parcels located in moderate and high WUI risk areas. Table 4-30 summarizes this information, and Figure 4-66 shows the generalized areas of the parcels on a map.

Table 4-30 Parcels in High and Moderate WUI Risk Areas

Jurisdiction	# Parcels Moderate WUI Risk	# Parcels High WUI Risk	Total Parcels	Total Exposure Moderate WUI Risk	Total Exposure High WUI Risk	Total Exposure
Loghill Mesa FPD	1,039	765	1,804	$292,191,115	$225,801,200	$517,992,315
Town of Ridgway	297	770	1,067	$136,693,215	$264,790,485	$401,483,700
City of Ouray	147	379	526	$55,643,995	$126,328,870	$181,972,865
Unincorporated County (excluding Loghill Mesa FPD)	1,106	901	2,007	$394,490,160	$301,004,835	$695,494,995
Total	**2,589**	**2,815**	**5,404**	**$879,018,485**	**$917,925,390**	**$1,796,943,875**

Figure 4-66 Parcels in High and Moderate WUI Risk Areas



Additionally, SHELDUS reports $4,576 in crop damages and $5,719 in property damages, totaling $10,295 (2017 dollars) in total damages from one wildfire event. It is recognized that there has been more than one wildfire in the County, and this may be a low estimate of the total damages from previous wildfires, making it difficult to draw annualized losses.

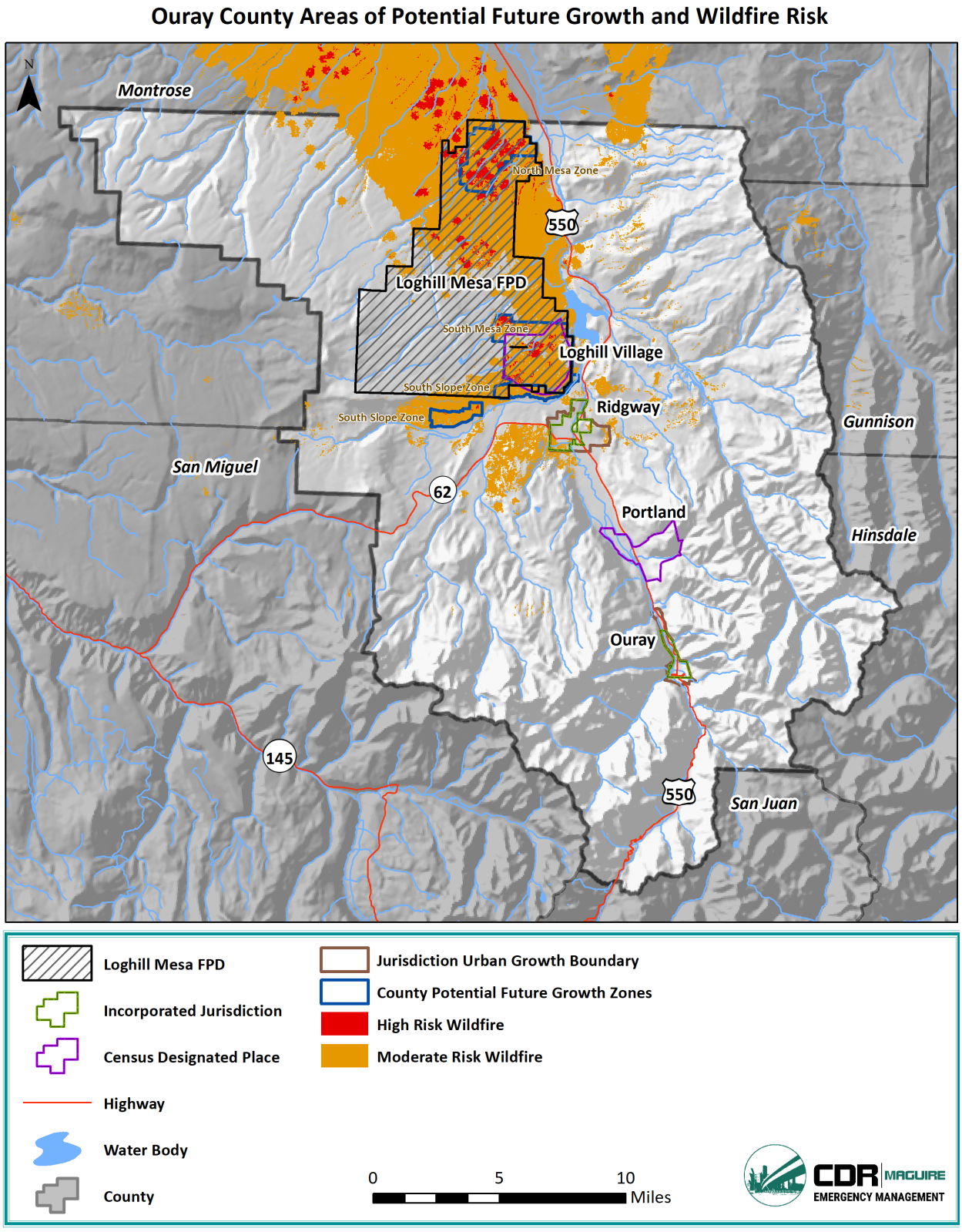
Future Conditions

Land Use and Development

The City of Ouray, Town of Ridgway, and unincorporated Ouray County have all experienced population growth in the last decade and are projected to continue to grow in population through 2050. With much of the County susceptible to wildfires, new developments, can substantially increase residents' risk to wildfire. During a wildfire, growth increases the resources needed to protect development from burning, as well as increases firefighting costs. Any new developments in the County should evaluate their risk to wildfire and practice Firewise principles to reduce their potential losses.

Figure 4-67 shows areas designated by the County as suitable for future growth overlayed with medium and high-risk wildfire areas. Nearly all of the unincorporated County future growth zones are in either medium or high-risk areas to wildfire. The North Mesa Zone has substantial areas of high wildfire risk. Development in these areas should prioritize mitigation measures to decrease their losses in the event of a wildfire.

Figure 4-67 Ouray County Areas of Potential Future Growth and Wildfire Risk



Climate Change

Warmer temperatures due to climate change have already influenced wildfires in the western United States, contributing to an increase in frequency of high-intensity fires as well as a longer wildfire season. Higher temperatures can lead to dry vegetation, which provides fuel for wildfire. Dry vegetation is also exacerbated under drought conditions, which are also projected to increase in frequency due to climate change. Total area burned per year is projected to increase across the Rocky Mountain West and Colorado. Additionally, Colorado's wildfire season is projected to increase by several weeks. These factors will lead to an increased risk from current levels to wildfire across the entire County. It will be important to plan for these projected changes when mitigating against wildfire in the County.

Summary Risk Ranking

Hazards were ranked for each jurisdiction based on the results of this HIRA, LPC input, and public perception of risk. The overall ranks were derived by assigning each jurisdiction a value of 1 (low), 2 (medium), or 3 (high) for each hazard for: the probability of an event occurring, the potential impact of the hazard on property/structures/economy, and the potential impact of the hazard on people. The results were summed for each hazard and jurisdiction to create an overall rank. A summed score of four or less equates to a "low" ranking, five to six equates to a "medium" ranking, and seven or greater equates a "high" ranking. The results are shown in the following figures below.

Table 4-31 Wildfire Risk Ranking

	Probability (of losses)	Potential Impact (economic)	Potential Impact (people)	Score	Risk Rank
City of Ouray	3	3	3	9	H
Town of Ridgway	3	3	3	9	H
Unincorporated County	3	3	3	9	H
Loghill Mesa FPD	3	3	3	9	H

4.5.16. Windstorm

Description

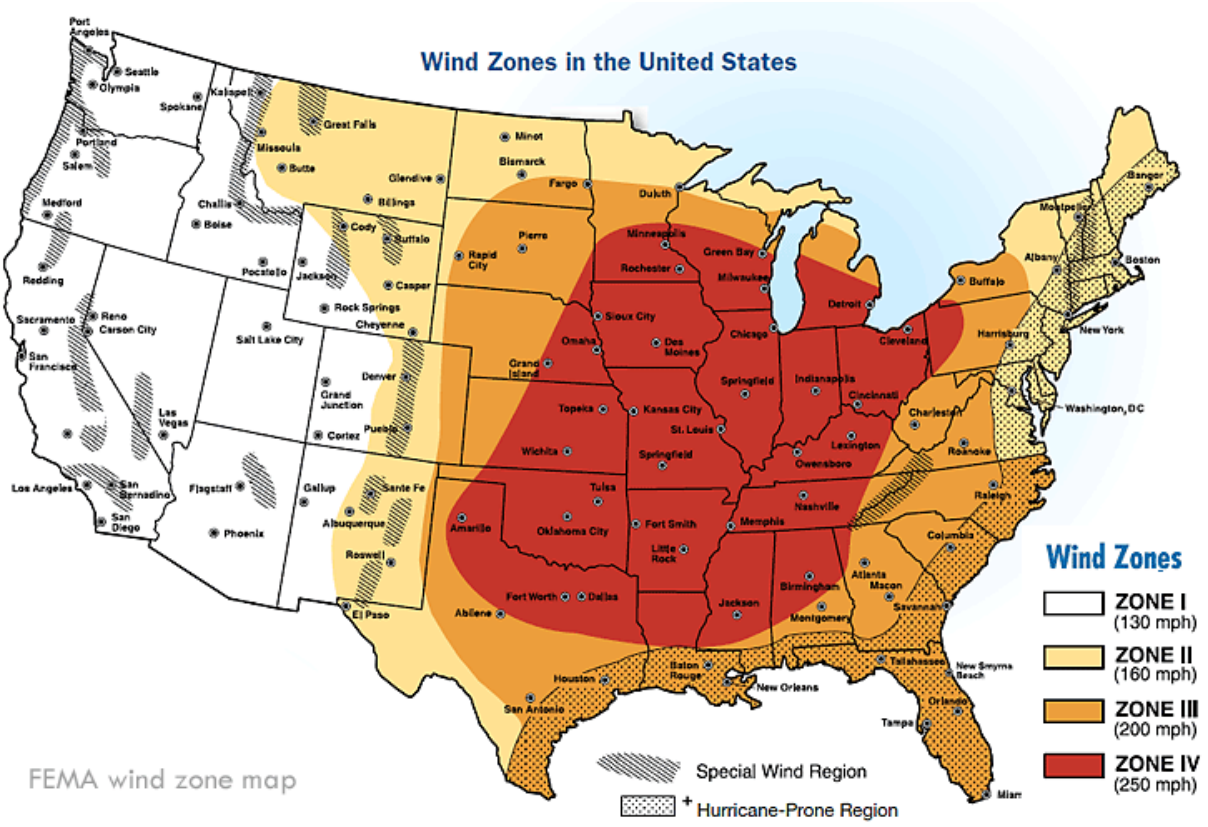
High winds, often accompanying severe thunderstorms, can cause significant property and crop damage, threaten public safety, and have adverse economic impacts from business closures and power loss. Windstorms in Ouray County are typically straight-line winds. Straight-line winds are generally any thunderstorm wind that is not associated with rotation (i.e., is not a tornado). It is these winds, which can exceed 100 miles per hour, that represent the most common type of severe weather and are responsible for most wind damage related to thunderstorms. Since thunderstorms do not have narrow tracks like tornadoes, the associated wind damage can be extensive and affect entire (and multiple) counties. Objects like trees, barns, outbuildings, high-profile vehicles, and power lines/poles can be toppled or destroyed, and roofs, windows, and homes can be damaged as wind speeds increase. One type of straight-line wind is the downburst, which can cause damage equivalent to a strong tornado and can be extremely dangerous to aviation. Since these winds are associated with thunderstorms, the most common time for straight-line winds or downbursts to occur in Ouray County is from April through September.

Air pressure differences during cold and warm seasons cause high winds in Colorado. The western part of the State typically doesn't experience the Chinook winds that impact the Front Range, but Bora winds are common in western Colorado. Bora winds are cold winds caused by a strong low-pressure system coupling with a high-pressure system to the west.

Location

FEMA recognizes four wind zones in the U.S., depicted in Figure 4-68. Ouray County falls into Zone I. Winds speeds reach up to 130 miles per hour in Zone I.[68]

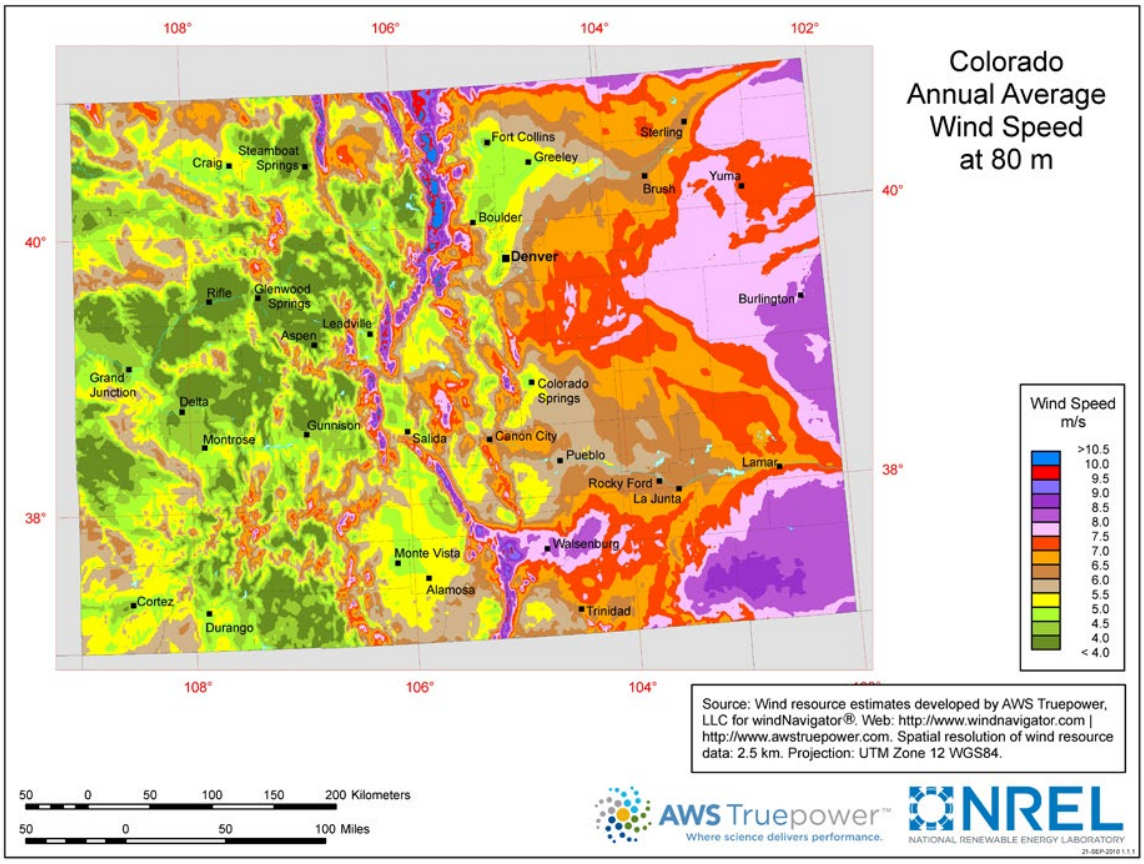
Figure 4-68 Wind Zones in the United States



Additionally, Figure 4-69 shows wind speeds at 80 meters in Colorado. It is evident that the western portion of the State has less extreme wind speeds than the Front Range and Eastern Plains. However, the high peaks in southern Ouray County can experience higher wind speeds than lower elevations across western Colorado.

[68] FEMA

Figure 4-69 Colorado Annual Average Wind Speed at 80 meters



Overall, windstorms could occur anywhere in Ouray County. The unpopulated high-country areas will experience the highest wind events. The windstorms themselves can also occur over a large area. Bora winds can cause widespread rather than localized damage.

Extent

Wind can be categorized by the Beaufort Wind Scale as shown in Table 4-32 below.[69]

Table 4-32 Beaufort Wind Scale

Appearance of Wind Effects			
Force	**Wind (Knots)**	**WMO Classification**	**On Land**
0	Less than 1	Calm	Calm, smoke rises vertically
1	1-3	Light Air	Smoke drift indicates wind direction, still wind vanes
2	4-6	Light Breeze	Wind felt on face, leaves rustle, vanes begin to move
3	7-10	Gentle Breeze	Leaves and small twigs constantly moving, light flags extended

[69] https://www.spc.noaa.gov/faq/tornado/beaufort.html

Appearance of Wind Effects			
Force	**Wind (Knots)**	**WMO Classification**	**On Land**
4	11-16	Moderate Breeze	Dust, leaves, and loose paper lifted, small tree branches move
5	17-21	Fresh Breeze	Small trees in leaf begin to sway
6	22-27	Strong Breeze	Larger tree branches moving, whistling in wires
7	28-33	Near Gale	Whole trees moving, resistance felt walking against wind
8	34-40	Gale	Twigs breaking off trees, generally impedes progress
9	41-47	Strong Gale	Slight structural damage occurs, slate blows off roofs
10	48-55	Storm	Seldom experienced on land, trees broken or uprooted, "considerable structural damage"
11	56-63	Violent Storm	
12	64+	Hurricane	

Additionally, straight-line winds associated with thunderstorms are considered “damaging” when they exceed 50 mph.[70]

Previous Occurrences

According to the NCEI, there have been 22 high wind, strong wind, and thunderstorm wind events in Ouray County from 1998 to April 2019. Of these events, 14 were high wind events, 7 strong wind, and 1 thunderstorm wind. The highest magnitude event was on January 25, 1999 in the Northwestern San Juan Mountain Zone, at 122 mph. The NCEI events are recorded by NWS zone. The zone with the most wind event is the Northwest San Juan Mountains Zone, with 13 events. These events have resulted in $90,500 in total damages, with the most damaging event being a thunderstorm wind event in Colona on May 28,2013, resulting in $60,000 in damages.

SHELDUS reports 29 wind events, causing $20,395 in crop damages and $360,876 in property damages, totaling $381,271 in damages from 1960 to 2017 (2017 dollars). This was the second highest number of hazard events reported by SHELDUS, behind winter storms.

Based on online resources and input from the LPC, there have not been any damaging wind events since the 2015 Ouray County Hazard Mitigation Plan. A full description of these events as well as detailed descriptions of notable events can be found in Appendix C – HIRA Appendix.

Probability

Based on the SHELDUS wind event data, there have been 29 events from 1960 to 2017, equating to a 51% annual chance of occurrence, or a likely probability.

Vulnerability Assessment

Inventory Exposed/Impacts

All current and future buildings and populations are at risk to wind in Ouray County. Wind can result in a variety of impacts to current and future buildings and populations including:

[70] https://www.nssl.noaa.gov/education/svrwx101/wind/

- Torn-off roofs and shingles
- Downed trees and limbs
- Debris generation

The availability of sheltered locations such as basements, buildings constructed using tornado-resistant materials and methods, and public storm shelters, all reduce the exposure of the population to wind events. However, there are also segments of the population that are especially exposed to the indirect impacts of high-wind events, particularly the loss of electrical power. These populations include the elderly or disabled, especially those with medical needs and treatments dependent on electricity. Nursing homes, Community Based Residential Facilities, and other special needs housing facilities are also vulnerable if electrical outages are prolonged, since backup power generally operates only minimal functions for a short period of time. In terms of property losses caused by any high-wind hazard, the actual damages will depend on the building density and quality of construction in the impacted area. Buildings that are close to large trees or overhead power lines are also at greater risk of suffering more extensive damages. Construction practices can help maximize the resistance of the structures to damage. High-wind events also have the potential to wreak havoc on above-ground infrastructure such as power and communication lines. Downed power and communications transmission lines, coupled with disruptions to transportation, create difficulties in reporting and responding to emergencies. Additionally, high winds that occur on hot, dry days can cause dangerous fire conditions, and winds can cause a fire to spread rapidly.

Potential Losses

Jurisdictional-specific loss information is not available for the County. However, the Northwestern San Juan Mountain Zone has experienced both the strongest wind speeds and the most wind events in the County. This zone approximately covers the County's southern high-country, which is largely undeveloped.

SHELDUS reports 29 wind events, causing $20,395 in crop damages and $360,876 in property damages, totaling $381,271 in damages from 1960 to 2017 (2017 dollars). This equates to approximately $6,689 in annual damages.

Future Conditions

Land Use and Development

The City of Ouray, Town of Ridgway, and unincorporated Ouray County have all experienced population growth in the last decade and are projected to continue to grow in population through 2050. This exposes more people across the County to impacts from windstorms. Additionally, future residential or commercial buildings built to code should be able to withstand high winds in Ouray County.

Climate Change

Climate change is not projected to impact the windstorm hazard.

Summary Risk Ranking

Hazards were ranked for each jurisdiction based on the results of this HIRA, LPC input, and public perception of risk. The overall ranks were derived by assigning each jurisdiction a value of 1 (low), 2 (medium), or 3 (high) for each hazard for: the probability of an event occurring, the potential impact of the hazard on property/structures/economy, and the potential impact of the hazard on people. The

results were summed for each hazard and jurisdiction to create an overall rank. A summed score of four or less equates to a "low" ranking, five to six equates to a "medium" ranking, and seven or greater equates a "high" ranking. The results are shown in the following figures below.

Table 4-33 Windstorm Risk Ranking

	Probability (of losses)	Potential Impact (economic)	Potential Impact (people)	Score	Risk Rank
City of Ouray	2	2	2	6	**M**
Town of Ridgway	2	2	2	6	**M**
Unincorporated County	2	2	2	6	**M**

4.5.17. Hazardous Materials Incident

Description

Ouray County is susceptible to accidents involving hazardous materials on roads, highways, and at fixed facilities that manufacture, use, or store dangerous chemical substances. A hazardous materials incident may occur at any time during routine business operations or as a result of a natural disaster. The release of hazardous materials can threaten people and natural resources in the immediate vicinity of the accident. Air releases can prompt large-scale population evacuations and spills into water or onto the ground can adversely affect public water and sewer systems.

A transportation incident refers to accidental and uncontrolled releases of chemicals or other hazardous materials during transport (i.e., highways, pipelines, and airways). A fixed-facility incident is an uncontrolled release of chemicals or other potentially hazardous materials from a facility. Fixed facilities include companies that store hazardous materials at their facility as well as all hazardous waste sites.

The U.S. Department of Transportation (U.S. DOT) uses nine classes of hazardous materials:

- Explosives
- Compressed Gasses: Flammable Gasses; Non-Flammable Compressed Gasses; Poisonous Gasses
- Flammable Liquids: Flammable (Flash Point Below 141 degrees); Combustible (Flash Point 141 degrees – 200 degrees)
- Flammable Solids; Spontaneously Combustible; Dangerous When Wet
- Oxidizers and Organic Peroxides
- Toxic Materials: Material that is Poisonous; Infectious Agents
- Radioactive Material
- Corrosive Material: Destruction of Human Skin; Corrode Steel at a Rate of 0.25 Inches Per Year
- Miscellaneous

The U.S. DOT, U.S. Environmental Protection Agency (EPA), and the Occupational Health and Safety Administration (OSHA) all have responsibilities in regulating hazardous materials and waste.

Location

There are no designated routes for hazardous materials transporters in Ouray County, but illicit transport of materials has been known to occur on Highways 550 and 62. Fuel trucks traveling over Highway 550 are a concern to the County and trucking industry shortest route requirements may be

routing more trucks over the pass. Since Ouray County is surrounded by mountains and diverse terrain, transportation of hazardous materials is at higher risk to accidents on high mountain passes with severe weather conditions and ice, wildlife, and debris on the roadways.

There are several methods to determine locations of fixed facilities in an area.

Started in 1988, the Toxics Release Inventory (TRI) is a federal program established by the U.S. Environmental Protection Agency that contains information on releases of nearly 650 chemicals and chemical categories from industries including manufacturing, metal and coal mining, electric utilities, and commercial hazardous waste treatment, among others. TRI facilities are required to file reports of their disposal or other environmental releases as well as other waste management quantities of regulated chemicals if they manufacture, process, or otherwise use more than the established threshold quantities of these chemicals. Ouray County has no reported TRI data. Another method of determining hazardous materials fixed facility sites is through the U.S. EPA's National Priorities List (NPL). The NPL is the list of sites of national priority among the known releases or threatened releases of hazardous substances, pollutants, or contaminants throughout the United States and its territories. Again, Ouray County does not have any active NPL or Superfund sites.

Additionally, releases associated with the mining industry could occur in Ouray County.

Extent

The extent for a hazmat release can vary widely based on the chemical released, amount, weather, and location of release.

Previous Occurrences

Statistics from the National Response Center, which serves as the sole national point of contact for reporting all oil, chemical, radiological, biological, and etiological discharges into the environment anywhere in the United States and its territories, indicate that between 1990 and 2019, 11 incidents were reported in Ouray County. Of the incidents, four were fixed and seven were mobile. The City of Ouray was the closest city for seven of these events, Ridgway three events, and Montrose (Montrose County) one event. As discussed in the mass casualties hazard profile, the aircraft incident in the Ridgway Reservoir killed five people, however, no injuries or deaths were related directly to a hazmat release. Additionally, according to the LPC, a fireman was killed in the 1950s when a fire burned in a shed that was filled with explosives. Table 4-34 describes incidents that have occurred since the 2015 Ouray County Hazard Mitigation Plan.[71] Details on events prior to the previous Plan can be found in Appendix C – HIRA Appendix.

[71] http://nrc.uscg.mil/Default.aspx

Table 4-34 National Response Center Recorded Hazmat Releases in Ouray County, 2012 to 2019

Incident Date	Description of Incident	Type of Incident	Nearest City	Location	Medium Affected	Materials
9/23/2016	Caller stated due to unknown causes there was a head on collision involving a pickup and a fuel tanker truck. Caller stated the tanker truck rolled over and released 70 gallons of diesel fuel onto the roadway. Caller stated driver of the pickup truck fled the scene.	Mobile	Montrose	Hwy 550; MP 114	Land	Oil: Diesel
8/11/2014	Sodium hydroxide, a chemical floating agent and other unknown chemicals are releasing from the water that comes from the underground portal that is being pumped out into the water supply that feeds the town. This incident has been ongoing for months and the last time it possibly occurred was approx. Eight days ago.	Fixed	Ouray	At a mine site 14 miles above Ouray (Star Revenue Mine)	Water	Unknown
3/22/2014	A small aircraft crashed into the Ridgway Reservoir causing a sheen. Caller stated there might have been 5	Aircraft	Ridgway	Ridgway Reservoir at Ridgway State Park	Water	Oil, Misc: Motor

Incident Date	Description of Incident	Type of Incident	Nearest City	Location	Medium Affected	Materials
	people on board and no survivors.					

Natural gas pipelines are another source of hazmat events in the County. According to the LPC, there have been a number of incidents in which a pipeline was breached. Depending on the location of the incident and extent of damage to the pipeline, impacts could be serious.

Additionally, the Idarado Mine, located between Telluride and Ouray, was listed as a Natural Resource Damage Site. The eastern portal of the mine is located approximately 11 of miles south of Ouray. Heavy metals were present in the mine tailings, specifically lead and cadmium. The main impact of heavy metals was on aquatic ecosystems and human contact was minimal. However, elevated lead levels presented a concern for children in the area. The site has since been remediated.[72]

Probability

Based on the NRC data, there have been 11 hazmat releases from 1990 to 2019 in Ouray County, equating to approximately a 39% annual chance of occurrence, or a likely probability.

Vulnerability Assessment

Inventory Exposed/Impacts

People and the environment are at the highest risk to hazmat incidents in Ouray County. As demonstrated by previous occurrences, drivers transporting hazardous materials on Highway 550 are at a high risk to accidents that may lead to releases. Additionally, Highway 550 runs through both the City of Ouray and the Town of Ridgway, putting both of those jurisdictions at risk if an accident were to occur nearby. Highway 62 also runs through Ridgway, increasing the risk. Fixed facility releases are less common in the County due to lack of major facilities housing hazardous materials or waste. However, mine tailings are a potential for release.

A hazmat release can cause acute or chronic impacts on human health depending on the chemical released and level of exposure. Additionally, an incident causing an explosion or fire can cause injury or loss of life as well as damages to structure or infrastructure. A transportation hazmat release could cause road closures, which are a concern for the County due to the limited access in and out. Releases in the environment may require costly remediation and can cause environmental damages, which could impact tourism and recreation in the County. Populated areas could experience a higher amount of people exposed to the impacts of a release. If an event occurred near or at a facility in the Ridgway School District during school hours, there could be significant impact on the staff and students. Therefore, the City of Ouray, Town of Ridgway, and Ridgway School District are at a higher risk to the

[72] https://www.colorado.gov/pacific/cdphe/idarado

impacts of a hazmat release on people. A release in unincorporated County could still have significant impacts on the environment and infrastructure.

Potential Losses

There are not recorded damage estimates for hazmat events in Ouray County. Potential losses include injuries and loss of life, as well as cleanup costs for environmental contamination. The jurisdictions are primarily vulnerable to transportation related hazmat incidents and could experience more losses due to the denser populations and buildings.

Future Conditions

Land Use and Development

The City of Ouray, Town of Ridgway, and unincorporated Ouray County have all experienced population growth in the last decade and are projected to continue to grow in population through 2050. This exposes more people across the County to impacts from a hazmat event. Development near major transportation corridors, such as Highway 550, and fixed facility hazmat sites will be at the highest risk to a hazmat release.

Climate Change

Due to the human-caused nature of hazmat incidents, this hazard is not projected to be impacted by climate change.

Summary Risk Ranking

Hazards were ranked for each jurisdiction based on the results of this HIRA, LPC input, and public perception of risk. The overall ranks were derived by assigning each jurisdiction a value of 1 (low), 2 (medium), or 3 (high) for each hazard for: the probability of an event occurring, the potential impact of the hazard on property/structures/economy, and the potential impact of the hazard on people. The results were summed for each hazard and jurisdiction to create an overall rank. A summed score of four or less equates to a "low" ranking, five to six equates to a "medium" ranking, and seven or greater equates a "high" ranking. The results are shown in the following figures below.

Table 4-35 Hazardous Materials Incident Risk Ranking

	Probability (of losses)	Potential Impact (economic)	Potential Impact (people)	Score	Risk Rank
City of Ouray	2	1	2	5	**M**
Town of Ridgway	2	1	2	5	**M**
Unincorporated County	2	1	2	5	**M**

4.5.18. Mass Casualty Events

Description

In general, a mass casualty event is defined as an incident in which local emergency response capabilities are overwhelmed by the number and severity of casualties. While many of the hazards profiled in this plan could result in such an incident, this hazard is specifically concerned with transportation incidents that involve large numbers of people (e.g., a plane or bus crash). These

incidents could be primary hazards or secondary effects of another hazard (e.g., an avalanche along a transportation corridor could bury vehicles). A plane crash in the rugged terrain of Ouray County is likely to have few survivors, whereas a tour or school bus crash could result in multiple injuries and fatalities. Additionally, the mining industry has seen growth in Ouray County in the last few years. Mass casualty events sometimes occur in the mining industry due to cave-ins or explosions.

Ouray County is particularly concerned that a tour/motor coach bus could go over the side of Highway 550. Greyhound has changed their route and no longer goes through the City of Ouray.

According to the Centers for Disease Control and Prevention, the most severe injuries in mass casualty events are fractures, burns, lacerations, and crush injuries. However, the most common injuries are eye injuries, sprains, strains, minor wounds, and ear damage. Additionally, it is normal for people to suffer emotional and physical stress after a mass casualty event, even if they are not at or near the scene. This additional stress can make existing health conditions worse or trigger a new health problem.

Location

An event such as an airplane crash could occur anywhere in the County. Traffic and bus accidents are most likely to occur along the Highway corridors of 550 and 62. The steeper, curvy sections of Highway 550 above and south of Ouray are particularly prone to accidents. The section of Highway 550, also known as the Million Dollar Highway, extending south from the City of Ouray to Silverton is 27 twisty mountain miles with very few guard rails. The first section up to the Ironton Park meadows runs along an eastern cliff side with up to 410 foot drops down to the bottom and the Uncompahgre River. Mass casualty events could also occur in the County's active mines. Figure 4-70, Figure 4-71, and Figure 4-72 shows current permitted mines in Ouray County.[73]

[73] Colorado Division of Reclamation Mining & Safety; https://mining.state.co.us/Reports/Pages/GISData.aspx

Figure 4-70 Mine Locations in Ouray County

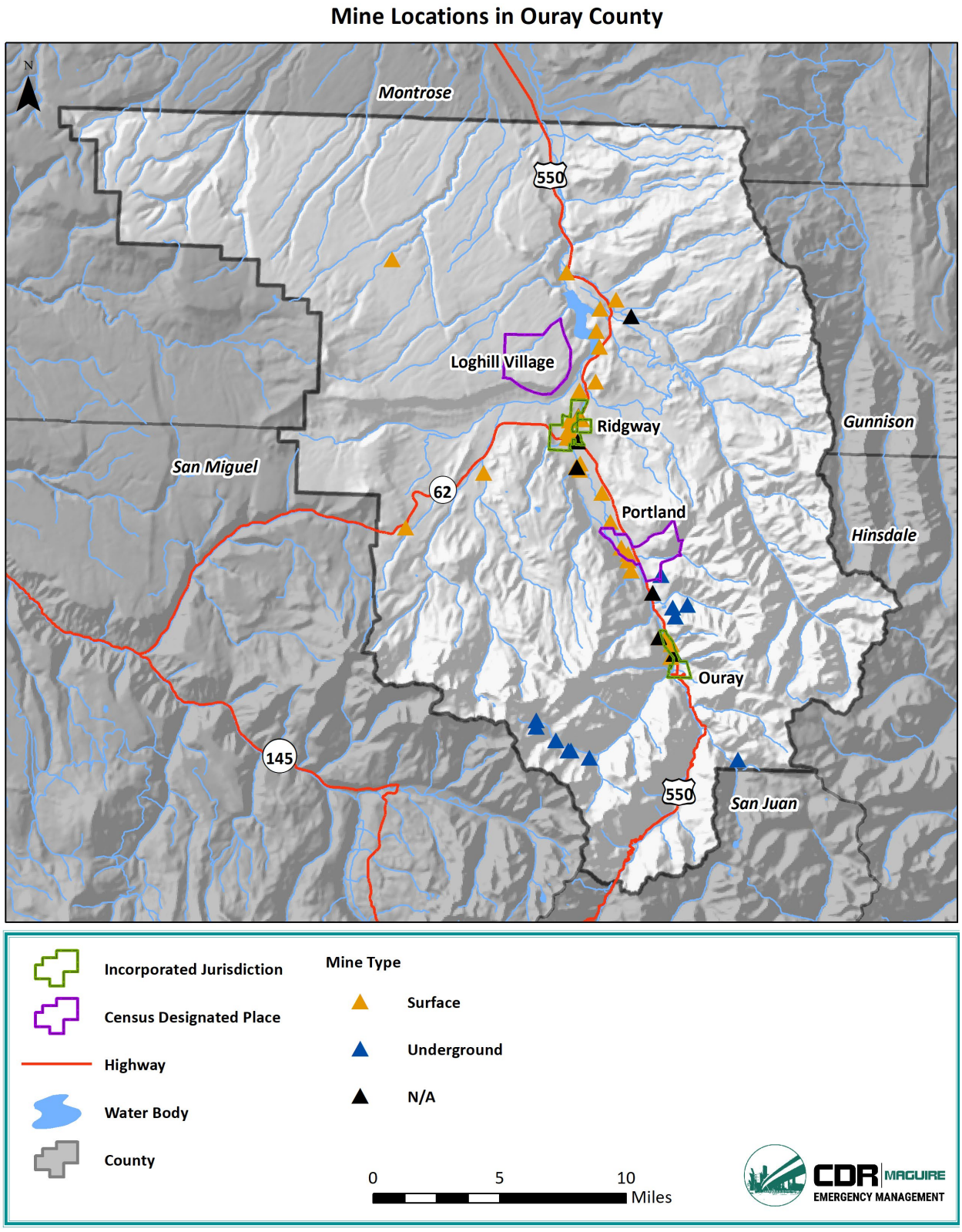


Figure 4-71 Mine Locations in the City of Ouray

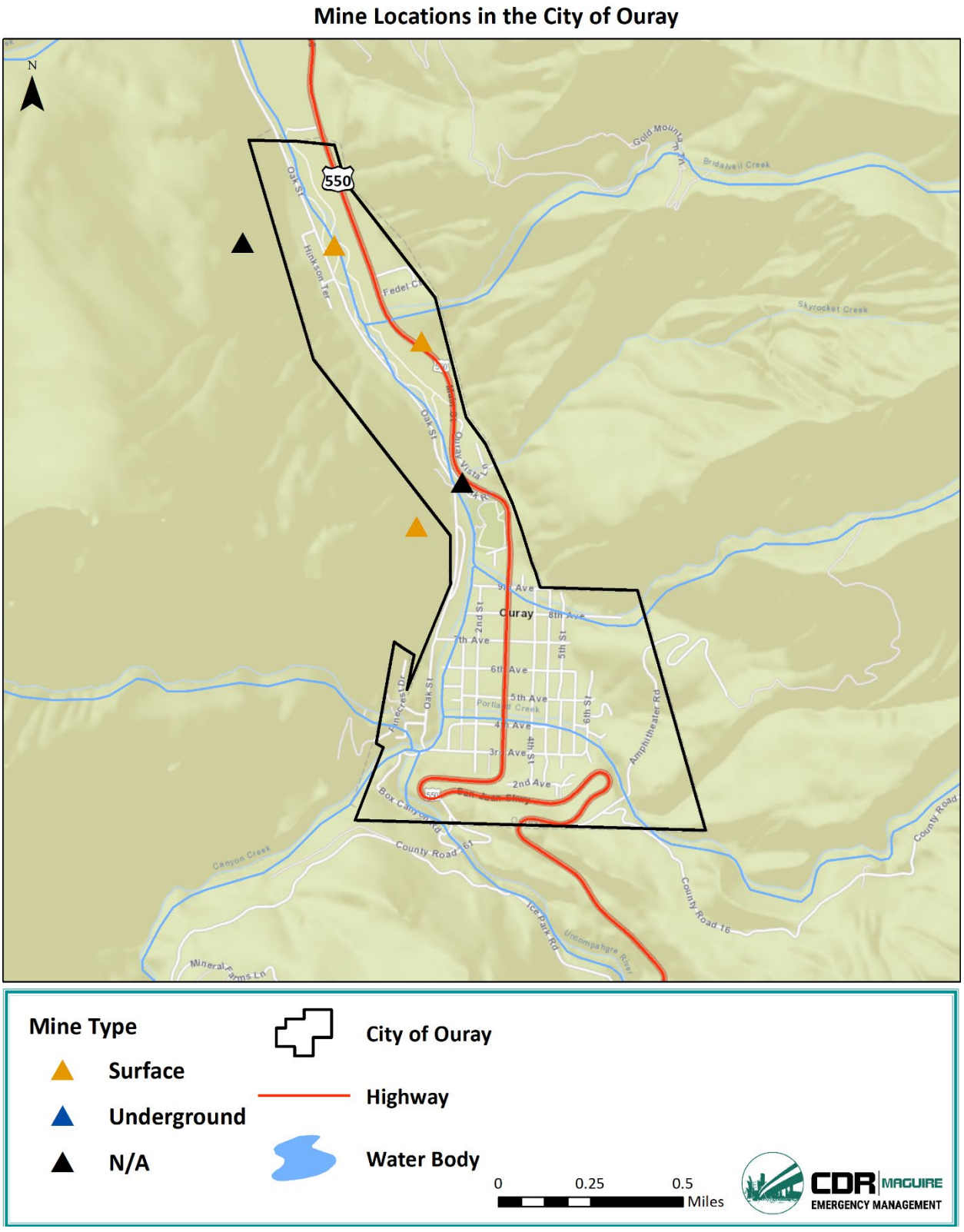
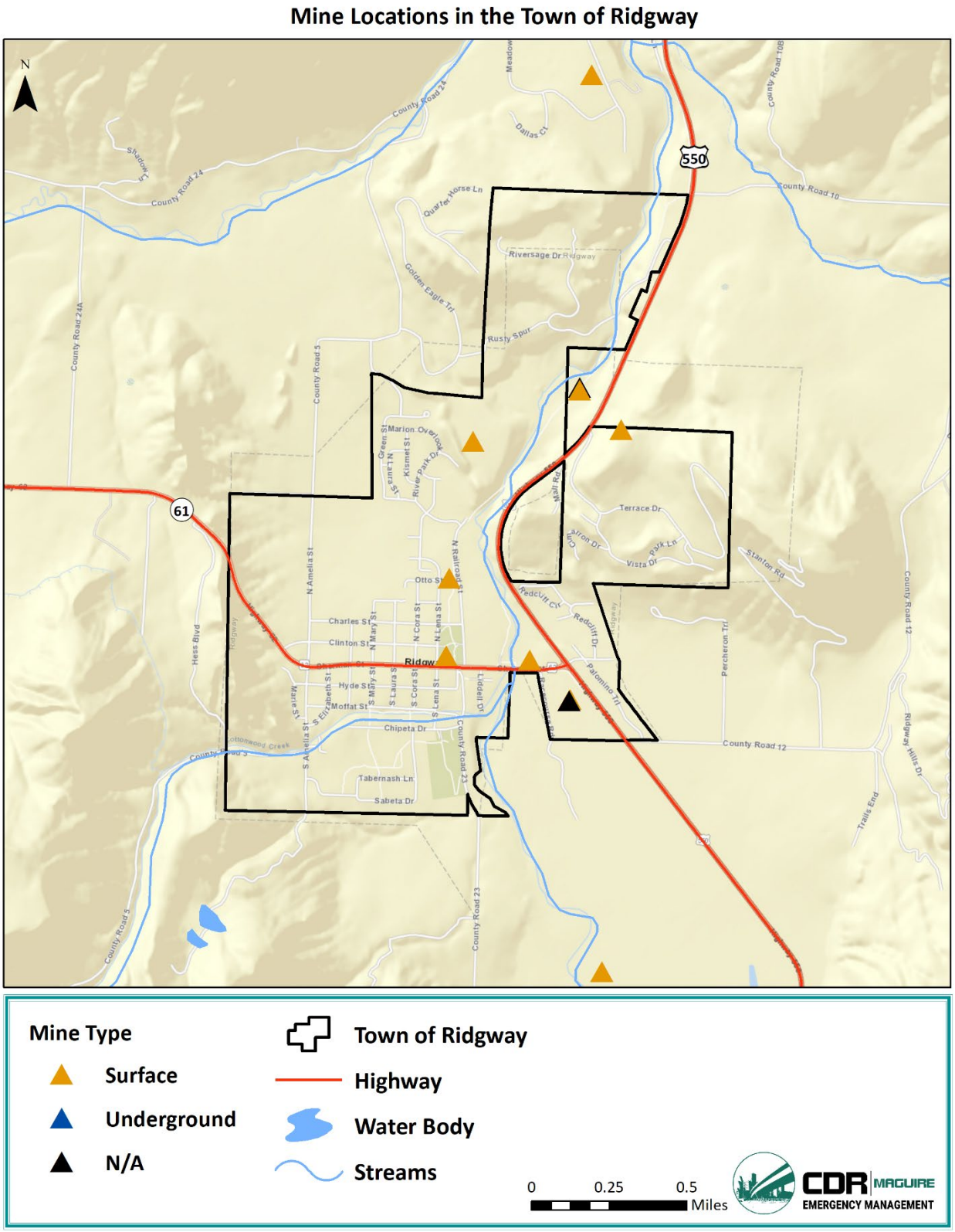


Figure 4-72 Mine Locations in the Town of Ridgway



Extent

A mass casualty incident would likely be a sudden, unpredictable occurrence.

Previous Occurrences

Since 2005, emergency services in Ouray County have responded to five incidents where a vehicle carrying enough people to be considered a mass casualty has gone over the side of the highway. There have been additional vehicles that have gone off the side of the highway, although not considered a mass casualty. Impacts ranged from minor injuries to fatalities. One of these incidents, which received national attention, occurred in February 2005 when a van carrying six passengers hit a patch of black ice, flipped sideways, started rolling, and plunged approximately 400 feet down the mountain ravine (all passengers were able to walk away from the accident). Although none of these five events were mass casualty events, they are indicative of what could happen given the right combination of circumstances.

An airplane crash in the winter of 2004 killed four people on Whitehouse Mountain and the bodies could not be recovered until the following spring. On March 22, 2014, a small plane carrying five people crashed into Ridgway Reservoir.[74] No one survived the crash. The passengers, all from Alabama, were on their way to Montrose for a skiing trip. It was noted this incident tied up emergency responders in the County. If a second hazard event were to occur during this time, it would overwhelm emergency response resources.

On November 17, 2013 two miners at the Revenue-Virginius Mine died from carbon monoxide poisoning.[75] Twenty other miners were taken to regional hospitals to be treated for carbon monoxide exposure. An area of the mine was contaminated with lethal levels of carbon monoxide from a previous explosive detonation.

No mass casualty events have occurred since the 2015 Ouray County Hazard Mitigation Plan.

Probability

Based on previous occurrences and input from the LPC, the probability of a mass casualty event occurring is occasional, with between 1 and 10% of occurring annually.

Vulnerability Assessment

Inventory Exposed/Impacts

The impact to people would be the most severe in a mass casualty event. Tourism is a major economic driver in the County, and particularly the City of Ouray. This brings a large influx of people who are visiting, particularly to see the natural beauty in the County. This often means driving over Red Mountain Pass and the "Million Dollar Highway." People driving the highway are vulnerable to accidents.

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[74] "Ridgway Reservoir plane crash: 5 believed to be dead in sunken wreckage." March 23, 2014. http://www.thedenverchannel.com/news/local- news/ridgway-reservoir-plane-crash-search-for-victims-continues-sunday. Accessed May 2, 2014.

[75] Joey Bunch and Tom McGhee. "Two miners dead in Colorado, 20 others injured after Ouray blast." *The Denver Post*, November 17, 2013. Available online at http://www.denverpost.com/breakingnews/ci_24542891/two-miners-trapped-20-others-injured-after-ouray?source=pkg. Accessed November 26, 2013.

Tour bus crashes are more likely to occur during the tourist season, which is most busy June through August, and when vans and buses are transporting people between the Telluride ski area and Montrose Airport during the winter.

Additionally, a mine accident would largely impact people, causing injuries or death. This could happen from an incident similar to the 2013 event from carbon monoxide poisoning, or from the physical impact of a mine collapse. There are thousands of historic mines throughout the County, and some can be accessed by visitors. Most are sealed off for public protection, but there are remote mines that are unsealed. Visiting historic mines is a typical tourist activity in the County, and if an incident occurred while tourists were visiting, injuries or fatalities could occur.

Potential Losses

In May 2010, Ouray County EMS produced a full-scale exercise that simulated an estimated worst-case scenario event. The scenario involved a school bus going off the side of County Road 1 down a 50-60-foot embankment, resulting in 20-30 patients and no fatalities. Emergency responders also had to address the needs of family members of the exercise "victims," making the exercise much larger in scope. An estimated 120 people were involved on the emergency response side of the exercise. A similar training exercise was conducted in May 2008.[76] These exercises serve as guidelines for the potential magnitude of a mass casualty incident in Ouray County.

Response to the March 22, 2014 plane crash in Ridgway Reservoir took over 1,500 labor hours. The overall cost of the plane recovery was approximately $75,000.

Future Conditions

Land Use and Development

The City of Ouray, Town of Ridgway, and unincorporated Ouray County have all experienced population growth in the last decade and are projected to continue to grow in population through 2050. With more people in the County, the likelihood for a mass casualty event could increase. Additionally, with continued visitors and residents traveling along Red Mountain Pass on Highway 550 increases the risk of a mass casualty event along the highway.

Climate Change

Due to the human-caused nature of mass casualty incidents, this hazard is not projected to be impacted by climate change.

Summary Risk Ranking

Hazards were ranked for each jurisdiction based on the results of this HIRA, LPC input, and public perception of risk. The overall ranks were derived by assigning each jurisdiction a value of 1 (low), 2 (medium), or 3 (high) for each hazard for: the probability of an event occurring, the potential impact of the hazard on property/structures/economy, and the potential impact of the hazard on people. The results were summed for each hazard and jurisdiction to create an overall rank. A summed score of four

[76] Gus Jarvis. "Bus Crash Training Exercise Set for May 8 Near Ridgway." The Watch, May 3, 2010. Available online at http://www.watchnewspapers.com/view/full_story/7281608/article-Bus-Crash-Training-Exercise-Set-for-May-8-Near-Ridgway. Last accessed September 10, 2013.

or less equates to a "low" ranking, five to six equates to a "medium" ranking, and seven or greater equates a "high" ranking. The results are shown in the following figures below.

Table 4-36 Mass Casualty Events Risk Ranking

	Probability (of losses)	Potential Impact (economic)	Potential Impact (people)	Score	Risk Rank
City of Ouray	1	1	2	4	L
Town of Ridgway	1	1	2	4	L
Unincorporated County	1	1	3	5	M

4.5.19. Imminent Threat

Description

Imminent threat includes the potential for violent attacks, including but not limited to domestic and international terrorism. The Federal Bureau of Investigation (FBI) defines terrorism as "the unlawful use of force or violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives." The threat of terrorism, both international and domestic, is ever present, and an attack is likely to occur when least expected. Incidents of mass shootings in public areas around the United States have shown that individuals can inflict severe damage. These individuals' motives may vary, from terrorism to random or criminal acts.

Imminent threats to public safety are a growing concern worldwide that must be addressed through security and awareness. Needs associated with imminent threats include training and equipping of local emergency response personnel in cooperation with state and federal agencies.

Ouray County could be a source of explosives for imminent threats to public safety. These sources could be from active mines (dynamite) or hand charges and shells for howitzers used for avalanche control by the Colorado Department of Transportation. The mines themselves could be targets from radical environmental groups. There are families and individuals in Ouray County with a history of strong anti-governmental statements, action, and signage. It is these latter groups that are of particular concern to Ouray County. Ecoterrorism is a form of domestic terrorism that the FBI defines as "the use or threatened use of violence of a criminal nature against innocent victims or property by an environmentally-oriented, subnational group for environmental-political reasons, or aimed at an audience beyond the target, often of a symbolic nature."

Imminent threats may also include cyber terrorism, or cyber security incidents more generally. Cyber-security incidents are a growing concern as many energy delivery systems are managed by computers. There are many threats, some more serious than others. For example, many power plants and other infrastructure are remotely controlled by supervisory control and data acquisition (SCADA) systems. SCADA systems are vulnerable to attack through hackers who could access the system and sabotage the target facility. Some examples of how computers and systems could be affected by a cyber security incident— whether because of improper cyber security controls, manmade or natural disasters, or malicious users wreaking havoc—include the following:

- **Denial-of-service:** This refers to an attack that successfully prevents or impairs the authorized functionality of networks, systems, or applications by exhausting resources. This type of attack could shut down a government agency's website, thereby preventing citizens from accessing information or completing transactions. This type of attack could also impede business operations or critical services such as emergency medical systems, police communications, or air traffic control.
- **Malware, worms, and Trojan horses**: These spread by email, instant messaging, malicious websites, and infected non-malicious websites. Some websites will automatically download the malware without the user's knowledge or intervention. This is known as a "drive-by download." Other methods will require the users to click on a link or button.
- **Botnets and zombies**: A botnet, short for robot network, is an aggregation of compromised computers that are connected to a central "controller." The compromised computers are often referred to as "zombies." These threats will continue to proliferate as the attack techniques evolve and become available to a broader audience, with less technical knowledge required to launch successful attacks. Botnets designed to steal data are improving their encryption capabilities and thus becoming more difficult to detect.
- **"Scareware:"** Fake security software warnings: In this type of scam cyber criminals use pop- up warnings telling users that their system is infected. Many users are then lured into downloading and paying for unnecessary software to "protect" their system.

Location

The following areas of the County are potential terrorist targets:

- Active mines
- Resort development in northwest corner of County
- Ridgway Reservoir and Dam
- Ouray Hydroelectric Power Plant
- Power grid, substations, and communications facilities
- Events/festivals that attract large crowds
- Churches

Extent

It is difficult to describe the extent of an imminent threat due to the human-caused nature of the hazard. Factors such as the type of attack, location, time of day, and weather can all influence the impacts of an attack. The United States Department of Homeland Security utilizes the National Terrorism Advisory System (NTAS) to communicate information about terrorist threats by providing timely, detailed infomration to the public.

Previous Occurrences

Ouray County has had some incidents in the past that could be considered terrorist activities today. A suicide bomber blew himself up on Highway 550, near the East Riverside avalanche shed in the 1970s. In 1920, there was an incident in Ridgway that involved unknown perpetrators blowing up some buildings in the downtown area with dynamite. Their motives were unknown. Also, in the 1920s there were Ku Klux Klan rallies in Ridgway and Ouray. The Idarado Mine in Ouray was the source of explosives for terrorist activity in Boulder County during the 1980s.

Probability

Based on previous occurrences as well as the potential target areas in the County, the probability of an imminent threat occurring in the County is possible, with a 1 to 10% chance of annual occurrence.

Vulnerability Assessment

Inventory Exposed/Impacts

An attack could cause deaths, injuries, structural damage, and economic damage in Ouray County. These impacts could be long-term as communities recover after an attack. Cyber-attacks can significantly impact the economy and safety of the County. An attack that occurred during peak tourist season when large groups of people are concentrated in a small area, such as the 4th of July, could cause severe impacts such as mass injuries and fatalities. Additionally, high risk targets such as schools, churches, or government buildings, are at risk to mass shootings or other attacks. The Ridgway School District is vulnerable to an attack during school hours. All identified critical facilities in the County are also at risk to an attack.

The County is also vulnerable to cyber-attacks due their assumed lack of IT capabilities by hackers. Smaller City or County governments may not have the resources to fight off a cyber-attack and are assumed to be more willing to pay a hacker to get their data restored, increasing their risk to these attacks. It was noted during the first LPC workshop that Ouray County fights off cyber threats fairly frequently.

Potential Losses

Given the lack of historical loss data on terror events in the County, it is assumed that while one major event could potentially result in significant losses, annualizing those losses over a long period of time would most likely yield a very low annualized loss estimate for the County. Injury and loss of life would likely be the greatest impact from an imminent threat event. Cyber-attacks could cause major disruptions in local or County services that may result in monetary losses for the County.

On November 10, 2018, first responders around Ouray County conducted a full-scale emergency response drill at Ridgway Secondary School. The drill focused on emergency response to an imminent threat at the school. This was a multi-jurisdictional effort with 32 agencies and 198 participants that aided with preparing for and testing systems to handle an imminent threat event at a school. This training also gave insight for the impacts and losses that could be associated with this type of imminent threat event.

Future Conditions

Land Use and Development

The City of Ouray, Town of Ridgway, and unincorporated Ouray County have all experienced population growth in the last decade and are projected to continue to grow in population through 2050. More population can lead to more people being impacted in the case of an imminent threat event. Additionally, increased population density can increase the risk for becoming a target for an imminent threat event.

Climate Change

Due to the human-caused an imminent threat event, this hazard is not projected to be impacted by climate change.

Summary Risk Ranking

Hazards were ranked for each jurisdiction based on the results of this HIRA, LPC input, and public perception of risk. The overall ranks were derived by assigning each jurisdiction a value of 1 (low), 2 (medium), or 3 (high) for each hazard for: the probability of an event occurring, the potential impact of the hazard on property/structures/economy, and the potential impact of the hazard on people. The results were summed for each hazard and jurisdiction to create an overall rank. A summed score of four or less equates to a "low" ranking, five to six equates to a "medium" ranking, and seven or greater equates a "high" ranking. The results are shown in the following figures below.

Table 4-37 Imminent Threat Risk Ranking

	Probability (of losses)	Potential Impact (economic)	Potential Impact (people)	Score	Risk Rank
City of Ouray	1	1	2	4	**L**
Town of Ridgway	1	1	2	4	**L**
Unincorporated County	1	1	2	4	**L**

5. Mitigation Strategy

5.1. Hazard Mitigation Strategy Overview

The Mitigation Strategy provides a blueprint for Ouray County to follow to become less vulnerable to its identified hazards. It is based on general consensus of the County's planning team, the findings and conclusions of the Risk Assessment, and input from the public and stakeholders. The Mitigation Strategy includes hazard mitigation plan goals, objectives, and hazard mitigation actions. The plan goals and objectives serve as the guiding principles for future mitigation policy and project administration and hazard mitigation actions serve as implemental items that support goals. The mitigation strategy includes a process for evaluating mitigation actions to ensure actions are feasible based on community capabilities, tied to plan goals, and effective in reducing hazard losses for current and future structures and populations.

This section outlines the goals, objectives, capabilities, mitigation action evaluation, and prioritization process undertaken in Ouray County.

5.2. Ouray County Hazard Mitigation Goals and Objectives

The goals and objectives identified in the 2015 Ouray County Mitigation Strategy were reviewed as part of the planning process and when developing mitigation actions. The planning team decided to largely keep the goals and objectives the same from the 2015 Plan, with changes in some wording for goals and objectives to be more inclusive for the mitigation needs in the County. These new Plan goals and objectives reflect current needs and priorities of the County and are intended to reduce long-term vulnerability and risk to all hazards identified in this Plan. The new 2019 mitigation goals and objectives are as follows:

- **Goal One:** Minimize Loss of Life and Injury from Anticipated Hazard Events
    - **Objective 1:** Educate citizens about natural hazard events and ways to protect themselves
    - **Objective 2:** Complete local-level community wildfire protection plans to include evacuation routes and procedures as well as re-entry procedures
    - **Objective 3:** Improve flash flood and debris flow warning and evacuation capabilities
    - **Objective 4:** Implement debris flow mitigation
    - **Objective 5:** Make travel safer on Highways 550 and 62, County Roads, and major corridors through the County
    - **Objective 6:** Provide training and equipment to responders and government officials
    - **Objective 7:** Update and expand all-hazard emergency response plans
    - **Objective 8:** Update building codes
- **Goal Two:** Reduce the Potential Impact of Natural, Human-caused, and Technological Disasters on Public and Private Property, the Economy, Natural Environment, and Historic Resources
    - **Objective 1:** Reduce flood impacts to the residents and visitors of the City of Ouray, Town of Ridgway, and the County
    - **Objective 2:** Reduce debris flow impacts to public, private, and historic structures in City of Ouray
    - **Objective 3:** Reduce wildfire impacts to structures and response resources

  - **Objective 4:** Continue to reduce impacts of wildfire to future and existing development through land use planning, subdivision reviews, permitting, and building codes
  - **Objective 5:** Update mapping of hazard areas, including flood, debris flow, wildfire, rockfall, and avalanche
  - **Objective 6:** Use updated risk maps to improve the risk assessment in future updates to this plan and to provide public information
  - **Objective 7:** Reduce drought impacts
  - **Objective 8:** Provide training and equipment to responders and government officials
  - **Objective 9:** Update building codes
- **Goal Three:** Reduce the Potential Impact of Natural, Human-caused, and Technological Disasters on Critical Facilities, Infrastructure, and Critical Support Services
  - **Objective 1:** Protect critical facilities and assets at risk to flood, debris flows, or landslide
  - **Objective 2:** Protect critical facilities and assets at risk to wildfire
  - **Objective 3:** Protect necessary communication infrastructure from multiple hazards (wildfire, lightning, windstorm, flood, extreme temperatures)
  - **Objective 4:** Provide continuity of operations and continuity of government
  - **Objective 5:** Provide necessary support infrastructure
  - **Objective 6:** Review government capabilities for responding effectively to anticipated hazard events and upgrade where possible
  - **Objective 7:** Reduce the impact and risk of potential terroristic attacks on critical facilities, infrastructure, and services

5.2.1. Ouray County Capabilities Assessment

Prior to forming new mitigation actions, a capabilities assessment was conducted for the County to understand what planning and regulatory, administrative and technical, financial, and education and outreach capabilities the County has (or is lacking) for implementing hazard mitigation projects. To assess capabilities, an online survey was distributed to each jurisdiction. Additionally, capabilities were discussed during each planning team workshop. Ouray County capabilities are described in the tables below. Overall, capabilities in all jurisdictions in the County are generally unchanged from the 2015 Plan. Between the jurisdictions and the County, there is overall good coverage of capabilities in Ouray County. For the most part, the Loghill Mesa FPD falls under the same capabilities as the County.

Table 5-1 Ouray County Planning and Regulatory Capabilities

Capability	City of Ouray	Town of Ridgway	Loghill Mesa FPD	Ouray County
Building Codes	x	x		x
Building Codes Year		Adopting in 2019		2006, but the County is looking at updating to 2018 codes
BCEGS Rating	x	x		
Capital Improvements Program (CIP) or Plan	x	x		x

Capability	City of Ouray	Town of Ridgway	Loghill Mesa FPD	Ouray County
Community Rating System (CRS)				
Community Wildfire Protection Plan (CWPP)	x	x	x	x
Comprehensive, Master, or General Plan	x	x		x
Economic Development Plan	x	x		
Elevation Certificates	x	x		x
Erosion/Sediment Control Program	x	x		
Floodplain Management Plan or Ordinance	x	x		x
Flood Insurance Study	x	x		
Growth Management Ordinance				
Non-Flood Hazard-Specific Ordinance or Plan (e.g.- Steep Slope, Wildfire, Snow Load)	x	x		x
NFIP	x	x		x
Site Plan Review Requirements	x	x		x
Stormwater Program, Plan, or Ordinance	x	x		
Zoning Ordinance	x	x		x
Other				Wildfire mitigation regulations

Table 5-2 Ouray County Administrative and Technical Capabilities

Capability	City of Ouray	Town of Ridgway	Loghill Mesa FPD	Ouray County
Emergency Manager	x	x		x
Floodplain Administrator	x	x		x
Community Planning:				
- Planner/Engineer (Land Development)	x	x		x
- Planner/Engineer/Scientist (Natual Hazards)	x	x		x
- Engineer/Professional (Construction)	x	x		x
- Resiliency Planner	x	x		
- Transportation Planner	x	x		
Full-Time Building Official	x	x		x
GIS Specialist and Capability		x		x
Grant Manager, Writer, or Specialist		x	x	x
Warning Systems/Services:				
- General		x	x	x
- Flood		x		x
- Wildfire		x	x	x
- Tornado				
- Geological Hazards		x		x
Other				

Table 5-3 Ouray County Financial Capabilities

Capability	City of Ouray	Town of Ridgway	Loghill Mesa FPD	Ouray County
Has community used any of the following to fund mitigation activities?				
- Levy for Specific Purposes with Voter Approval				
- Utilities Fees		x		
- System Development / Impact Development Fee		x		
- General Obligation Bonds to Incur Debt		x		
- Special Tax Bonds to Incur Debt				
- Withheld Spending in Hazard-Prone Areas				
- Stormwater Service Fees				
- Capital Improvement Project Funding		x		
- Community Development Block Grants		maybe		
- Other	general fund, flume tax		Mill levy taxation without specific voter approval, federal and state grants	

Table 5-4 Ouray County Education and Outreach Capabilities

Capability	City of Ouray	Town of Ridgway	Loghill Mesa FPD	Ouray County
Local Citizen Groups That Communicate Hazard Risks	x	x	x	
Firewise		x	x	x
StormReady		x		x

Capability	City of Ouray	Town of Ridgway	Loghill Mesa FPD	Ouray County
Other		Newsletter, email listserv, social media	Ready Set Go!	

5.2.2. Ouray County Continued NFIP Compliance

Given the flood hazard and risk in the County, and recognizing the importance of the NFIP in mitigating flood losses, an emphasis will be placed on continued compliance with the NFIP by Ouray County, the City of Ouray, and the Town of Ridgway. As NFIP participants, these communities have and will continue to make every effort to remain in good standing with NFIP. This includes continuing to comply with the NFIP's standards for updating and adopting floodplain maps and maintaining and updating the floodplain zoning ordinance. There are several action items identified in Table 5-6 that address specifics related to NFIP continued compliance. Other details related to NFIP participation are discussed in the flood vulnerability discussion in Section 4 of this Plan.

5.2.3. Ouray County Past Action Reporting

Table 5-5 describes the progress on actions from the 2015 Ouray County Hazard Mitigation Plan.

Table 5-5 Ouray County Progress on 2015 Mitigation Actions

ID	Jurisdiction	Action	Priority	Hazard	2019 Status	2019 Status Summary
1	Multi jurisdictional	Develop CWPP for other remaining designated WUI areas for extreme and very high communities	H	Wildfire	Ongoing	Log Hill Fire updated individual parcel evals in 2017 and provided recommendations to all structure owners on ways to improve home safety.
2	Multi jurisdictional	Improve and expand early warning systems to detect hazardous precipitation events and potential flooding	H	Flooding, All hazards	Ongoing	Ouray County is now using CodeRED warning system in addition the the Wireless Emergency Notification System (WENS). They are also utilizing Facebook and the county website. The City of Ouray is now using WENS, CodeRED, Facebook, Twitter, Business Alerts and the City Website for early

ID	Jurisdiction	Action	Priority	Hazard	2019 Status	2019 Status Summary
						notification systems. There is still a significant amount of work that needs to be done for the early detection system.
3	Multi jurisdictional	Improve the coverage of the NOAA all-hazards radio in Ouray County for all potential warning situations (present coverage is limited to Ridgway area)	H	All hazards	Deferred	There is still lack of funding for this action
4	Multi jurisdictional	Develop a flood evacuation plan for the critical portions of the City of Ouray	H	Flooding	ongoing	Lidar studies have been complete. US Army Corps is working with Ouray County on Northerly Evacuation Route from Ouray. A multi-jurisdictional Evacuation Plan will be developed in 2020
5	Multi jurisdictional	Maintain State of Colorado avalanche forecasting and control efforts	M	Avalanche	Delete	Not a plan adoptee
6	Multi jurisdictional	Encourage the State of Colorado to continue to monitor and enforce	M	Hazardous Materials	Ongoing	Continuously being done

ID	Jurisdiction	Action	Priority	Hazard	2019 Status	2019 Status Summary
		hazardous materials transport regulations				
7	Multi jurisdictional	Have the State of Colorado re-evaluate the extension of the East Riverside avalanche shed for greater protection	L	Avalanche	Delete	Not a plan adoptee
8	Multi jurisdictional	Evaluate driver safety options to minimize risks to motorists and tour buses on Highway 550 between Ouray and Red Mountain Pass	L	All hazards	Delete	Not a plan adoptee
9	Multi jurisdictional	Invite the Colorado Water Conservation Board and FEMA to host flood insurance workshops prior to flood season every two years	H	Flooding	Deferred	This has been deferred to the 2019 HMP
10	Multi jurisdictional	Continue to implement sound floodplain management practices as communities participating in the National Flood Insurance Program	M	Flooding	Ongoing	Ouray County in still in the process of updating the floodplain management practices. The City of Ouray in still in the process of updating the floodplain management practices.

ID	Jurisdiction	Action	Priority	Hazard	2019 Status	2019 Status Summary
11	Multi jurisdictional	Encourage residents to construct defensible space around homes through promotion of Firewise techniques	M	Wildfire	Ongoing	Log Hill Fire residents actively participate in the WRWC mitigation program and annual chipping program to create more defensible space and maintain same. LHVFD Station 1 completed a defensible space project in 2019.
12	Multi jurisdictional	Improve FPD wildland capabilities per CWPP recommendations	M	Wildfire	Ongoing	Log Hill Fire continues to improve wildfire capabilities. Certifications of firefighters improves through use of task books and academy classes. Currently have 4 engine bosses, Strike Team leader trainee and other leadership positions. Continue to improve wildfire equipment stocking on engines. In 2019 brought Type 6 stocking up to NUS levels. Seeking to gain experience for firefighters through fire deployments. Sent Tender to Bull Draw Fire in 2018.
13	Multi jurisdictional	Implement fuels treatment projects in areas identified in the Ouray County CWPP	H	Wildfire	Ongoing	Log Hill Fire residents actively participate in the WRWC mitigation program and annual chipping program to create more defensible space and maintain same. LHVFD Station 1 completed d space project in 2019.

ID	Jurisdiction	Action	Priority	Hazard	2019 Status	2019 Status Summary
14	Multi jurisdictional	Review County wildfire regulations with insurance industry. Partner with insurance industry*	M	Wildfire	Ongoing	WRWC has worked with planning commission to rewrite wildfire regs and is approaching approval of same.
15	Multi jurisdictional	Redo or update the flood hazard risk maps for 100- and 500-year floods*	M	Flooding	Delete	This is now done by FEMA
16	Multi jurisdictional	Provide hazardous fuels reduction treatments around the five radio/cell sites in Ouray County	H	Wildfire	Ongoing	Log Hill Fire plans to work with DFPC to mitigate Log Hill Site in 2020 or 2021.
17	Multi jurisdictional	Provide hazardous fuels reduction treatments around the Ridgway power substation	H	Wildfire	Delete	No longer a plan adoptee
18	Multi jurisdictional	Provide hazardous fuels reduction treatments around the 230 KV power line	H	Wildfire	Delete	Not a plan adoptee
19	Multi jurisdictional	Evaluate multi-hazard risk to five radio/cell sites and repeater sites and develop appropriate mitigation	H	All hazards	Ongoing	Ouray County has worked with the West Region Wildfire Council to mitigate the risks to the 5 radio/cell sites

ID	Jurisdiction	Action	Priority	Hazard	2019 Status	2019 Status Summary
		recommendations				
20	Multi jurisdictional	Develop capability for off-site backup of critical data	L	All hazards	Ongoing	Ouray County has developed an off-site backup for critical data
21	Multi jurisdictional	Develop continuity of operations and continuity of government plans	L	All hazards	Deferred	This has been deferred to the 2019 HMP. Town of Ridgway completed and adopted an Emergency Operations Plan Feb. 2019
22	Multi jurisdictional	Identify potential multi-hazard shelter sites and ensure adequate supplies and backup power capabilities	H	All hazards	Ongoing	6 Shelter sites have been identified and approved by Red Cross in Ouray County. 4 of those sites are in the City of Ouray (Ouray Community Center, Ouray Schools, St Daniels Church, and the Elks Club). The sites are still in need of funding to finalize back up power.
23	Multi jurisdictional	Upgrade County Wireless Communications to include access to State 800 Mhz system	H	All hazards	Ongoing	Log Hill Fire has access to 800 mghz in vehicles but VHF is primary communication means.
24	Multi jurisdictional	Improve countywide GIS capabilities to support land use planning and emergency management*	M	All hazards	Ongoing	There has been significant progress made but there will always be a need for GIS updates
25	Multi jurisdictional	Produce multi-hazard education.	L	Avalanche	Ongoing	County, City, and Town work continuously on public outreach, education, and training.

ID	Jurisdiction	Action	Priority	Hazard	2019 Status	2019 Status Summary
26	Multi jurisdictional	Hazmat awareness training for first responders	H	Hazardous Materials	Ongoing	Log Hill Fire has 8 HAZMAT OPS personnel.
27	Multi jurisdictional	Provide the Grand Junction NWS office with appropriate non- weather emergency message (NWEM) templates	H	All hazards	Complete	NWS has received appropriate non-weather emergency message
28	Multi jurisdictional	Work with State Patrol hazmat officers to monitor hazmat through county roads and CDOT roads	H	Hazardous Materials	Ongoing	This is continually monitored and improved
29	Multi jurisdictional	Education of citizens about flood insurance: clear water vs. sediment/mudflow	H	Flood/Debris Flows	Deferred	This has been deferred to the 2019 HMP
30	Ouray County	Update the County's emergency operations plan to the latest standards and include Ridgway and Ouray	L	All hazards	Complete	This was adopted by the city, town, and county.
31	Ouray County	Review the County wildfire mitigation standards code against the National Fire Protection Association model and modify the	M	Wildfire	In Progress	WRWC has worked with planning commission to rewrite wildfire regs and is approaching approval of same.

ID	Jurisdiction	Action	Priority	Hazard	2019 Status	2019 Status Summary
		Ouray County code if appropriate*				
32	Ouray County	Explore adding the development of a community wildfire protection plan and defensible space as requirements for subdivision planned unit development approvals*	L	Wildfire	In Progress	WRWC has worked with planning commission to rewrite wildfire regs and is approaching approval of same.
33	Ouray County	Update and modernize the avalanche hazard atlas with development of a GIS avalanche database	M	Avalanche	Deferred	This has been deferred to the 2019 HMP
34	Ouray County	Set up a countywide emergency operations center at the Ridgway Land Use Office, which is not in potential flood and fire risk areas and is close to the County fuel supply and the central radio system repeater	M	All hazards	Complete	The EOC was established in 2015.

ID	Jurisdiction	Action	Priority	Hazard	2019 Status	2019 Status Summary
35	Ouray County	Upgrade County emergency manager position from part-time to full-time	H	All hazards	Complete	This was completed in 2017 and both the town and city are contributing to this as well.
36	Ouray County	Improve fire response capabilities, including installing “quick dumps” on all County and City water trucks and equip to carry “porta-ponds”	L	Wildfire	Deferred	Deferred due to a lack of resources
37	Ouray County	Educate citizens on beetle kill and work with USFS to mitigate beetle kill affected trees within the County	H	Wildfire	Ongoing	Ongoing due to the different variety of beetles. A significant amount of time and energy have been placed on Beetle Kill education and mitigation. This is ongoing as Beetle Kill Trees still surround the City. The City will continue to support pheromone projects to mitigate impacts to surrounding forest
38	Ouray County	Build a culvert or drainage system to prevent County Road 17 near Corbett Creek from flooding and washing out during heavy rainstorms	H	Flooding	Ongoing	Working with Corps of Engineers to develop preliminary engineering design for bridge crossing. Engineering will be completed in 2020

ID	Jurisdiction	Action	Priority	Hazard	2019 Status	2019 Status Summary
39	Ouray County	Reduce avalanche risks to miners and first responders	H	Avalanche	ongoing	Continuously being done
40	Ouray County	Create emergency management resource lists	H	All hazards	Ongoing	Continuously being done by the County. The city will continue creating the list and will ensure that all City Resources are in WEBEOC by the end of 2020.
41	Ouray County	Ensure all are trained in NIMS according to FEMA regulations	H	All hazards	Ongoing	Ongoing program in LHVFD.
42	Ouray County	Create preloaded warning messages for specific events (e.g. flood, fire, evacuation) for our target notification system and NOW	H	All hazards	Ongoing	LHVFD has preloaded evac messages in Code Red.
43	Ouray County	Research and implement a strategy to reduce ISO ratings countywide	H	Wildfire	Ongoing	LHVFD improved rating from 5/8B to 4/4Y. WRWC has no input to ISO ratings.
44	Ouray County	Work with Parks & Wildlife and Tri-County to keep debris low in Ridgway Reservoir to prevent flooding and dam overflow	M	Flooding, Dam Failure	Ongoing	Continuously being done

ID	Jurisdiction	Action	Priority	Hazard	2019 Status	2019 Status Summary
45	Ouray County	Create EOPs related to imminent threats for public buildings such as the County Courthouse City Hall, Town Hall, and schools	H	Imminent Threat	Complete / Ongoing	This was completed in 2016. The City will continue education, training, and planning for imminent threats of all of the City infrastructure
46	City of Ouray	Replace Skyrocket Creek Diversion Dam to divert debris flows away from the Ouray Hot Springs Pool	H	Debris Flow	Complete	This project has been completed
47	City of Ouray	Conduct outreach on debris flow and flood protection methods for property and business owners in the City of Ouray	M	Flooding/ Debris Flow	Ongoing	The city has been working on debris flow and flood protection education. The city has utilized Colorado Geologic Survey, Colorado Division of Emergency Management, and Ouray County Emergency Management for these educational pieces.
48	City of Ouray	Protect City of Ouray water main from landslide impacts	M	Landslide	Ongoing	This has been done in phases and is ongoing.
49	City of Ouray	Bi-annual removal of rock and debris in the Cascade catchment basin to prevent flooding	M	Flooding	Ongoing	This is being done annually to bi-annually

ID	Jurisdiction	Action	Priority	Hazard	2019 Status	2019 Status Summary
50	City of Ouray	Annual removal of rock and debris in the Skyrocket catchment basin to prevent flooding	M	Flooding	Ongoing	This is being done annually
51	City of Ouray	Replace or repair Weehawken Spring transmission line should an event take the line out of service. Develop plan for public notification, conservation methods, and fire protection alternatives if service is interrupted.	H	All hazards	Deferred	Deferred to lack of resources
52	City of Ouray	Complete CWPP for City of Ouray Volunteer Fire Department	H	Wildfire	Deferred	Deferred to lack of resources
53	Town of Ridgway	Develop a stormwater management plan for the Town of Ridgway	H	Flooding	In Progress	The Town is currently working with consultants to complete this task. Project is scheduled to be done by end of year 2019.
54	Town of Ridgway	Develop additional raw water storage for Ridgway	H	Drought	Complete	Lake Otonowanda expansion has been completed.
55	Fire Protection Districts	Develop CWPP for Log Hill Mesa	H	Wildfire	Ongoing	Individual parcel level ratings were updated in 2017 and provided to homeowners.

ID	Jurisdiction	Action	Priority	Hazard	2019 Status	2019 Status Summary
56	Fire Protection Districts	Complete the Horsefly Fire Protection Association CWPP to include evacuation routing and signage	M	Wildfire	Delete	No longer a plan adoptee
57	Fire Protection Districts	Complete ISO reevaluation of Log Hill Mesa Fire Protection District	M	Wildfire	Complete	Re-Eval complete in 2017. Improved from 5/8B to 4/4Y.
58	Ridgway School District	Secure exterior school entrances by installing electronic locks with card readers	H	Imminent Threat	Delete	No longer a plan adoptee
59	Ridgway School District	Upgrade emergency notification system	H	All hazards	Delete	No longer a plan adoptee
60	Ridgway School District	Improve earthquake preparedness in School District Buildings	M	Earthquake	Delete	No longer a plan adoptee
61	Ridgway School District	Install safety film on windows at secondary schools to prevent intrusion and injuries from shattered glass	M	All hazards	Delete	No longer a plan adoptee
Total	**61**					

5.2.4. Ouray County Identification of New Mitigation Actions

Selection of Mitigation Actions

Selected actions are included in the Mitigation Action Plan (MAP), which is presented in Table 5-6. The MAP is a functional plan for action and is considered to be the most essential outcome of the mitigation planning process. The MAP includes a prioritized listing of proposed hazard mitigation actions for the County and participating jurisdictions to implement. Each action includes accompanying information such as the department responsible for completing the action, timeline, and funding source. The MAP provides those departments or individuals responsible for implementing mitigation actions with a clear path to reduce risk and vulnerability over time. Further, the MAP provides a mechanism to monitor progress over time. Each action also considers the benefits and costs of an action, to ensure it is cost effective, which is included in the prioritization of actions.

Mitigation actions were derived from the HIRA, local planning team workshops, the public surveys, and other County plans. Changes in priorities were reflected in the selected mitigation actions by reviewing what has been completed since 2015, reviewing how changes in development have impacted hazard risk (discussed in Section 4 – HIRA for each hazard), and through the local planning team discussions and workshops. Overall, priorities have remained generally consistent since the 2015 Ouray County Hazard Mitigation Plan. Top hazards still remain consistent with wildfire, debris flow, and flood. However, severe winter storms and landslide/rockfall were also higher-ranked hazards during this Plan update. Additionally, a major concern reflected in this Plan update is the need for critical infrastructure redundancy as well as ensuring access in and out of the County. These priorities are reflected in the MAP.

Prioritization of Mitigation Actions

During the third planning team workshop methods to prioritize mitigation actions were discussed. It was determined that a “high, medium, low” prioritization scheme would work best for the County. Actions were ranked high, medium, or low based on the following criteria:

1. Overall hazard ranking
2. Social considerations (life safety)
3. Protecting critical facilities / infrastructure
4. Positive Cost-benefit ratio
5. Economic impacts
6. Availability of local funds is always a priority (but still include projects that don’t have funding currently)
7. Alignment with other local objectives / public survey results

Implementation of Mitigation Actions

The MAP includes several measures to ensure actions are implemented. The Ouray County Emergency Management Department will serve as the coordinating agency, however, each action is tied to a responsible agency or organization who will be responsible for leading the completion of the mitigation action. By assigning responsibility, it increases accountability and the likelihood of action.

In addition to the assignment of a local lead department or agency, an implementation time period or a specific implementation date has been assigned in order to assess whether actions are being implemented in a timely fashion. Further, the County will seek outside funding sources to implement mitigation projects in both the pre-disaster and post-disaster environments. When known, potential

funding sources have been identified for proposed actions listed in the Mitigation Action Plan. Further detail on implementation can be found in the Maintenance and Implementation section of this Plan.

5.2.5. 2019 Ouray County Mitigation Actions

This section describes the 2019 Ouray County mitigation actions and their MAPs. Each action includes a number of items, as shown below. This is followed by the 2019 mitigation actions, beginning in Table 5-6.

- Action ID
- Jurisdiction
- Project description
- Lead (bold)/partner agencies
- Priority
- Goal(s) addressed
- Hazard(s)
- Completion date
- Cost
- Potential funding sources
- Status

Table 5-6 Ouray County 2019 Mitigation Actions

Action ID	Jurisdiction	Action	Lead (bold) / Partner Agencies	Priority	Goal(s) Addressed	Hazard(s)	Completion Date	Cost	Potential Funding Sources	Status
2019.62	LHMFPD	Work with DCWC and Tri County Water to ensure emergency water system tie in is completed.	**DCWC** /Tri County Water	H	1,2,3	Multiple	2022	$550,000	Grants and customer billing	New
2019.63	LHMFPD	Complete re-assessment of parcel level wildfire risk ratings	**LHMFPD** / WRWC	H	1,2,3	Wildfires	2024	$7,000	50/50 match with WRWC and district funds	New
2019.66	LHMFPD	Develop and implement a program to enable more firefighters to deploy on Federal fire assignments to provide a greater depth of experience. Assignments include regional RX burn assignments.	**LHMFPD**	H	1,2,3	Wildfires	2021	Volunteer and employee hours	Firefighters reimbursed by Feds. Increased funding received for vehicle deployments.	New
2019.107	LHMFPD	Work with WRWC and Federal and State cooperators to develop a plan to prioritize and begin accomplishing landscape scale mitigation projects set forth in CWPP.	**LHMFPD** / WRWC / DFPC / BLM	H	1,2,3	Wildfires	2023	variable based on scheduled projects	WRWC 75/25 match and landowner funds	New

Action ID	Jurisdiction	Action	Lead (bold) / Partner Agencies	Priority	Goal(s) Addressed	Hazard(s)	Completion Date	Cost	Potential Funding Sources	Status
2019.64	LHMFPD	Complete review and update of Firewise Plan to ensure renewal of Firewise Status	**LHMFPD** / WRWC	L	1,2,3	Wildfires	2021	Volunteer and employee hours		New
2019.65	LHMFPD	Complete review and update of Firewise Community evaluation to ensure Firewise Status renewal	**LHMFPD** / WRWC	L	1,2,3	Wildfires	2023	Volunteer and employee hours		New
2019.67	LHMFPD	Provide a robust public education system to provide information on fire danger, mitigation actions and assistance available to homeowners. Use social media, website, HOA meetings, public events and local news sources as channels.	**LHMFPD** / WRWC / BLM / USFS / Ouray County EM / Sheriff	M	1,2,3	Wildfires	2020	Volunteer and employee hours		New
2019.68	LHMFPD	Integrate HMP goals into 5 year plan to ensure funding is budgeted and action items receive proper attention.	**LHMFPD**	M	1,2,3	Wildfires	2020	Volunteer and employee hours		New
2019.69	Ouray County	Work with Ouray County Land Use and Planning Commission to develop wildfire regulations for BOCC considerations	**Ouray County**	H	1,2	Wildfires	2020	Employee Hours	County	New
2019.70	Ouray County	Rock Fall Scaling on County Road 17 and other county Roads	**Ouray County**	H	1,2	Landslide / Rockslide	2020	Employee Hours and	DOLA and US Army Corps	New

Action ID	Jurisdiction	Action	Lead (bold) / Partner Agencies	Priority	Goal(s) Addressed	Hazard(s)	Completion Date	Cost	Potential Funding Sources	Status
								Contract labor		
2019.71	Ouray County	Collaborate with CDOT on Federal Land Access Grant for safety improvements on US 550 and CR 361. Including improved parking for recreation and hard surfacing a portion of 361.	**Ouray County**	H	1,2	Multiple	2022	Employee Hours and Contract labor	FLAP Grant	New
2019.72	Ouray County	Fiber build of broadband to better serve responders, community, and the region	**Ouray County**	M	1,2,3	Multiple	2021	Employee Hours and Contract labor	Universal Service Assoc. Co. (USAC)	New
2019.73	Ouray County	Hardening the Ouray County Courthouse and other county Facilities from imminent threat.	**Ouray County**	H	1,2,3	Multiple	2020	Employee Hours and Contract labor	DOLA, Courthouse Security, and underfunded courthouse grants	New
2019.74	Ouray County	Water Storage Study for the whole of Ouray County	**Ouray County**	H	1,2,3	Multiple	2020	Employee Hours and Contract labor	CWCB Board Grant	New
2019.75	City of Ouray	Hardening the City Facilities from Imminent threat including Water Tanks, Source water protection area (Weehawken	**City of Ouray**	H	1,3	Multiple	2020	Employee Hours and Contract labor		New

Action ID	Jurisdiction	Action	Lead (bold) / Partner Agencies	Priority	Goal(s) Addressed	Hazard(s)	Completion Date	Cost	Potential Funding Sources	Status
		Spring source), and Sewage Plant.								
2019.76	City of Ouray	Fiber build of broadband to better serve responders and the community	**City of Ouray**	M	1,2,3	Multiple	2021	Employee Hours and Contract labor		New
2019.77	City of Ouray	Complete phase 3 of the Geothermal Line that supplies the Ouray hot Springs Pool and Hydro electric for Public Works Shop	**City of Ouray**	H	1,2,3	Multiple	2021	Employee Hours and Contract labor	City of Ouray	New
2019.78	City of Ouray	Work with Ouray Ice Park Inc. to build a redundant water line from the Wehawken Springs for Ouray water Supply	**City of Ouray**	H	1,2,3	Multiple	2023	Employee Hours and Contract labor	Fundraising, CWCB grant	New
2019.79	City of Ouray	Develop wildfire protection regulations	**City of Ouray**	H	1,2,3	Wildfires	2021	Employee Hours and Contract labor	City of Ouray	New
2019.80	City of Ouray	Develop Flood Protection building codes	**City of Ouray**	H	1,2	Flooding	2021	Employee Hours and Contract labor	City of Ouray	New
2019.81	City of Ouray	Complete the City Of Ouray Community Plan Update (last updated 2004)	**City of Ouray**	H	2	Multiple	2020	Employee Hours and Contract labor	City of Ouray	New

Action ID	Jurisdiction	Action	Lead (bold) / Partner Agencies	Priority	Goal(s) Addressed	Hazard(s)	Completion Date	Cost	Potential Funding Sources	Status
2019.82	City of Ouray	Revisit building regulations in identified flood hazard areas including flumes	**City of Ouray**	H	1,2	Flooding	2022	Employee Hours and Contract labor	City of Ouray	New
2019.83	City of Ouray	Rock fall hazard study to be conducted in 2022	**City of Ouray**	H	1,2,3	Flooding	2022	Employee Hours and Contract labor	City of Ouray	New
2019.84	Town of Ridgway	Prioritize the conservation and preservation of community valued natural resources such as environmentally sensitive areas, view and wildlife corridors, riparian areas and wetlands, river corridor, natural filtration and storm water drainage areas.	**Town of Ridgway**	L	1,2,3	Multiple	On-going	Employee hours + $ when project is determined		New
2019.85	Town of Ridgway	Work with Ouray County to regulate uses or activities allowed within or adjacent to the Town's Source Water Protection Area to reduce the risk of pollution or other contaminants entering the Town's water supply and ensure the Town has access as needed.	**Town of Ridgway**/ Ouray County Land Use	M	3	Multiple	On-going	Employee hours		New
2019.86	Town of Ridgway	Research and explore water conservation opportunities in follow up to the 2018 adoption	**Town of Ridgway**	M	3	Drought	2025	Employee hours		New

Action ID	Jurisdiction	Action	Lead (bold) / Partner Agencies	Priority	Goal(s) Addressed	Hazard(s)	Completion Date	Cost	Potential Funding Sources	Status
		of the Water Management and Conservation Plan and water rate increases. Codify regulations as appropriate.								
2019.87	Town of Ridgway	Share radon mitigation information with the building community by disseminating information via training and electronic media.	**Town of Ridgway**	H	1,2	Hazardous Materials	2021	Employee hours		New
2019.88	Town of Ridgway	Explore opportunities for mental health support and outreach.	**Town of Ridgway** / Ouray County Public Health	H	1	Mass Casualty Event	On-going	Employee hours + $ when project is determined		New
2019.89	Town of Ridgway	Develop and maintain a local emergency response and management plan, as well as a plan for the continuation of government operations during and following an emergency event.	**Town of Ridgway**	H	1,2,3	Multiple	On-going	Employee hours		New
2019.90	Town of Ridgway	Review and update the Town code's regulations regarding adequate water supply for new development.	**Town of Ridgway**	M	3	Drought	2022	$10,000	DOLA	New
2019.91	Town of Ridgway	Define "steep slopes" in the development code, and develop	**Town of Ridgway**	L	1,2,3	Landslide /Rockslide	2025	$5,000	DOLA	New

Action ID	Jurisdiction	Action	Lead (bold) / Partner Agencies	Priority	Goal(s) Addressed	Hazard(s)	Completion Date	Cost	Potential Funding Sources	Status
		regulations that detail the conditions and performance standards under which such development may be evaluated.								
2019.92	Town of Ridgway	Identify and secure a secondary interconnection for any interruption in the Town's water supply.	**Town of Ridgway**	H	3	Multiple	2021	$58,000	DOLA	New
2019.93	Town of Ridgway	Maintain a contingency plan in case of an emergency that threatens or disrupts the community water supply.	**Town of Ridgway and Tri-County Water**	M	3	Multiple	On-going	Employee hours		New
2019.94	Town of Ridgway	Continue to evaluate Town infrastructure and critical facilities to determine what values are at risk from hazards. Identify opportunities to introduce redundancies into infrastructure systems.	**Town of Ridgway**	M	3	Multiple	On-going	$20,000		New
2019.95	Town of Ridgway	Work with FEMA and Ouray County to maintain up-to-date maps of the 100-year floodplain and floodway along all waterways flowing through Ridgway.	**Town of Ridgway and FEMA**	M	1,2,3	Flooding	2022		FEMA	New
2019.96	Town of Ridgway	Rollans Park - Restoration project, in-stream improvements	**Town of Ridgway**	L	2,3	Flooding	2025	$400,000	FHC, GOCO, DOLA	New

Action ID	Jurisdiction	Action	Lead (bold) / Partner Agencies	Priority	Goal(s) Addressed	Hazard(s)	Completion Date	Cost	Potential Funding Sources	Status
2019.97	Town of Ridgway	Town-wide storm water drainage improvements	**Town of Ridgway**	H	1,2,3	Flooding	2025	$1,500,000	CWRPDA, CDPHE, DOLA	New
2019.98	Town of Ridgway	Back up generator for water plant	**Town of Ridgway**	H	1,2,3	Multiple	2021	$75,000	FEMA	New
2019.99	Town of Ridgway	Back up compressor for water plant	**Town of Ridgway**	H	1,2,3	Multiple	2021	$5,000		New
2019.100	Town of Ridgway	Water plan surge and lightning protection	**Town of Ridgway**	H	3	Lightning	2021	$7,500		New
2019.101	Town of Ridgway	Water conservation plan / Basin Protection Implementation	**Town of Ridgway and watershed**	M	1,2,3	Multiple	2025	$25,000	CWCB, River District	New
2019.102	Town of Ridgway	Fencing for water treatment plant	**Town of Ridgway**	M	3	Imminent Threat	2025	$30,000		New
2019.103	Town of Ridgway	2nd river crossing for water system	**Town of Ridgway**	M	1,2,3	Multiple	2025	$100,000	CDPHE, DOLA, River District	New
2019.104	Town of Ridgway	Increase water storage east of the Uncompahgre River	**Town of Ridgway**	M	1,2,3	Multiple	2025	$750,000	CDPHE, DOLA, River District	New
2019.105	Town of Ridgway	Sewer emergency generator	**Town of Ridgway**	M	3	Multiple	2025	$80,000		New
2019.106	Town of Ridgway	Portable generator for chlorine metering pump at water plant	**Town of Ridgway**	H	1,2,3	Multiple	2021	$5,000		New

Action ID	Jurisdiction	Action	Lead (bold) / Partner Agencies	Priority	Goal(s) Addressed	Hazard(s)	Completion Date	Cost	Potential Funding Sources	Status
2019.107	City of Ouray	Annual removal of rock and debris in the Portland catchment basin to prevent flooding	**City of Ouray**	M	1,2,3	Flooding	Annual	Employee Hours		New – being performed annually

6. Plan Maintenance, Revision, and Integration

6.1. Introduction

This section of the Plan describes the ongoing methods to keep the Plan current. It describes how the Plan will be reviewed annually, how the public will be kept involved, and how the Plan will be integrated into other planning mechanisms. The plan maintenance process details the formal process that will ensure the Ouray County Hazard Mitigation Plan remains an active and relevant document. The procedures include a schedule for monitoring and evaluating the Plan annually, as well as revising it every five years. This section also describes how the County will integrate public participation throughout the plan maintenance process. It was determined during the mitigation strategy workshops the County will utilize the Multi-Agency Coordination (MAC) Group for monitoring and updating this Plan. The MAC Group is chaired by the County emergency manager and consists of representatives for all jurisdictions that work in or assist Ouray County.

6.2. Plan Monitoring, Evaluation and Enhancement

The Ouray County Emergency Management Department is tasked with the overall responsibility of monitoring this Plan for Ouray County. The Plan will be periodically reviewed to ensure it reflects current vulnerabilities and priorities of the County and participating jurisdictions. Reviewing and monitoring the Plan also gives plan developers an opportunity to report progress made and provides the public with an opportunity to see progress made.

The planning team will continue to meet regularly and communicate via email. As part of the monitoring, evaluation, and enhancement process, a meeting will be held at least once annually during a MAC meeting, which are held quarterly. Additionally, it was discussed that an annual report to BOCC and city/town councils on what progress has been made over the year would be an ideal opportunity to discuss mitigation actions and any relevant progress or updates.

6.2.1. Annual Meeting and Review

The Plan will be reviewed at one of the quarterly Ouray County MAC meetings. The planning team and responsible agencies will be invited via email. Led by the Ouray County Emergency Management Department, the meeting will be used to determine the effectiveness of programs and reflect changes in programs that may affect mitigation priorities. As part of the evaluation process, responsible agencies will be invited to share an update on their project or projects at the meeting.

In addition, the following questions will be asked:

- Have any potential hazards developed that were not addressed in the Plan?
- Have any natural disasters occurred that were not addressed in the Plan?
- Has any unanticipated development occurred that is vulnerable to hazards?
- Are there any additional mitigation ideas that need to be incorporated?
- Have projects been initiated and or completed?
- What are the barriers to completing projects identified in the Plan?
- Are the Plan goals still reflective of community priorities to reduce hazard vulnerabilities?

The purpose of these questions is to determine if the goals are still current and what progress has been made on the Plan. Agencies responsible for mitigation actions, as well as all participating jurisdictions, will be asked to submit any progress on implementing actions. An update will be required at the annual meeting and can be submitted at any time to the Ouray County Emergency Management Department. The discussion will be documented so that when the Plan is revised, the findings of the monitoring can be incorporated in the next five-year update.

6.2.2. Five Year Update of the Plan

Any of the following three situations could trigger a review and update of the Plan:

- Occurrence of a major natural disaster in or near the County
- Passage of five years
- Change in state or federal regulations which must meet compliance.

The Plan will be thoroughly reviewed and updated at the five-year mark unless it has undergone a more recent revision (with associated FEMA approval). At the five-year mark, several questions will be asked:

- Do the goals address current and expected conditions?
- Has the nature or magnitude of risks changed?
- What additional hazard events have occurred?
- Have the capabilities changed including social, technical, administrative, political, legal, economic, and environmental?
- Are there any coordination issues that should be addressed?
- What progress has been made to complete mitigation actions?
- How has the public remained involved over the last five years?
- Did the identified departments, individuals and/or other partners participate in the Plan implementation process as assigned?

6.2.3. Five Year Revision Procedures

Should a major disaster occur in Ouray County, the planning team shall meet following the disaster to determine whether a review of the hazard mitigation plan is warranted. In the absence of a major disaster, the five-year review will take place during the six-month period preceding the FEMA approval anniversary date (or sooner). Following proper notice in the papers of record, the Ouray County Emergency Manager will convene the steering committee for Ouray County, and with their assistance (and/or the assistance of a contractor as determined necessary), carry out the following tasks:

- Review the Hazard Mitigation Plan Review Tool form completed by the CO DHSEM and FEMA during their most recent review of the Plan.
- Examine and revise the risk assessment data as needed to ensure it is current.
- Update the mitigation strategies to incorporate completion of actions and add any needed strategies or projects.
- Identify problems that may be hindering or affecting implementation of the Plan and recommend actions for resolving those problems.
- Recommend any necessary revisions to the hazard mitigation plan.
- Comply with all applicable regulations and statutes.

Forty-five days prior (or earlier) to the five-year anniversary date, a final draft of the revised plan will be submitted to DHSEM, and then to FEMA. Once FEMA approval has been granted, the Plan will be adopted locally.

6.3. Plan Adoption

Plan adoption will occur following an "approved pending adoption" status by FEMA. Once this status has been received, the counties and participating jurisdictions need to adopt the Plan. Adoption will occur via a resolution and will be passed by county commissions. A copy of the current resolution can be found in Appendix D. The Ouray County Emergency Management Department will be the primary authority in maintaining and coordinating the Plan adoption by the jurisdiction.

6.4. Continued Public Involvement

The public is encouraged to be involved in the continual updates of the hazard mitigation plan. The previous methods of public involvement were reviewed to ensure they were successful in engaging the public. It was determined that the existing methods were working, largely utilizing the County's existing social media pages such as Facebook, but could be expanded upon utilizing additional County programs. Additionally, through the 2019 Plan update, the County implemented a robust public engagement effort and the methods utilized can continue to be used for ongoing public involvement. The County Emergency Management Department will be the lead agency to ensure the public remains involved over the next five years via following methods:

- Including hazard mitigation education at the annual County Safety Fair. Approximately 25 other agencies/organizations participate in the fair.
- Loghill Mesa FPD – utilizing social media, future meetings and activities, and the County website.
- Ouray FPD - utilizing social media
- Public Information Officers will be utilized to communicate hazard mitigation education to the public.
- City of Ouray will incorporate hazard mitigation education into their established community policing programs, which are held monthly.
- All jurisdictions will continue to utilize social media, print media, and community websites to involve the public on hazard mitigation efforts.

6.5. Integration of Hazard Mitigation into other Planning Mechanisms

The participating jurisdictions will integrate this Hazard Mitigation Plan into relevant government decision-making processes or mechanisms, where feasible. This includes integrating the requirements of the Hazard Mitigation Plan into other local planning documents, processes, or mechanisms, such as comprehensive or capital improvement plans, when appropriate. The members of the planning team, led by the Ouray County Emergency Management Department, will remain charged with ensuring that the goals and actions of new and updated local planning documents for their agencies or departments are consistent and do not conflict with the goals and actions of the Hazard Mitigation Plan. Further, they will ensure that any actions will not contribute to increased hazard vulnerability in the County.

During the planning team mitigation strategy workshop, integration methods were discussed for each jurisdiction, as described below.

- There is a County Planning Commission public hearing for land use code/wildfire mitigation regulations taking place at the end of 2019. Discussions of hazard mitigation will take place to be incorporated into updated regulations.
- The City of Ouray is beginning an update of their community plan. This Hazard Mitigation Plan will be incorporated into the community plan.
- Loghill Mesa FPD has a five-year plan and will integrate mitigation actions into that plan
- The Town of Ridgway recently adopted their updated Master Plan. This Hazard Mitigation Plan will be integrated into the Master Plan maintenance.

The Ouray County Emergency Manager will continue to coordinate and support this effort. The County Emergency Manager works closely with planning commissioners, ensuring hazard mitigation is considered during applicable decisions. Further, most plans originate or filter through the Emergency Management office. Much of the information in this Plan, such as the risk assessment, will be incorporated into other emergency management planning efforts, such as the EOP. Many different agencies will be responsible for following the Ouray County Hazard Mitigation Plan. The County Commissioners and participating jurisdictions will have the authority to promote policies regarding hazards. The County LEPC will also consider the hazard mitigation plan in its efforts. It can refer to the Plan for guidance on past occurrences and future impacts. Agencies can also utilize the plan to seek out grants and projects that fulfill the mitigation requirements outlined in the Plan. The Ouray County Emergency Manager will include the necessary information in future plans and coordinate this operation through other agencies as plans are revised and reviewed.

APPENDIXES

7. Appendix A: Meeting Sign-in Sheets and Agendas

Figure 7-1 Hazard Mitigation Planning Steering Committee Kickoff Webinar

CDR MAGUIRE
EMERGENCY MANAGEMENT

Ouray County – Hazard Mitigation Plan
Kick-Off Webinar (Steering Committee)

When: 2:00-3:00 MST – April 9, 2019

Where: Webinar (https://cdrmaguire.zoom.us/j/536081696) – Conference Call (US: +1 669 900 6833 or +1 408 638 0968 \ Meeting ID: 536 081 696)

Invitees: Ouray Fire Department <ouray.fire@gmail.com>; Trevor Latta <trevorlatta@hotmail.com>; Susan Lacy <slacy@ridgway.k12.co.us>; Justin Perry <perryj@cityofouray.com>; City Administrator <administrator@cityofouray.com>; Jennifer Coates <jcoates@town.ridgway.co.us>; Tammy Stroup <tstroup@town.ridgway.co.us>; Lance Fitzgerald <lfitzgerald@ouraycountyco.gov>; John Rogers <jsr5@hotmail.com>; Tom Austin <toma67@aol.com>; Connie Hunt <chunt@ouraycountyco.gov>; Tad Rowan <tad.rowan@montrosefire.org>; Chris Miller <rvfdchief@hotmail.com>; Kristy Orvis <coloradosnowflakes@hotmail.com>; spankow@ouray.k12.co.us; Glenn Boyd (Ouray EM); Mike Garner and Lisa Clay (CDR Maguire)

Agenda:

1. Welcome & Introductions
2. Project Scope & Schedule
3. Roles & Responsibilities
4. Local Planning Team
5. Current HMP
6. Hazards to Profile
7. Recent Hazard Events
8. Recent Community Planning
9. Best Available Data
10. Local Planning Team
11. Public Involvement Strategy
12. Questions / Concerns / Other Topics

Post Meeting Action Items for Steering Committee:

A. Best Available Data / Recent Community Plans
B. Local Planning Team Participants
C. Public Involvement Input

Questions, Comments, Concerns? – Contact project manager Mike Garner at any point throughout the planning process: 303.710.9498 | Michael.Garner@CDRMaguire.com

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Figure 7-2 Ouray County Local Planning Team Kickoff Workshop Agenda

CDR MAGUIRE
EMERGENCY MANAGEMENT

Ouray County – Hazard Mitigation Plan

Kick-Off Workshop (Local Planning Committee)

When: 9:00-11:00 MST – June 13, 2019

Where: 111 Mal Road, Ridgway (Ouray County EOC) | Webinar (https://cdrmaguire.zoom.us/j/863697829) – Conference Call (US: +1 669 900 6833 or +1 408 638 0968 \ Meeting ID: 863 697 829)

Invitees: See sign-in sheet, meeting appointment

Agenda:

1. Welcome & Introductions
2. Project Scope & Schedule
3. Roles & Responsibilities
4. Local Planning Team
5. Current HMP
6. Hazards to Profile
7. Recent Hazard Events
8. Recent Community Planning
9. Mitigation Capabilities
10. Best Available Data
11. Critical Facilities
12. Public Involvement Strategy
13. Questions / Concerns / Other Topics

Post Meeting Action Items for Steering Committee:

A. Best Available Data / Recent Community Plans
B. Local Planning Team Participants
C. Mitigation Capabilities Input
D. Public Involvement Input

Questions, Comments, Concerns? – Contact project manager Mike Garner at any point throughout the planning process: 303.710.9498 | Michael.Garner@CDRMaguire.com

CDR MAGUIRE
EMERGENCY MANAGEMENT

Local Mitigation Capabilities Tracker for Local Plan Updates

Planning & Regulatory	Yes/No
Building Codes	
Building Codes Year	
BCEGS Rating	
Capital Improvements Program (CIP) or Plan	
Community Rating System (CRS)	
Community Wildfire Protection Plan (CWPP)	
Comprehensive, Master, or General Plan	
Economic Development Plan	
Elevation Certificates	
Erosion/Sediment Control Program	
Floodplain Management Plan or Ordinance	
Flood Insurance Study	
Growth Management Ordinance	
Non-Flood Hazard-Specific Ordinance or Plan (e.g.- Steep Slope, Wildfire, Snow Load)	
NFIP	
Site Plan Review Requirements	
Stormwater Program, Plan, or Ordinance	
Zoning Ordinance	
Other	

Administrative & Technical	Yes/No
Emergency Manager	
Floodplain Administrator	
Community Planning:	
- Planner/Engineer (Land Development)	
- Planner/Engineer/Scientist (Natual Hazards)	
- Engineer/Professional (Construction)	
- Resiliency Planner	
- Transportation Planner	
Full-Time Building Official	
GIS Specialist and Capability	
Grant Manager, Writer, or Specialist	
Warning Systems/Services:	
- General	
- Flood	
- Wildfire	
- Tornado	
- Geological Hazards	
Other	

Financial	Yes/No
Has community used any of the following to fund mitigation activities:	
- Levy for Specific Purposes with Voter Approval	
- Utilities Fees	
- System Development / Impact Development Fee	
- General Obligation Bonds to Incur Debt	
- Special Tax Bonds to Incur Debt	
- Withheld Spending in Hazard-Prone Areas	
- Stormwater Service Fees	
- Capital Improvement Project Funding	
- Community Development Block Grants	
- Other	

Education & Outreach	Yes/No
Local Citizen Groups That Communicate Hazard Risks	
Firewise	
StormReady	
Other	

Figure 7-3 Ouray County Local Planning Team Kickoff Workshop Sign-in Sheets

Ouray County – Hazard Mitigation Plan
Workshop #1 (Local Planning Commitee)
June 13, 2019

Name	Title	Organization	Email	Sign In	In-Kind (1-way - drive time / miles travelled [if not Federal vehicle]?)
Ben Tisdel	BOCC	Ouray County	btisdel@ouraycountyco.gov	[signature]	—
Chase Jones	Public Work	Town of Ridgway	cjones@town.ridgway.co.us		
Chris Asborn		USFS - Montrose Interagency Unit	casborn@fdm.gov		
Chris Hawkins	Comminty Development	City of Ouray	development@cityofouray.com		
Chris Miller	Fire Chief	Ridgway FPD OURAY FIRE	rifdchief@hotmail.com	Chris MILL	
Connie Hunt	County Admin / CFO	Ouray County	chunt@ouraycountyco.gov	C. Hunt	
Courtney Haynes	Wildfire Mitigation Specialist	West Region Wildfire Council	[illegible] Courtney.Haynes@COWildfire.org		30
Craig Kaminsky	Training officer/orginizer	Ouray FPD	ouray.fire@gmail.com		
Don Batchelder	BOCC	Ouray County	dbatchelder@ouraycountyco.gov		
Drew Petersen	Field Manager	State of Colorado	drew.petersen@state.co.us		
Gary Ray	Acting Police Chief	City of Ouray	rayg@cityofouray.com	[signature]	
Glenn Boyd	EM	Ouray County	gboyd@ouraycountyco.gov	[signature]	10
Jamie Gomez	Director	West Region Wildfire Council	[illegible] Jamie.Gomez@COWildfire.org		30
Jeff Bockes	GIS	Ouray County	jbockes@ouraycountyco.gov		
Jennifer Coates	Town Manager	Town of Ridgway	jcoates@town.ridgway.co.us		
Jennifer Miller	PIO	City of Ouray	millerj@cityofouray.com	J Miller	10
Jodi Rist	Forester	CSFS	jodi.rist@colostate.edu		
Joe Coleman	Public Work	City of Ouray	coleman@cityofouray.com		
John Clark	Mayor	Town of Ridgway	macdoktor@gmail.com		
John Peters	BOCC	Ouray County	jpeters@ouraycountyco.gov		
John Rogers	Fire Chief	Loghill FPD	jcf5@hotmail.com		
Justin Perry	Interm City Adminastrator	City of Ouray	administrator@cityofouray.com		
Kimberly Mitchell	EMS Chief	Ouray County	kmitchell@ouraycountyco.gov		
Kristy Orvis	Assistant Chief	Ridgway FPD	coloradosnowflakes@hotmail.com		
Lance Fitzgerald	Sheriff	Ouray County	lfitzgerald@ouraycountyco.gov	[signature]	10
Luke Odom	Battalion Chief	DFPC	luke.odom@state.co.us		
Mark Thompson	Mitigation Office	State of Colorado	markw.thompson@state.co.us	[signature]	—
Melissa Drake	Finance Director	City of Ouray	Drakem@cityofouray.com		
Pam Larson	Mayor	City of Ouray	larsonp@cityofouray.com		
Pam Memcimer		Dallas Creek Water	administrator@dallascreekwater.com		

please update the email address

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Ouray County – Hazard Mitigation Plan
Workshop #1 (Local Planning Commitee)
June 13, 2019

Name	Title	Organization	Email	Sign In	In-Kind (1-way - drive time / miles travelled (if not Federal vehicle)*)
Patricia Gavelda	Mitigation Office	State of Colorado	patricia.gavelda@state.co.us		
Scott Pankow	Superintendant	Ouray K-12	spankow@ouray.k12.co.us		
Shane Schmalz	Interim Marshal	Town of Ridgway	sschmalz@town.ridgway.co.us	Shane Schmalz	
Shay Coburn	Planner	Town of Ridgway	scoburn@town.ridgway.co.us	SHAY COBURN	
Steven Calkins	Road and Bridge	Ouray County	scalkins@ouracountyco.gov	Steven Calkins	
Susan Lacy	Superintendant	Ridgway K-12	slacy@ridgway.k12.co.us		
Susie Mayfield	Assessor	Ouray County	smayfield@ouracountyco.gov	[signature]	10
Tad Rowan	Fire Chief	Montrose FPD	tad.rowan@montrosefire.org	[signature]	10
Tom Austin	Assistant Chief	Loghill FPD	tomaj67@aol.com		
Trevor Latta	Fire Chief	Ouray FPD	trevorlatta@hotmail.com		
Victoria Duman	Public Health	Ouray County	vduman@ouracountyco.gov		
MICHAEL GARNER	CONSULTANT	CDRM			
LISA CLAY	"	"			
MARY KAY WRAY	GOV OPS	AM RED CROSS	maryKay.wray@redcross.org		90 2 HR
Mandy Stallsteimer	Exec Director	WestCO	mstallsteimer@uwcde.net	[signature]	22 miles
Chris Hawkins	Community Outreach	City of Ouray	chawkins@cityofouray.com	[signature]	4
Jodi Rist	Supervisory Forester	CO State Forest Service	jodi.rist@colostate.edu	[signature]	25
GARY RAY	OURAY PD	CITY OF OURAY	RAY@CITYOFOURAY.COM	[signature]	

Ouray County – Hazard Mitigation Plan
Workshop #1 (Local Planning Commitee)
June 13, 2019

Name	Title	Organization	Email	Sign In	In Kind (1-way - drive time / miles travelled if not Federal vehicle(?)
Greg Nelson		American Red Cross	GMNelsonPE@gmail.com		

Figure 7-4 Ouray County Local Planning Team HIRA Workshop Agenda

CDR MAGUIRE
EMERGENCY MANAGEMENT

Ouray County – Hazard Mitigation Plan

Workshop #2 (Local Planning Committee)

When: 1:00-3:00 MST – August 5, 2019

Where: TBD | Webinar (https://cdrmaguire.zoom.us/j/250031023) – Conference Call (US: +1 669 900 6833 or +1 408 638 0968 \ Meeting ID: 250 031 023)

Invitees: See sign-in sheet

Agenda:

1. Welcome & Introductions
2. Hazard Mitigation Planning Review
3. Risk Assessment Summary
4. Capability Assessment Results
5. Mitigation Strategy
6. Mitigation Funding
7. Mitigation Actions / Projects
8. Public Involvement
9. Action Items

Post Meeting Action Items for the Local Planning Committee:

- Continue local discussions relating to this project
- Begin identifying new mitigation actions
- Public survey dissemination / involvement
- Review of Risk Assessment chapter

Questions, Comments, Concerns? – Contact project manager Mike Garner at any point throughout the planning process: 303.710.9498 | Michael.Garner@CDRMaguire.com

Figure 7-5 Ouray County Local Planning Team HIRA Workshop Sign-in Sheets

Ouray County – Hazard Mitigation Plan
Workshop #2 (Local Planning Commitee)
August 5, 2019

Name	Title	Organization	Email	Sign In	In-Kind (1-way - drive time / miles travelled [if not govt. vehicle]?)
Ben Tisdel	BOCC	Ouray County	btisdel@ouraycountyco.gov		
Bobbie Lucero	EM	Gunnison County	BLucero@gunnisoncounty.org		
Chase Jones	Public Work	Town of Ridgway	cjones@town.ridgway.co.us		
Chris Asborn		USFS - Montrose Interagency Unit	casbjorn@blm.gov		
Chris Hawkins	Comminty Development	City of Ouray	development@cityofouray.com		
Chris Miller	Fire Chief	Ouray Fire	chief@ridgwayfire.org		
Connie Hunt	County Admin / CFO	Ouray County	chunt@ouraycountyco.gov		
Courtney Haynes	Wildfire Mitigation Specialist	West Region Wildfire Council	courtney.haynes@cowildfire.org		
Craig Kaminsky	Training officer/orginizer	Ouray FPD	ouray.fire@gmail.com		
Don Batchelder	BOCC	Ouray County	dbatchelder@ouraycountyco.gov		
Drew Petersen	Field Manager	State of Colorado	drew.petersen@state.co.us		
Gary Ray	Acting Police Chief	City of Ouray	rayg@cityofouray.com		
Glenn Boyd	EM	Ouray County	gboyd@ouraycountyco.gov		
Greg Fisher	EM	Montrose County	gfisher@montrosecounty.net		
Greg Nelson		American Red Cross	gmnelsonpe@gmail.com		20 min drive / 12 miles
Heidi Pankow	Ouray Tourism Office	Ouray County	ocra.marketing@gmail.com		
Henry Mitchell	EM	San Miguel County	henrym@sanmiguelsheriff.org		
Jamie Gomez	Director	West Region Wildfire Council	jamie.gomez@cowildfire.org		
Jeff Bockes	GIS	Ouray County	jbockes@ouraycountyco.gov		
Jennifer Coates	Town Manager	Town of Ridgway	jcoates@town.ridgway.co.us		
Jennifer ~~Miller~~ Peterson	PIO	City of Ouray	millerj@cityofouray.com	Peterson	10
Jodi Rist	Forester	CSFS	jodi.rist@colostate.edu		
Joe Coleman	Public Work	City of Ouray	colemanj@cityofouray.com		
John Clark	Mayor	Town of Ridgway	macdoktor@gmail.com		
John Peters	BOCC	Ouray County	jpeters@ouraycountyco.gov		
John Rogers	Fire Chief	Loghill FPD	jsr5@hotmail.com		
Justin Perry	City Adminastrator	City of Ouray	administrator@cityofouray.com		20
Kat Papenbrock	Ouray Tourism Office	Ouray County	k.papenbrock@ouraycolorado.com		
Kimberly Mitchell	EMS Chief	Ouray County	kmitchell@ouraycountyco.gov	Kimberly Mitchell	2
Kirsten Copeland		State Parks	kirstin.copeland@state.co.us		

Ouray County – Hazard Mitigation Plan
Workshop #2 (Local Planning Commitee)
August 5, 2019

Name	Title	Organization	Email	Sign In	In-Kind (1-way - drive time / miles travelled [if not govt. vehicle]?)
Kris Stewart	EM	Delta County	kstewart@deltacounty.com		
Lance Fitzgerald	Sheriff	Ouray County	lfitzgerald@ouraycountyco.gov	L Fitzgerald	
Luke Odom	Battalion Chief	DFPC	luke.odom@state.co.us		
Mandy Stoll Steimer	Exec. Director	WestCO	mstollsteimer@wcrdc.net		
Mark Thompson	Mitigation Office	State of Colorado	markw.thompson@state.co.us		—
Mary Kay Wray	Government Ops	American Red Cross	marykay.wray@redcross.org		
Melissa Drake	Finance Director	City of Ouray	Drakem@cityofouray.com		
Pam Larson	Mayor	City of Ouray	larsonp@cityofouray.com		
Pam Memcimer		Dallas Creek Water	administrator@dallascreekwater.com		
Patricia Gavelda	Mitigation Office	State of Colorado	patricia.gavelda@state.co.us		
Scott Morrill	EM	Gunnison County	smorrill@gunnisoncounty.org		
Scott Pankow	Superintendant	Ouray K-12	spankow@ouray.k12.co.us		
Shane Schmalz	Interm Marshal	Town of Ridgway	sschmalz@town.ridgway.co.us		
Shay Coburn	Planner	Town of Ridgway	scoburn@town.ridgway.co.us		
Steven Calkins	Road and Bridge	Ouray County	scalkins@ouraycountyco.gov		
Susan Lacy	Superintendant	Ridgway K-12	slacy@ridgway.k12.co.us		
Susie Mayfield	Assessor	Ouray County	smayfield@ouraycountyco.gov		
Tad Rowan	Fire Chief	Montrose FPD	tad.rowan@montrosefire.org		
Thomas Warnes		Black Hills Energy	thomas.warnes@blackhillscorp.com		
Tom Austin	Assistant Chief	Loghill FPD	toma67@aol.com		7
Tom Fowlds		Bureau of Reclamation	tfowlds@usbr.gov		
Trevor Latta	Fire Chief	Ouray FPD	trevorlatta@hotmail.com		
vacant	EM	Hinsdale County			
Victoria Durnan	Public Health	Ouray County	vdurnan@ouraycountyco.gov	Victoria Durnan	20
Wiley Freeman		San Miguel Power	wiley@smpa.coop		

Figure 7-6 Ouray County Mitigation Strategy Workshop Agenda

CDR MAGUIRE
EMERGENCY MANAGEMENT

Ouray County – Hazard Mitigation Plan
Mitigation Strategy Workshop (Local Planning Committee)

When: 1:00-3:00 MDT – October 21, 2019

Where: 111 Mall Road, Ridgway, CO – Land Use Conf. Room | Webinar: https://cdrmaguire.zoom.us/j/205161943 – Conference Call (US: +1 669 900 6833 or +1 408 638 0968 or +1 646 876 9923 \ **Meeting ID: 205 161 943**)

Invitees: See meeting sign-in sheet

Agenda:

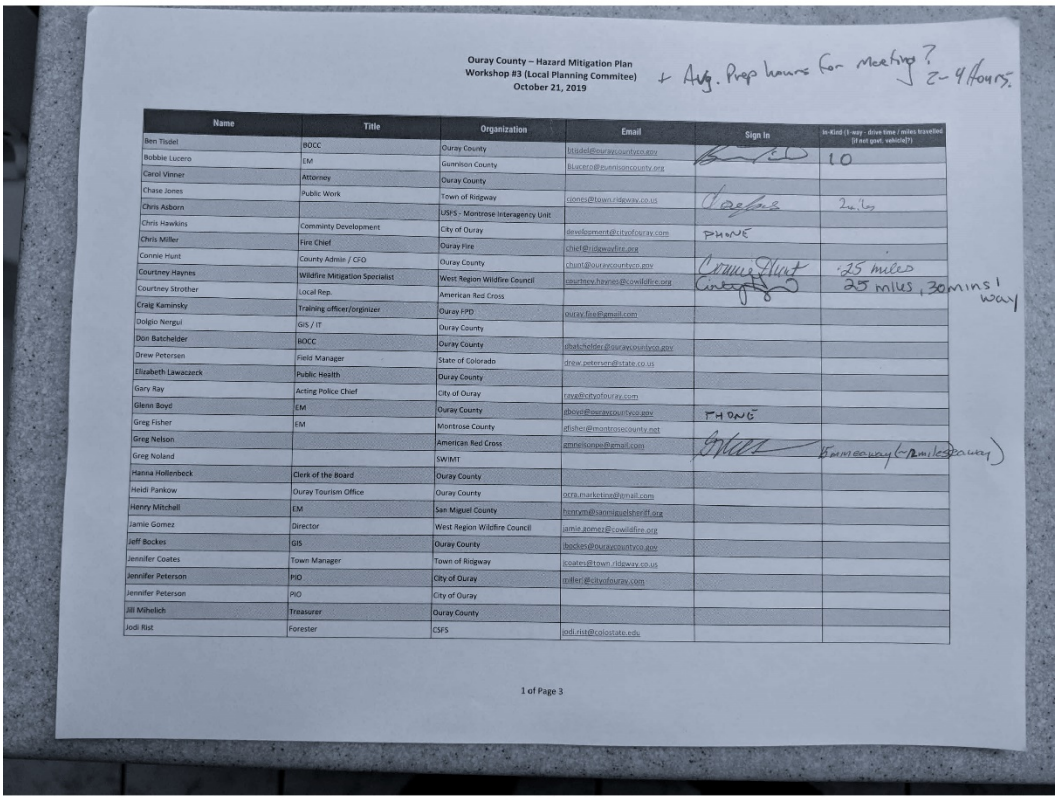
1. Welcome & Introductions
2. Project Overview
3. 2015 Mitigation Action / Project Review
4. Plan Maintenance / Implementation
5. Plan Integration
6. Mitigation Strategy – Goals & Objectives
7. Mitigation Strategy Inputs
8. Mitigation Strategy – New Actions / Projects
9. Funding Resources

Post Meeting Action Items for the Local Planning Team:

- Finalize new Mitigation Actions / Projects
- Finalize past Mitigation Actions / Projects reporting
- Public Review and Comment

Questions, Comments, Concerns? – Contact project manager Mike Garner at any point throughout the planning process: 303.710.9498 | Michael.Garner@CDRMaguire.com

Figure 7-7 Ouray County Mitigation Strategy Workshop Sign-In



Ouray County – Hazard Mitigation Plan
Workshop #3 (Local Planning Commitee)
October 21, 2019

+ Avg. Prep hours for Meeting? 2-4 Hours.

Name	Title	Organization	Email	Sign In	In-Kind (1-way - drive time / miles travelled [if not gsvt. vehicle]?)
Ben Tisdel	BOCC	Ouray County	btisdel@ouraycountyco.gov	[illegible]	10
Bobbie Lucero	EM	Gunnison County	BLucero@gunnisoncounty.org		
Carol Vinner	Attorney	Ouray County			
Chase Jones	Public Work	Town of Ridgway	cjones@town.ridgway.co.us	[illegible]	2 miles
Chris Asborn		USFS - Montrose Interagency Unit			
Chris Hawkins	Comminty Development	City of Ouray	development@cityofouray.com	PHONE	
Chris Miller	Fire Chief	Ouray Fire	chief@ridgwayfire.org		
Connie Hunt	County Admin / CFO	Ouray County	chunt@ouraycountyco.gov	[illegible]	.25 miles
Courtney Haynes	Wildfire Mitigation Specialist	West Region Wildfire Council	courtney.haynes@cowildfire.org	[illegible]	25 miles, 30 mins 1 way
Courtney Strother	Local Rep.	American Red Cross			
Craig Kaminsky	Training officer/orginizer	Ouray FPD	ouray.fire@gmail.com		
Dolgio Nergui	GIS / IT	Ouray County			
Don Batchelder	BOCC	Ouray County	dbatchelder@ouraycountyco.gov		
Drew Petersen	Field Manager	State of Colorado	drew.petersen@state.co.us		
Elizabeth Lawaczeck	Public Health	Ouray County			
Gary Ray	Acting Police Chief	City of Ouray	ray@cityofouray.com		
Glenn Boyd	EM	Ouray County	gboyd@ouraycountyco.gov	PHONE	
Greg Fisher	EM	Montrose County	gfisher@montrosecounty.net		
Greg Nelson		American Red Cross	gmnelsonpe@gmail.com	[illegible]	15 mins away (~12 miles away)
Greg Noland		SWIMT			
Hanna Hollenbeck	Clerk of the Board	Ouray County			
Heidi Pankow	Ouray Tourism Office	Ouray County	orra.marketing@gmail.com		
Henry Mitchell	EM	San Miguel County	henrym@sanmiguelsheriff.org		
Jamie Gomez	Director	West Region Wildfire Council	jamie.gomez@cowildfire.org		
Jeff Bockes	GIS	Ouray County	jbockes@ouraycountyco.gov		
Jennifer Coates	Town Manager	Town of Ridgway	jcoates@town.ridgway.co.us		
Jennifer Peterson	PIO	City of Ouray	miller@cityofouray.com		
Jennifer Peterson	PIO	City of Ouray			
Jill Mihelich	Treasurer	Ouray County			
Jodi Rist	Forester	CSFS	jodi.rist@colostate.edu		

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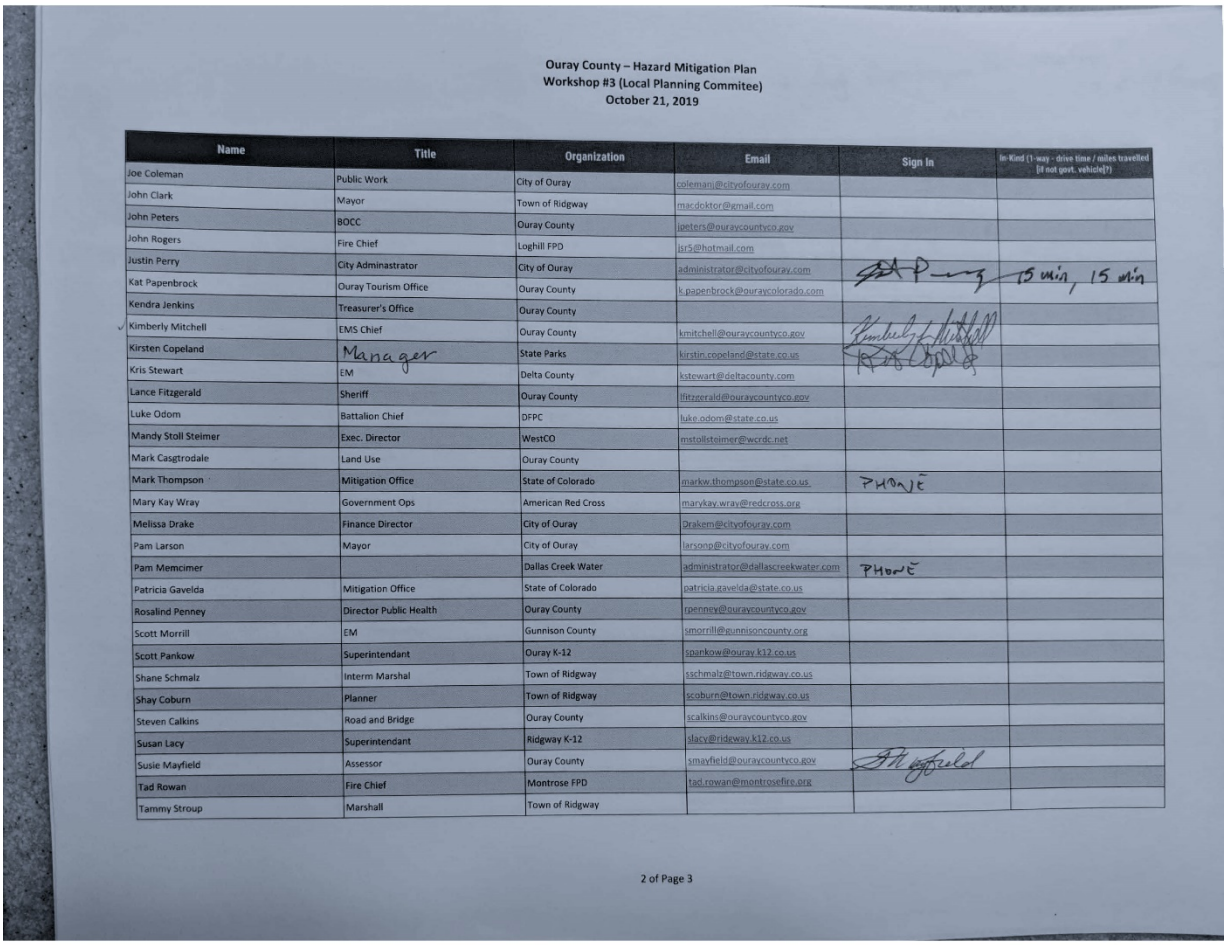

Ouray County – Hazard Mitigation Plan
Workshop #3 (Local Planning Commitee)
October 21, 2019

Name	Title	Organization	Email	Sign In	In-Kind (1-way - drive time / miles travelled [if not govt. vehicle]?)
Joe Coleman	Public Work	City of Ouray	colemanj@cityofouray.com		
John Clark	Mayor	Town of Ridgway	mac.doktor@gmail.com		
John Peters	BOCC	Ouray County	jpeters@ouraycountyco.gov		
John Rogers	Fire Chief	Loghill FPD	jsr5@hotmail.com		
Justin Perry	City Adminastrator	City of Ouray	administrator@cityofouray.com		15 min, 15 min
Kat Papenbrock	Ouray Tourism Office	Ouray County	k.papenbrock@ouraycolorado.com		
Kendra Jenkins	Treasurer's Office	Ouray County			
Kimberly Mitchell	EMS Chief	Ouray County	kmitchell@ouraycountyco.gov		
Kirsten Copeland	Manager	State Parks	kirstin.copeland@state.co.us		
Kris Stewart	EM	Delta County	kstewart@deltacounty.com		
Lance Fitzgerald	Sheriff	Ouray County	lfitzgerald@ouraycountyco.gov		
Luke Odom	Battalion Chief	DFPC	luke.odom@state.co.us		
Mandy Stoll Steimer	Exec. Director	WestCO	mstollsteimer@wcrdc.net		
Mark Casgtrodale	Land Use	Ouray County			
Mark Thompson	Mitigation Office	State of Colorado	markw.thompson@state.co.us	PHONE	
Mary Kay Wray	Government Ops	American Red Cross	marykay.wray@redcross.org		
Melissa Drake	Finance Director	City of Ouray	Drakem@cityofouray.com		
Pam Larson	Mayor	City of Ouray	larsonp@cityofouray.com		
Pam Memcimer		Dallas Creek Water	administrator@dallascreekwater.com	PHONE	
Patricia Gavelda	Mitigation Office	State of Colorado	patricia.gavelda@state.co.us		
Rosalind Penney	Director Public Health	Ouray County	rpenney@ouraycountyco.gov		
Scott Morrill	EM	Gunnison County	smorrill@gunnisoncounty.org		
Scott Pankow	Superintendant	Ouray K-12	spankow@ouray.k12.co.us		
Shane Schmalz	Interm Marshal	Town of Ridgway	sschmalz@town.ridgway.co.us		
Shay Coburn	Planner	Town of Ridgway	scoburn@town.ridgway.co.us		
Steven Calkins	Road and Bridge	Ouray County	scalkins@ouraycountyco.gov		
Susan Lacy	Superintendant	Ridgway K-12	slacy@ridgway.k12.co.us		
Susie Mayfield	Assessor	Ouray County	smayfield@ouraycountyco.gov		
Tad Rowan	Fire Chief	Montrose FPD	tad.rowan@montrosefire.org		
Tammy Stroup	Marshall	Town of Ridgway			

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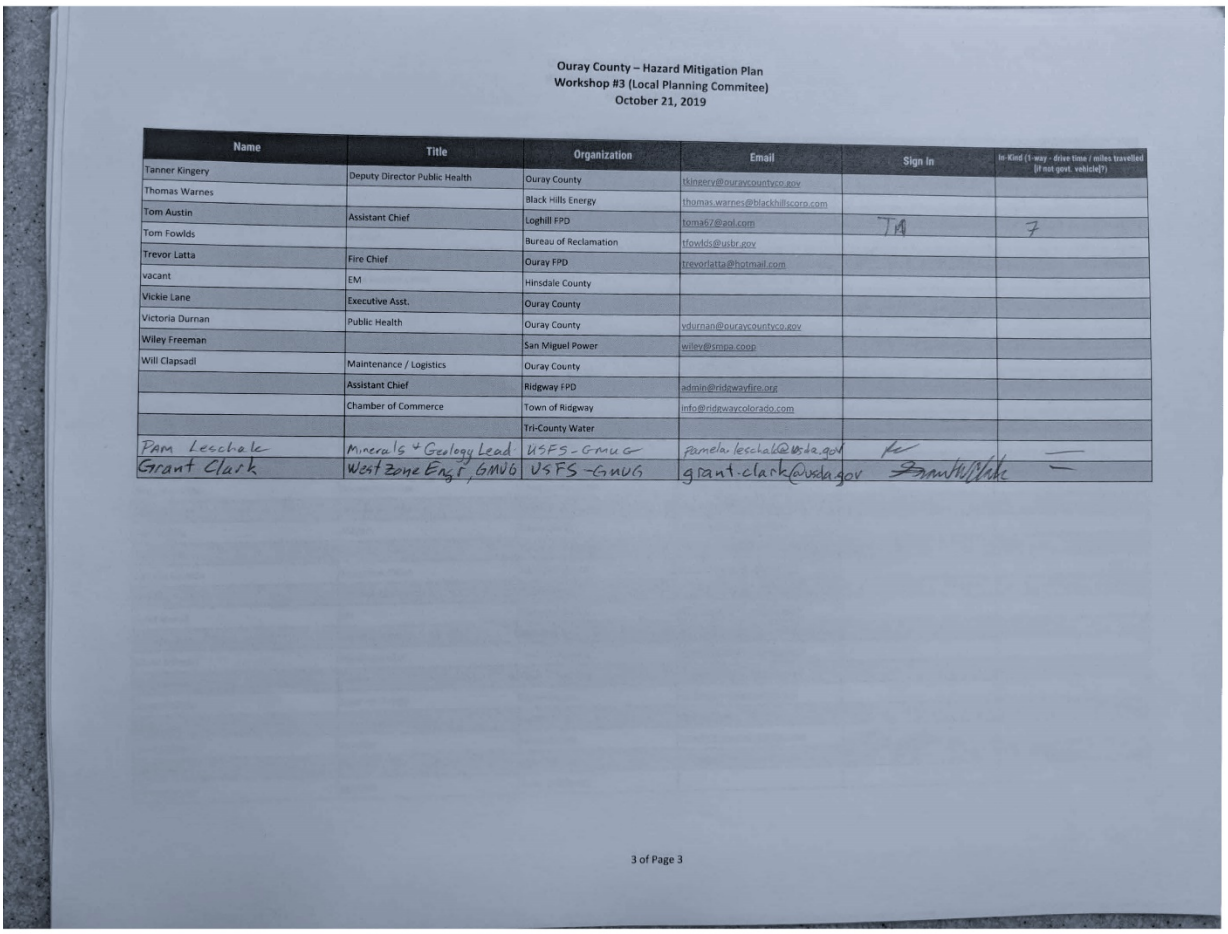

Ouray County – Hazard Mitigation Plan
Workshop #3 (Local Planning Commitee)
October 21, 2019

Name	Title	Organization	Email	Sign In	In-Kind (1-way - drive time / miles travelled (if not govt. vehicle(?))
Tanner Kingery	Deputy Director Public Health	Ouray County	tkingery@ouraycountyco.gov		
Thomas Warnes		Black Hills Energy	thomas.warnes@blackhillscorp.com		
Tom Austin	Assistant Chief	Loghill FPD	toma67@aol.com	TA	7
Tom Fowlds		Bureau of Reclamation	tfowlds@usbr.gov		
Trevor Latta	Fire Chief	Ouray FPD	trevorlatta@hotmail.com		
vacant	EM	Hinsdale County			
Vickie Lane	Executive Asst.	Ouray County			
Victoria Durnan	Public Health	Ouray County	vdurnan@ouraycountyco.gov		
Wiley Freeman		San Miguel Power	wiley@smpa.coop		
Will Clapsadl	Maintenance / Logistics	Ouray County			
	Assistant Chief	Ridgway FPD	admin@ridgwayfire.org		
	Chamber of Commerce	Town of Ridgway	info@ridgwaycolorado.com		
		Tri-County Water			
Pam Leschak	Minerals + Geology Lead	USFS-GMUG	pamela.leschak@usda.gov	PL	—
Grant Clark	West zone Engr, GMUG	USFS-GMUG	grant.clark@usda.gov	[illegible]	—

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8. Appendix B: Public Involvement

Figure 8-1 Ouray County PIP

CDR MAGUIRE
EMERGENCY MANAGEMENT

Ouray County – Hazard Mitigation Plan
Public Involvement Plan

Overview: This Public Involvement Plan (PIP) for the Ouray County Hazard Mitigation Plan (HMP) outlines the approach to engage communities and stakeholders. As the planning process and plan are guided by public and stakeholder input and the Local Planning Committee (LPC), this document provides direction for engagement activities, tools, and schedule.

This engagement plan outlines the public outreach goals, activities, venues, and County / LPC / CDR Maguire team responsibilities that seek to keep citizens informed throughout the planning process, gather feedback at critical points, and create local champions. Every effort will be made to encourage meaningful public involvement throughout the process by involving interested parties early, frequently, and effectively.

Objectives: Outreach efforts are critical to the development of a successful Mitigation Strategy, formulated as part of this HMP project. Our team will focus on creating a community-supported strategy, clearly defining the problems the HMP is trying to solve, and methodically identifying the range of potential solutions and tradeoffs so that informed decisions can be made. The process will:

- Ensure the public has an opportunity to shape the planning for the community and the goals for the future.
- Foster collaboration among local and regional agencies, organizations, and stakeholders.
- Utilize multiple mediums for outreach to engage the greatest possible range of participants and perspectives, including those who have been previously under-represented.
- Create an opportunity for smaller communities and districts to have a vision for their individual communities.
- Strengthen a foundation for ongoing dialogue, collaborative learning and planning for communities.

Tools: A broad range of techniques, events, and tools can be used to engage, inform, and educate members of the public, stakeholders, and community leaders. Options to consider will be based on each community's input and can include:

- LPT meetings
- Social media
- Website
- Surveys
- Newspaper / Radio / TV
- Utility bill insert
- Public postings
- Schools
- Community groups
- Other public events
- Project specific events
- Other tools and resources

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Stakeholder Involvement: Ultimately, each community understands how best to involve their residents, businesses, and organizations. Table 1 outlines those specific tools to be utilized as part of this HMP project. CDR | Maguire will develop any necessary content for these activities and will share with the LPC.

Table 1 – HMP Community Engagement Tools and Resources

Tool	Contact	Phone	Email / Web	Type
Example	*Public event, community, social media, online, radio, utility bill insert, flyers, mailers, newsletter, email list, etc.*			
Ouray County website	Glenn Boyd		gboyd@ouraycountyco.gov	Online
Ouray County Facebook / Twitter	Glenn Boyd		gboyd@ouraycountyco.gov	Social
Ouray County newsletter	Glenn Boyd		gboyd@ouraycountyco.gov	Online / Print
City of Ouray Facebook	Jennifer Miller		millerj@cityofouray.com	
City of Ouray Twitter	Jennifer Miller		millerj@cityofouray.com	
City of Ouray board meeting	Justin Perry		administrator@cityofouray.com	Public event
City of Ouray newsletter	Jennifer Miller		millerj@cityofouray.com	online
City of Ouray master plan update process	Justin Perry		administrator@cityofouray.com	
Ridgway public flyers	Shay Coburn		scoburn@town.ridgway.co.us	Online / Print
Ridgway town newsletter	Shay Coburn		scoburn@town.ridgway.co.us	Online
Ridgway Facebook	Shay Coburn		scoburn@town.ridgway.co.us	Social
Ridgway town email	Shay Coburn		scoburn@town.ridgway.co.us	Email list
Log Hill FPD website	Tom Austin		Toma67@aol.com	Online
Log Hill FPD Facebook	Tom Austin		Toma67@aol.com	Social
Log Hill FPD public meetings	Tom Austin		Toma67@aol.com	Public / HOA meetings
Ouray Tourism Office	Heidi Pankow		Ocra.marketing@gmail.com	

Ouray School District R-1 handouts	Scott Pankow		spankow@ouray.k12.co.us	Print
Ridgway School District R-2 handouts	Susan Lacy		slacy@ridgway.k12.co.us	Print
San Miguel Power Association	Alex Shelly	970.626.5549 x 212		Utility bill insert

Schedule: Aligning stakeholder involvement activities to the overall project schedule and major milestones will allow relevant content to be disseminated in a timely manner. Table 2 on the following page will serve as the outline for future project involvement activities. CDR Maguire will develop any necessary content for these activities and will share with the LPC.

Table 2 - Project Involvement Activities and Schedule

Activity	June	July	August	September	October	November	December	Early 2020
LPT Kick-off Workshop	x							
Initial Public Information Messaging		x						
LPT Risk Assessment (RA) Workshop			x					
RA Public Engagement Survey			x					
RA Public Education Messaging			x					
Mitigation Strategy Public Engagement Survey				x				
LPT Mitigation Strategy Workshop					x			
Draft Plan Public Information Messaging						x		
Final Plan Public Information Messaging								x
Community Engagement Tools	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**Early 2020**
Email list		x	x	x		x		x
Print		x		x				
Utility bill insert			x			x		
Online		x	x	x		x		x
Social		x	x	x		x		x
Public Event – Board Meeting (City)			x					
Public / HOA Meetings (Log Hill)		x	x					

9. Appendix C: HIRA Appendix

9.1. Avalanche

9.1.1. Previous Occurrences

Significant recent previous occurrences of avalanches prior to 2015 impacting Ouray County are described below.

February 2, 2013—Two events occurred in Cement Creek within roughly 20 minutes of each other on February 2, 2013. The first incident occurred north of Gladstone and involved a group of three skiers. While descending, the second skier triggered an avalanche. Two of the group members were caught in the slide. None of them sustained any serious injuries. On their way out, the first group came in contact with victims of the second avalanche event that occurred nearby on Clothesline Path. The second event also involved a group of 3 skiers. Two of these individuals were partially buried by an avalanche, with one sustaining a lower leg injury and a dislocated shoulder. The third person was fully buried. One of the other group members was able to partially extricate the third person. Unfortunately the third person had no pulse and was not breathing. The uninjured skier went for help and met up with the unaffiliated first group. A member of the first group went for help and was able to flag down a Silverton Mountain shuttle bus. The bus driver radioed the ski area mountain manager with the accident information. The Silverton Mountain helicopter and Durango-based Flight for Life were called to assist with evacuation of the injured skier and recovery of the deceased skier.

February 25, 2012—A group of 8 people were skiing in Big Horn Gulch south of Red Mountain Pass. The group triggered an avalanche that caught two people. One was partially buried and the other was fully buried. Both skiers were uncovered fairly quickly and neither sustained any serious injuries.

December 17, 2011—Two people were skiing on Battleship, south of Red Mountain Pass, and triggered an avalanche. One skier was partially buried with his face and one hand exposed and sustained minor injuries. The second skier was able to dig his partner out, and the two left the scene together.

April 15, 2011—A snowboarder in the Red Mountain Pass backcountry was caught and partially buried by an avalanche. He was able to dig himself free and did not sustain any injuries.

January 15, 2011—A party of four started a tour from Red Mountain Pass. A splitboarder triggered an avalanche and was partially buried. She was uninjured and able to dig herself out.

March 30, 2010—An ice climber was killed while climbing the northeast side of Baldy Peak. Details of the events leading up to the avalanche are unknown since the climber was traveling alone and no witnesses were present. Based on evidence, it is suspected that the avalanche occurred naturally.

March 21, 2010—A group of eight from an advanced backcountry skiing college class was touring Peak 12,442. The group descended Peak 12,442 one at a time until the seventh person triggered an avalanche. Two people were caught but not buried. No one sustained any injuries, and the group was able to depart without rescue.

February 13, 2005—An experienced backcountry skier and CAIC avalanche forecaster was caught and buried by a medium-sized avalanche near Red Mountain Pass. His companions were able to uncover him

in seven minutes. He was unconscious when found but did not sustain any other serious injuries and was able to return to the trailhead under his own power.

9.2. Debris Flow

9.2.1. Vulnerability Assessment

Potential Losses

The following text describes the analysis conducted during the 2015 Ouray County Hazard Mitigation Plan to estimate potential losses from debris flows. This remains the best available loss estimation due to no available debris flow GIS data for this Plan update.

During the 2013 update to this plan the debris flow hazard analysis was refined and expanded. Colorado Geological Survey geologic hazard data representing debris fan/flow hazard areas was provided by Ouray County. This was used to supplement a debris fan layer created for the previous version of this plan to fill in areas to create a more complete layer for analysis. The original layer was created using GIS software to approximate debris fan hazard zones in the City of Ouray and north of the City in the Uncompahgre Canyon. The location, size, and shape of the debris fan polygons were approximated using both a debris flow map created by the Colorado Geological Survey (Jochim, 1986) and a hillshade and contour layer created from a 10 meter resolution Digital Elevation Model of the area as reference. The Jochim mapping classifies the fans into very high, high, and moderate to low hazard zones. Due to the approximate nature of the GIS mapping, these designations were not included, but it should be noted that large portions of the Skyrocket, Bridalveil and Corbett Creek fans are designated very high hazard, with the Portland, Cascade and Oak Creek fans being mostly high hazard areas. The new CGS debris fan layer did not have debris fan names within the data; these were included for analysis purposes where the old layer's named debris fans overlapped.

GIS was used to join the assessor's building improvement valuation data into the structure location points for analysis. Only structure points with improvement values greater than zero were used in the analysis. The CGS debris fan/flow layers were overlaid in GIS on the structure point locations to identify what could be potentially exposed to a debris fan/flow event. Building improvement values for those points were then extracted from the parcel/assessor's data and summed for the unincorporated county and for the City of Ouray and the Town of Ridgway.

Results of the overlay analysis area shown in Table 9-1, sorted by jurisdiction and the structure's occupancy type. Occupancy type refers to the land use of the parcel and includes residential, commercial, agricultural, vacant land, and exempt. Contents values were estimated as a percentage of building value based on their occupancy type, using FEMA/HAZUS estimated content replacement values. This includes 100% of the structure value for agricultural, commercial, and exempt structures, 50% for residential structures, and 0% for vacant land use classifications.

Potential losses from debris flows are related to a variety of factors, including debris depth, velocity, and building type, contents, and construction. FEMA's flood benefit-cost module models flood damage based on building type and flood depth. While there are several limitations to this methodology, it does provide an estimate of potential damage, which includes the following assumptions:

- Total value was estimated as structure plus contents.

- Loss estimate damage was estimated at 25 percent of the total value based on FEMA flood depth-damage curves assuming a two-foot flood depth.
- Every improved residential structure was assumed to contain one household.
- Population was estimated based on average household size for Ouray County (2.19), multiplied by the number of improved residential structures.

Details on the losses are shown in Table 9-1 by jurisdiction and Table 9-2 by specific debris fan. An analysis of populations at risk was conducted by applying an average household size of 2.19 (2010 Census) to the count of residential structures with improvements in the debris fan/flow areas. This analysis yielded an estimated 1,110 people in the debris fan/flow areas. It should be noted that there are a large number of second-home owners in the County, thus the numbers may overestimate the residential population. To compensate for this potential overestimation the population estimates were adjusted using the 2010 U.S. Census estimate of a 34.4% vacancy rate for the County. The adjusted population of 382 is likely to be a more accurate estimate of population at risk within the debris fan/flow areas, since population of the City of Ouray could swell by more than 1,000 people per day, more than doubling its population, during these months (excluding day-trippers and campers). Information from the City of Ouray Community Plan suggests that peak population in the City could approximate 3,000 people, including all overnight visitors and day visitors. Lodging-related tax revenues that could be lost to the City if a serious flood kept tourists away could be as high as $27,000 per month.

Table 9-1 Debris Fan and Flow Vulnerability by Jurisdiction

Jurisdiction	Occupancy Type	Building Count	Building Improved Actual Value	Estimated Content Value	Total Value	Loss Estimate***	Community Pop. Estimate*	Community Vacancy Rate Adjusted Pop.**
City of Ouray	Commercial	78	$24,893,460	$24,893,460	$49,786,920	$12,446,730		
	Exempt	1	$250,710	$250,710	$501,420	$125,355		
	Residential	387	$64,481,600	$32,240,800	$96,722,400	$24,180,600	848	292
	Unknown	4	$553,360	$553,360	$1,106,720	$276,680		
	Vacant Land	1	$315,360	$0	$315,360	$78,840		
	Total	**471**	**$90,494,490**	**$57,938,330**	**$148,432,820**	**$37,108,205**	**848**	**292**
Unincorporated	Agriculture	5	$1,620,930	$1,620,930	$3,241,860	$810,465		
	Commercial	4	$851,230	$851,230	$1,702,460	$425,615		
	Residential	120	$22,585,650	$11,292,825	$33,878,475	$8,469,619	263	90
	Total	**129**	**$25,057,810**	**$13,764,985**	**$38,822,795**	**$9,705,699**	**263**	**90**
Grand Total		**600**	**$115,552,300**	**$71,703,315**	**$187,255,615**	**$46,813,904**	**1,110**	**382**

*Average household size is 2.19 based on 2010 U.S. Census

**Based on vacancy rate of 34.4% based on 2010 U.S. Census

***Loss estimate = 25%

Table 9-2 Improved Structures within Named Debris Fans

Name	Building Count	Building Improved Actual Value	Estimated Content Value	Total Value	Loss Estimate***	Community Pop. Estimate*	Community Vacancy Rate Adjusted Pop.**
Cascade and Portland Creek Fan	373	$71,110,940	$48,076,820	$119,187,760	$29,796,940	646	222
Skyrocket Creek Fan	43	$9,509,700	$5,892,295	$15,401,995	$3,850,499	83	29
Bridalveil Creek Fan	39	$6,768,860	$3,990,200	$10,759,060	$2,689,765	72	25
Oak Creek Fan	36	$7,234,060	$3,812,710	$11,046,770	$2,761,693	77	26
Corbett Creek Fan	32	$4,729,710	$2,364,855	$7,094,565	$1,773,641	70	24
Cutler Creek Fan	28	$6,929,660	$3,594,225	$10,523,885	$2,630,971	59	20
Fan 5	12	$1,573,860	$786,930	$2,360,790	$590,198	26	9
Dexter Creek Fan	2	$197,780	$98,890	$296,670	$74,168	4	2
Fan 2	-	-	-	-	-	-	-
Fan 3	-	-	-	-	-	-	-

Name	Building Count	Building Improved Actual Value	Estimated Content Value	Total Value	Loss Estimate***	Community Pop. Estimate*	Community Vacancy Rate Adjusted Pop.**
Fan 4	-	-	-	-	-	-	-
Fan 6	-	-	-	-	-	-	-
Rotary Park Fan aka Fan 1	-	-	-	-	-	-	-
Total	**565**	**$108,054,570**	**$68,616,925**	**$176,671,495**	**$44,167,874**	**1,038**	**357**

*Average household size is 2.19 based on 2010 U.S. Census

**Based on vacancy rate of 34.4% based on 2010 U.S. Census

***Loss estimate = 25%

Sources: FEMA's Flood Insurance Rate Map, Ouray County Assessor's Office

9.3. Drought

9.3.1. Previous Occurrences

Significant previous occurrences of drought prior to the 2015 Ouray County Hazard Mitigation Plan are described below.

Southwestern Colorado and Ouray County were impacted by the multi-year drought that began in 2000 and continued into 2006. The summer of 2002 was particularly severe and negatively affected local agriculture and irrigation. The wildfires that burned that summer had a negative impact on the air quality in the region.

The 2010-2013 drought impacted Ouray County as well. In 2012 Ouray County was included as a primary county in the USDA drought declaration S3260 for drought, high winds, and excessive heat. It was included as a contiguous county in May 2013 for declaration S3548 for drought, high winds, wildfire, excessive heat, and insects, and as a primary county in June 2013 for declaration S3530 for drought, high winds, wildfire, excessive heat, and insects.

During 2012, the drought threatened the City of Ouray's municipal water supply. Downstream users with more senior water rights put a call on the City to curtail its water usage. This also happened in 2002. The City was attempting to acquire and repair the Red Mountain ditch to supplement its water supply. An augmentation plan was also in development to address this issue.[77]

The 2010-2013 drought also affected Ouray County's tourism and recreation sector. Colorado's ski industry suffered economic losses due to the low snowpack and drought conditions in 2011 and 2012. Colorado Ski Country USA (CSCUSA) reported a decrease of 11.4 % in skier visits during the 2011-12 season as compared to the previous ski season. Climate data indicates that precipitation on Colorado's Western Slope for the 2011-12 winter was 43% below average, with the second warmest March on record. Statewide, the snowpack was 54% of average in April 2012.

9.4. Earthquake

9.4.1. Previous Occurrences

Previous occurrences of earthquakes in Ouray County are described below.

- **May 2, 2013**—Two small earthquakes centered east of Ridgway Reservoir occurred at 7:11am and 7:16am. The first earthquake had a magnitude of 2.9 and the second had a magnitude of 2.7. According to the Planning Team an abandoned house near Highway 24 suffered some minor damage from these events.
- **November 21, 2006**—Magnitude 3.3, near intersection of Montrose, San Miguel, and Ouray county lines, no damage
- **January 17, 1994**—Ridgway, Magnitude 2.8, Intensity unknown
- **November 22, 1989**—Ouray
- **November 19, 1989**—Ridgway
- **April 4, 1967**—Montrose

[77] http://www.watchnewspapers.com/view/full_story/18539617/article-Water-Call-Threatens-Ouray%E2%80%99s-Municipal-Supply?instance=home_news_bullets

- **March 17, 1962**—Ridgway Area, Magnitude 3.0, Intensity unknown
- **February 5, 1962**—Ridgway-Montrose, Intensity V
- **November 12, 1960**—Magnitude unknown, no damage
- **October 11, 1960**—Montrose-Ridgway, Intensity VI, M 5.5; this earthquake was one of the largest historic earthquakes to occur in Colorado. Intensity VI damage was reported in Cimarron, Lake City, Montrose, Ophir, Ouray, Placerville, Powderhorn, Ridgway, and Telluride. Plaster, chimneys, and windows were cracked in many of these locations. Perhaps the hardest hit was Montrose, where a foundation was cracked in three places.
- **November 11, 1913**—Ridgway Area, Intensity VI; this quake was strong at Montrose, Ouray, and Telluride, and that objects were thrown from shelves and rocks rolled down cliffs at Ouray. Ridgway was hardest hit in the area and that the quake centered near Portland, about 10 km south of Ridgway. Pictures fell from walls, dishes were broken, and the Ridgway school ceiling was damaged during the earthquake. Similar types of damage were reported over a wide area.
- **August 3, 1897**—Ridgway, Intensity V; felt violently in Ridgway

The following describes previous earthquake events in neighboring counties:

Montrose County:

- **March 4, 2019** – Magnitude 4.5 event approximately 7 miles southeast of the Town of Paradox. The earthquake was felt across southwest Colorado and southeast Utah, however, no damages were reported.
- **April 4, 1967**—Magnitude 4.5, Intensity unknown

San Miguel County:

- **September 13-15, 1994**—Norwood
- **February 3, 1970**—South of Norwood
- **January 1, 1894**—Telluride, Intensity IV

Hinsdale County:

- **August 3, 1955**—Lake City, Intensity VI

9.5. Flooding

9.5.1. Previous Occurrences

Table 9-3 describes previous flooding events in Ouray County from 1909 to April 2019 based on the NCEI Storm Events Database and previous hazard mitigation plans.

Table 9-3 Ouray County Previous Flooding Events, 1909-2019

Location	Date	Event Type	Damages	Description
Ouray	August 1909	Flood	$50,000	This flood on Portland and Cascade creeks impacted the City of Ouray heavily. The portion of the City adjacent to Portland Creek channel that extends east and west

Location	Date	Event Type	Damages	Description
				through town between Fourth and Fifth streets was damaged the worst. Damage was estimated at $50,000 in 1909 dollars.
Ouray County	July 1927	Flood	$40,000	This flood washed out the highway and railway between Ouray and Ridgway, and submerged the power company station a foot or more. Simultaneous flooding occurred on Canyon, Skyrocket, Cascade, Corbett, and Dexter Creeks. Damage was estimated to be $25,000 to $40,000 in 1927 dollars
Ouray	July 1929	Flood	$150,000	The most devastating flood hit Ouray as a result of three consecutive days of heavy rainfall. 50 to 60 houses in Ouray were impacted by water and debris, and the Ouray Power Company was under about three feet of water. Several bridges were washed away and roads closed. A significant flood and debris flow descended Skyrocket creek in the City of Ouray and filled the hot springs pool with mud and debris (Source: City of Ouray). The event closed the pool, which is a significant revenue generator for the City, during the busy tourist season. Damage was estimated at $150,000 in 1929 dollars.
Ouray	July 1965	Flash Flood	$20,292	A cloudburst high up Portland and Cascade Creeks washed down tons of rocks, trees, and mud from the mountainsides east of Ouray. Both creeks became plugged with debris in town, spreading water through the City and flooding several homes. The next day another storm caused more flooding on Portland Creek, affecting homes that had previously escaped damage. Damage from the storms was considerable, and Ouray received $20,292 for the repair of the flumes and disaster relief from the Federal Office of Emergency Preparedness.
Ouray	July 1973	Flash Flood		This flash flood resulted after nearly an inch of rain fell in half an hour. Heavy runoff in

Location	Date	Event Type	Damages	Description
				Cascade Creek ultimately clogged the flume near the Uncompahgre River, backing up debris 300 feet to the Main Street overpass. Vacant lots received the worst of the flooding and debris.
Ouray	Summer 1981	Flood		Extensive flooding and debris flows impacted the City of Ouray from the Cascade Creek and Portland flume. Minor property damage occurred to homes and businesses and some bridges needed to be replaced. Main Street was closed. The event occurred during the busy summer tourist season and took days to clean up and reopen some businesses (Source: City of Ouray).
Ouray	Summer 1982	Flood		Extensive flooding and debris flows impacted the City of Ouray from the Cascade Creek and Portland flume. Minor property damage occurred to homes and businesses and some bridges needed to be replaced. Main Street was closed. The event occurred during the busy summer tourist season and took days to clean up and reopen some businesses (Source: City of Ouray).
Ouray County	Spring 1984	Flood	$59,024	Western Colorado received a Presidential Disaster Declaration in 1984 after one of the most severe and extensive snowmelts in the history of Colorado that spring. Widespread flood and landslide damage on the Western Slope impacted populated areas causing damage to roads and bridges, public facilities, and agricultural lands. Damage totaled over $29 million dollars. Ouray County was one of 15 counties included in the disaster declaration. The County incurred $59,024 in Public Assistance eligible damage, and the City of Ouray $31,280. According to the 1984 Western Slope Disaster after Action Report from the Colorado Division of Disaster and Emergency Services (Now Colorado DEM) the County

Location	Date	Event Type	Damages	Description
				and City of Ouray were able to avert damage to public and private property using emergency protective measures. County road crews constructed a 1,000 foot levee to protect Highway 23 from floodwaters of the Uncompahgre River. Along Highway 23 near Coal creek a levee was constructed to protect the embankment and roadway from erosion. Heavy flood flows over the shoulder of Engineer Pass Road closed the road for an extended period of time. The City of Ouray prepared for the flood by increasing the capacity of Cascade Creek and the Uncompahgre River. Channel material was removed and deposited on the banks to provide protection to streambanks and property nearby. The City's efforts cost more than $35,000 but saved thousands more in damage to public and private property.
Ouray	Spring 1984	Flood	$31,280	Same event as above
Ouray	7/21/1998	Flash Flood	$1,000	A flash flood washed a large quantity of debris and rocks onto Camp Bird Road at six places and stranded eight vehicles loaded with tourists.
Ouray	7/26/1998	Flash Flood	$20,000	Heavy rainfall caused a wall of water filled with boulders, logs, and sediment to race down Weehawken Creek, then into Canyon Creek, and finally into Box Canyon. A parked car near the Weehawken trailhead was half buried in mud and a 20-foot section of catwalk near Box Canyon Falls was destroyed. The flash flood also cut out a new channel near Box Canyon Falls.
Ouray	7/28/1999	Flash Flood	$50,000	Flash flooding across US Highway 550 deposited a large amount of rocks and other debris on the road. A section of the road shoulder was washed down the cliffs to the river 400 feet below the road. A crib wall

Location	Date	Event Type	Damages	Description
				along the cliff which is used to reinforce the road was partially washed out.
Ridgway	7/31/1999	Flash Flood	$1,250,000	Heavy rainfall at the headwaters of Dallas Creek and Pleasant Valley Creek resulted in flash flooding all the way downstream to Ridgway Reservoir. In some areas the rushing water was nearly 20 feet higher than the normal stream flow. The flash flooding damaged or destroyed several county bridges, destroyed a foot bridge, damaged about two miles of County Road 24, flooded a few residences, damaged a number of outbuildings, and carried away or flooded several vehicles. The water also flooded part of a golf course. A family was rescued from the loft of a barn from which they were trapped by the rising flood waters. Miraculously, the only livestock fatalities were a chicken and an ostrich. The USGS stream gage on Dallas Creek was washed away and never found. The estimated peak flow of water in Dallas Creek was 2300 cubic feet per second (cfs), which is more than double the previous record flow of 1120 cfs previously set in August of 1923. Rainfall measurements in the area ranged from 1.84 inches in Ridgway to 3.77 inches in Pleasant Valley, most of which came within a two hour period.
Ouray	8/17/1999	Flash Flood	$1,000	A flash flood deposited a large amount of rock and mud across a road at the head of Engineer Trail near U.S. Highway 550. The road closure stranded a number of tourists who were traveling in Jeeps.
Ridgway	8/30/2000	Flash Flood	$5,000	A slow moving thunderstorm dropped very heavy rainfall to the northeast of Ridgway. The runoff from the heavy rainfall washed away a portion of County Road 10 and a ranchers head gate.
Ridgway	7/11/2001	Flood	$0	Slow moving thunderstorms produced heavy rain resulting in 6 to 8 inches of water

Location	Date	Event Type	Damages	Description
				running across County Road 1. The road was closed temporarily due to the flooding.
Ridgway	7/12/2001	Flood	$0	Slow moving thunderstorms caused flooding of small creeks after nearly 2 inches of rainfall.
Ouray	7/25/2002	Flash Flood	$0	Heavy rainfall resulted in a mudslide which closed U.S. Highway 550 over the San Juan Mountains for about five hours. The mud covered both lanes up to 4 feet deep along a 100 foot stretch of road.
Ouray	8/13/2003	Flash Flood	$0	Flash flood waters deposited about a foot of mud on Highway 550 over Red Mountain Pass, which closed the highway for a while.
Ouray	8/28/2003	Flash Flood	$15,000	A wall of water 2 to 3 feet deep and 200 feet wide came down the Corbett Creek drainage. The flash flood carried numerous large logs and boulders up to 4 feet in diameter. The flash flood resulted in the creek forming a new channel about a fifth of a mile away from the original creek bed which became clogged with logs and boulders. 1 to 2 feet of mud, boulders, logs, and other debris were deposited on a 200 foot stretch of County Road 17. Mud and water flowed into the basement of a residence in the Whispering Pines sub-division. The flash flood also carved out a 15 foot deep gorge along another county road. Additionally, several inches of mud and water flowed across Highway 550.
Ouray	8/10/2005	Flash Flood	$15,000	Runoff from heavy rain producing thunderstorms caused flooding around Ridgway. Highway 550 was closed for a period of time and a pedestrian bridge spanning the Uncompahgre River in Ridgway was damaged.
Ouray	8/11/2005	Flash Flood	$15,000	Heavy rain producing thunderstorms caused flash flooding in the town of Ouray. Flooding from Sky Rocket Creek resulted in water and mud 1 foot deep for a 1/2 mile stretch along Highway 550. Highway 550 was closed from

Location	Date	Event Type	Damages	Description
				the hot springs pool to Timber Ridge Campground in Ouray. The visitor center had some water in it and lots of mud was reported in some parking lots.
Ouray	7/28/2008	Flash Flood	$4,000	Heavy rain on the mountains adjacent to the southeast part of the town of Ouray produced flash flooding on Oak Creek and Canyon Creek. The wall of water was six feet deep at the Box Canyon geothermal water plant where sediment got into the water line. Sediment carried by the water line was in inch deep at the Ouray Hot Springs. The Hot Springs had to be closed around 4 PM MDT and remained closed for the rest of that day to clean out the sediment. Six feet of South Pinecrest Road was washed out, and a culvert under that road was damaged. Debris up to a foot-and-a-half deep was deposited on other roads.
Ouray	8/9/2008	Flash Flood	$80,000	A flash flood came down Corbett Creek leaving a debris fan several hundred yards long, 300 feet wide and five feet deep. A house on Whispering Pines Drive sustained extensive damage to the foundation and exterior, with the deck having been ripped off. Another house on Chipmunk Way had debris up to a half foot deep into the basement and garage, and a deposit of debris up to 2 feet deep on the deck and against the house. A family of hikers on the Dallas Trail became stranded when their parked car was washed away. Their car was a total loss. Another car was carried away from a driveway and dropped over a short cliff. A boulder the size of a small car fell onto nearby Highway 550. County Road 17 was washed out and another nearby private road was washed out in places. The flash flood resulted in Corbett Creek carving out a new channel. A local official said this was the worst flash flood he had seen in that area since 1991.

Location	Date	Event Type	Damages	Description
Ouray	7/27/2010	Flash Flood	$100,000	Heavy rainfall caused flash flooding in the area of Dexter Creek and Skyrocket Creek north of Ouray, as well as along Cascade Creek in Ouray. In some sections of Dexter Creek, the flash flood waters were nearly 20 feet deep. A section of road was washed out and the remaining buildings from the abandoned Old Maid Mine and town, built in the late 1800s, were completely obliterated with only some foundations remaining. An enormous amount of debris flowed through and collected in sections of Dexter Creek, which is the main water source for many residents in Ouray County. In particular, log jams and boulders the size of large trucks clogged a quarter-mile section of Dexter Creek, filling the creek up to 20 feet deep from the original creek bed elevation. Skyrocket Creek flowed up to a foot deep across Highway 550 as the highway culvert was filled beyond capacity. A motel on the west side of the highway experienced flooding in the parking lot and to some lower level motel rooms. Skyrocket Creek deposited about 8000 cubic yards of debris, mostly rocks and boulders, in a catch basin just above the Uncompahgre River. About 2000 cubic yards of debris filled up a catch basin near Highway 550 just before Cascade Creek dumps into the Uncompahgre River. The Uncompahgre River gage near Ridgway measured a stage jump of nearly 2 feet that evening due to the upstream inflow from the flooding creeks. Radar storm total rainfall estimates over the mountains near Ouray ranged from 1.5 to 1.75 inches, most of which fell within 60 minutes.
Red Mtn	8/2/2011	Flash Flood	$0	Flash floods deposited 1 to 2 feet of mud, rocks, and other debris onto Highway 550 on the north side of Red Mountain Pass.

Location	Date	Event Type	Damages	Description
				Highway 550 was closed until crews were able to clear the road.
Portland	8/6/2013	Flash Flood	$0	Heavy rainfall along the Canyon Creek drainage area forced water and debris a foot deep over County Road 17 near Ouray.
Ouray	8/28/2013	Flash Flood	$0	Oak Creek and Canyon Creek experienced flash floods due to heavy runoff from nearby mountains. Roads on the west side of Ouray were impassable due to the rising and fast moving water.
Campbird	7/20/2017	Flash Flood	$50,000	Heavy rainfall resulted in flash flooding and mudslides southwest of the town of Ouray. The costliest flash flood in the impacted area tore up a section of County Road 361 where new construction had just been completed. The crib wall, culverts, and other cement road structures were damaged beyond repair. Additionally, several culverts along County Road 361 became clogged by debris. Flash flooding with tons of debris deposits also occurred further down on Yankee Boy Road where 26 mudslides occurred. Additional mudslides and flooding also came down across Corkscrew Road. Radar estimated rainfall was between 0.50 to 1.00 inches at the time.
29		**29**	**$1,956,596**	

9.6. Landslide/Rockfall

9.6.1. Previous Occurrences

Detailed descriptions of recorded landslide and rockfall events in Ouray County are provided in Table 9-4 below.

Table 9-4 Ouray County Previous Landslide/Rockfall Events, 1984-2019

Date	Landslide/ Rockfall	Location	Injuries	Deaths	Damages	Description	Data Source
1984	Landslide	County Road 17				Landslides and debris covered County Road 17 in numerous places during the spring runoff that year, creating access problems for residents.	1984 Western Slope Disaster after Action Report from the Colorado Division of Disaster and Emergency Services (Now Colorado OEM)
2005	Rockfall	Camp Bird Road		1		A motorist was killed by a rockfall on Camp Bird Road in 2005	
2005	Rockfall	East Riverside Slide				A semi-truck was hit by a boulder near the East Riverside Slide	
2008	Rockfall	Camp Bird Road		1			Planning Team
2012	Rockfall	Camp Bird Road		1			Planning Team
2012	Rockfall	Ridgway	1			A person was injured by rockfall at the base of the coxcomb in Ridgway	Planning Team

Date	Landslide/ Rockfall	Location	Injuries	Deaths	Damages	Description	Data Source
unknown	Rockfall	Mile Marker 90				A rock broke the rear window of a State Patrol car parked near mile marker 90 during a rescue of a vehicle that went off the road at that location	
1/12/2014	Rockfall	Red Mountain Pass			$1,000,000	A massive rockslide that began on January 12, 2014 closed Highway 550 at Red Mountain Pass. Rocks continued to fall for several days after the slide first began. Rocks were piled up eight feet deep in one spot on Highway 550, and a power line was severed. The event was believed to be caused by a freeze-thaw pattern, rare for that time of year. The pass was closed for roughly one month while CDOT crews worked to repair the damages and mitigate future rockslides in that area. Local businesses in Ouray County claimed economic losses of up to 60% while the pass was closed, and traffic was forced to take a 201-mile detour. Colorado Governor John Hickenlooper signed an executive order on March 3, 2014 declaring the event an emergency disaster. Repairs costed over $1 million. Mitigation measures included rock scaling and rockfall panels that had to be placed by helicopters. In May 2014, the Mayor of the City of Ouray declared an “Economic Emergency” for the City due to the extreme economic hardships	

Date	Landslide/ Rockfall	Location	Injuries	Deaths	Damages	Description	Data Source
						caused by Red Mountain Pass rockfall closure.	

Date	Landslide/ Rockfall	Location	Injuries	Deaths	Damages	Description	Data Source
Mar-16	Rockfall	City of Ouray				A rockfall totaled a house in the City of Ouray	County Emergency Manager

Date	Landslide/ Rockfall	Location	Injuries	Deaths	Damages	Description	Data Source
Nov-18	Rockfall	City of Ouray				A rockfall occurred in the City of Ouray in November 2018 that impacted a home and caused flooding concerns in a drainage ditch. Two boulders each "the size of a Volkswagen" came down the cliff that the couple's log home has been sitting on since 1975, one on each side of their home, narrowly missing on both sides. One boulder hit their motor home, turning it on its side while tearing a giant hole "just like a rocket" all the way through it as it came to rest further down the hill. The other boulder rushed down the other side of the home, taking with it large trees split from about waist-high and completely eradicating the snow shed built against the house. It also damaged the electric tram and stairs used to access the home	Ouray County Emergency Manager

Date	Landslide/ Rockfall	Location	Injuries	Deaths	Damages	Description	Data Source
Mar-19	Rockfall	County Road 17			$27,000	A massive rockslide caused significant damage to County Road 17, approximately three miles north of the City of Ouray. Rocks the size of two large SUVs landed on the surface of the road above the gas main that supplies the City of Ouray and Whispering Pines neighborhood. The current gas line is suspected to be damaged; however, there are no leaks or disruption of service identified at this time. As of April 2019, the road remains closed until further notice. County Officials, emergency officials, and Black Hills Energy have been working to determine the best solution to re-open County Road 17 in a safe manner. County Road 17 is the only alternative access out of Ouray. As of March 30, 2019, a cost of about $27,000 was estimated for strictly the engineering work to be done in the area, which doesn't include any costs related to rock removal and mitigation.	

Date	Landslide/ Rockfall	Location	Injuries	Deaths	Damages	Description	Data Source
Aug-19	Rockfall	City of Ouray			$8,000	A rockfall landed on the catwalk and geothermal line that supplies the Ouray Hot Springs pool. An initial damage assessment is a little over $8,000 in damage	County Emergency Manager
Totals	**12**		**1**	**3**	**$1,035,000**		

9.7. Wildfire

9.7.1. Previous Occurrences

Detailed descriptions of notable wildfires in Ouray County prior to 2014 are described below.

NCDC recorded three wildfire events in Ouray County. The Red Creek Fire occurred on June 27, 2006 about eight miles northeast of Ridgway. The fire consumed 350 acres of timber and resulted in the closure of trails in a wilderness area. Smoke from the fire impacted communities to the north, including Montrose. The second fire began on May 22, 2010. Around 2:30 pm on the afternoon of Saturday, May 22, strong winds downed a power line which sparked a wildfire near the border of San Miguel and Montrose Counties along Good Enough Road. The fire spread rapidly with dry conditions and very strong southwest winds in place. Highway 145 was closed for a period of time on May 5th due to the fire. Portions of the San Miguel River were also closed due to the wildfire hazard. The fire continued for several days and eventually burned through roughly 2,500 acres of the Uncompahgre National Forest and nearly 430 acres of BLM land. There were no injuries or personal property damage reported, but the estimated cost of fighting the fire was $1,500,000. The third fire in the NCDC database began on October 9, 2010. A controlled burn at a farm became a wildfire when breezy winds developed and blew embers beyond the planned burn area. A 100-foot by 50-foot area of baled hay burned, and a number of vehicles and farm implements were destroyed. Winds gusts in the west-central valleys of Colorado were measured at 20 to 25 mph. A firefighter incurred minor injuries.

Additionally, the Tappan Fire began by lightning on July 3, 2004 and burned 80 acres along the Ouray/Montrose county line. It was fought by resources from BLM, Log Hill Fire and Montrose Fire and burned for 5 days.[78]

The Log Hill Mesa FPD estimated that they deal with four to five wildfires a year in their district. They are typically small but are capable of causing a catastrophic event.

The 2013 fire season brought several smaller fires to Ouray County, most of them caused by lightning. On June 17, 2013, BLM, Log Hill and Montrose fire crews worked together to put out a fire roughly three acres in size at the Mackenzie Butte area. At 6:25 pm on June 23, 2013, Ouray Fire was paged to a structure fire at the Camp Bird Mine with surrounding trees catching fire. According to Adam Kunz of Ouray Fire (Former Chief), the fire had spread out about 5 acres. Crews from USFS, Ouray Fire Department, Ridgway Fire District, Ouray County Sheriff, Ouray PD, Ouray County EMS, and Ouray County Communications all responded. Crews were able to get the fire contained to about 1 acre.

The West Fork Fire Complex began June 5th, 2013 in Mineral and Archuleta counties. The West Fork Complex consisted of three lightning-caused wildfires: West Fork, Windy Pass, and Papoose. The fires were severe, burning over 100,000 acres and causing air quality issues in Ouray County. Roughly 1,500 people were displaced. Tourism in southwest Colorado suffered with evacuations, road closures, and closures of the Rio Grande National Forest and Weminuche Wilderness. On July 2, 2013 between 7:00am and 9:00am, six different fires were sparked by a lightning storm. Crews worked very quickly, and by 11:00am all of the fires were put out. The largest of those fires only consumed a few trees. At approximately 2:00pm that same day, Ouray Fire was paged to smoke investigation at Ironton Park (Mt

[78] Local Planning Team

Hayden). That fire was a few acres in size. BLM/USFS crews and Ouray Fire crews responded to the incident.

The 2002 wildfire season in Colorado was the worst on record. It began in April and continued until early fall, with the peak activity in June and July when several large and damaging fires burned simultaneously across the state. Southwest Colorado had its share of fires and close calls. Most damaging was the Missionary Ridge fire in nearby La Plata County that resulted in 70,485 acres burned, 56 structures lost, and 52 injuries. Ouray County was largely spared from fires in 2002, but experienced haze and air quality issues from fires elsewhere in southwest Colorado.

9.8. Windstorm

9.8.1. Previous Occurrences

The following Table 9-5 describes previous wind events in Ouray County from 1998 to April 2019, according to NCEI data.

Table 9-5 Wind Events in Ouray County, November 1998 to April 2019

Location	Date	Type	Wind Speed (knots)	Damages	Event Narrative	Episode Narrative
Uncompahgre Plateau (Zone)	11/17/1998	High Wind	55	$0		Strong winds associated with a Pacific trough in conjunction with an upper level jet stream produced sustained winds of 40 to 50 MPH and wind gusts in excess of 60 MPH mainly over mountain ridges. Some of the stronger gusts included 96 MPH (83 knots) at Snowmass, 93 MPH at Telluride, 90 MPH at Red Mountain Pass, 64 MPH at Huntman Mesa, and 60 MPH at Gothic. At elevations below the 7000-foot level in northwest Colorado, wind gusts in excess of 50 MPH were common on exposed ridges.
Northwestern San Juan Mountains (Zone)	11/17/1998	High Wind	78	$0		Strong winds associated with a Pacific trough in conjunction with an upper level jet stream produced sustained winds of 40 to 50 MPH and wind gusts in excess of 60 MPH mainly over

Location	Date	Type	Wind Speed (knots)	Damages	Event Narrative	Episode Narrative
						mountain ridges. Some of the stronger gusts included 96 MPH (83 knots) at Snowmass, 93 MPH at Telluride, 90 MPH at Red Mountain Pass, 64 MPH at Huntman Mesa, and 60 MPH at Gothic. At elevations below the 7000-foot level in northwest Colorado, wind gusts in excess of 50 MPH were common on exposed ridges.
Northwestern San Juan Mountains (Zone)	1/25/1999	High Wind	106	$0		A strong southwest flow aloft resulted in very strong winds and blizzard-like conditions in the western San Juan Mountains and on the Grand Mesa. Measured peak gusts included 70 MPH (61 knots) at Powderhorn Ski Area, 83 MPH (72 knots) at the top of Telluride Ski Area, 95 MPH (83 knots) on Red Mountain Pass, and 122 MPH (106 knots) on Mount Abrams.
Northwestern San Juan Mountains / E Ouray / X SW Gunnison / N Hinsdale / SE San Miguel (Zone)	3/31/1999	High Wind	95	$0		A strong southwest flow ahead of a Pacific trough produced wind gusts in excess of 70 MPH in the western San Juan Mountains of southwest Colorado. Reported peak gusts include 109 MPH (95 knots) on Mount Abrams, 84 MPH at Red Mountain Pass, 82 MPH at the top of Telluride Ski Area, and 73 MPH on Prospect Ridge.
Uncompahgre Plateau and Dallas Divide (Zone)	4/18/2000	High Wind	64	$0		

Location	Date	Type	Wind Speed (knots)	Damages	Event Narrative	Episode Narrative
Northwestern San Juan Mountains (Zone)	4/18/2000	High Wind	80	$0		
Uncompahgre Plateau and Dallas Divide (Zone)	11/29/2000	High Wind	60	$10,000		Strong winds associated with a cold front passage destroyed a galvanized steel garage at a residence near Unaweep Pass and tore the shingles off a trailer home at another residence about 5 miles away. The garage measured 25 feet by 36 feet and was blown about 200 feet away where it was stopped by trees.
Uncompahgre Plateau and Dallas Divide (Zone)	4/20/2001	High Wind	51	$0		
Northwestern San Juan Mountains (Zone)	4/20/2001	High Wind	58	$0		
Northwestern San Juan Mountains (Zone)	5/21/2002	High Wind	83	$0		Strong gradient winds gusting in excess of 80 knots snapped off several large ponderosa pine trees and blew them onto US Highway 550 just south of Ouray. The highway was blocked until the trees could be removed. The strong winds also blew rocks off the cliffs above the highway and onto the highway.
Northwestern San Juan Mountains (Zone)	4/2/2003	Strong Wind	69	$5,000		
Uncompahgre Plateau and Dallas Divide (Zone)	9/17/2003	Strong Wind	51	$2,000		Strong winds developed across western Colorado as a dry cold front moved through the area. A 60-foot-tall tree with a 4 foot diameter trunk was

Location	Date	Type	Wind Speed (knots)	Damages	Event Narrative	Episode Narrative
						toppled by the wind in the Grand Valley. Minor wind damage also occurred in other areas.
Northwestern San Juan Mountains (Zone)	5/11/2004	Strong Wind	55	$500		
Northwestern San Juan Mountains (Zone)	2/15/2006	Strong Wind	83	$6,000		
Uncompahgre Plateau and Dallas Divide (Zone)	2/15/2006	Strong Wind	65	$2,000		
Northwestern San Juan Mountains (Zone)	3/26/2007	Strong Wind	49	$3,000	Strong southwest winds buffeted the Northwest San Juan Mountains with numerous gusts to near 50. Locally stronger gusts included 86 mph and 80 mph at Mount Abrams and Bald Mountain, respectively. Numerous trees were blown down or snapped off at high elevations above Telluride.	Strong southwest gradient flow ahead of a cold front produced strong winds across most of western Colorado with damaging winds in some areas.
Uncompahgre Plateau and Dallas Divide (Zone)	6/6/2007	Strong Wind	49	$2,000	Widespread wind gusts of 40 to 55 mph and locally stronger gusts occurred over the Uncompahgre Plateau. Hundreds of trees were blown down along a 30 mile stretch of Divide Road.	A strong southwest flow ahead of a cold front produced damaging winds across portions of western Colorado.
Northwestern San Juan	2/16/2011	High Wind	91	$0	Very strong winds occurred across	A strong southwest flow produced very strong

Location	Date	Type	Wind Speed (knots)	Damages	Event Narrative	Episode Narrative
Mountains (Zone)					the area, with gusts generally ranging from 50 to 90 mph. Locally stronger gusts included 105 mph at the top of Telluride Ski Area.	surface winds in the mountains of southwest Colorado.
Northwestern San Juan Mountains (Zone)	12/31/2011	High Wind	86	$0	Wind gusts of 50 to 80 mph were measured across the area. Even stronger winds were measured at some high elevation locations, including 99 mph on Mount Abrahms.	A Pacific trough with an intense pressure gradient produced strong winds in some areas of western Colorado.
Ouray County	5/28/2013	Thunderstorm Wind	61	$60,000	A mobile home was rolled a few times and destroyed by severe thunderstorm outflow winds. A pole barn also lost part of its roof. No injuries were reported.	A thunderstorm produced destructive outflow winds near Colona on the afternoon of May 28th.
Northwestern San Juan Mountains (Zone)	12/21/2014	High Wind	102	$0	Wind speeds above 10,000 feet varied from 50 mph to 75 mph. The highest gust reported was at Mt Abrams with 117 mph.	The jet stream moved over the San Juan Mountains and caused a prolonged period of high wind gusts. Mt Abrams reported a maximum wind gust of 117 mph while Eagle Mountain reported a wind gust of 100 mph.
Northwestern San Juan Mountains (Zone)	2/18/2016	High Wind	92	$0	Winds gusted from 40 mph to 75 mph across the zone. At 1500, a peak wind gust of 106 mph was measured at an	A strong cold front moving through the region caused gusty winds to develop across much of western Colorado.

Location	Date	Type	Wind Speed (knots)	Damages	Event Narrative	Episode Narrative
					automated weather station near Telluride Ski Area. Numerous trees were blown down and Telluride Ski Area closed a total of 4 lifts by 1430. At 1500, the ski resort closed due to the high winds.	
Total	**22**			**$90,500**		

The following text describes further detail on notable wind events in the County.

- **December 31, 2011**—Wind gusts of 50 to 80 mph were measured across parts of western Colorado. Even stronger winds were measured at some high elevation locations, including 99 mph on Mount Abrams.
- **March 26, 2007**—Strong southwest winds buffeted the Northwest San Juan Mountains with numerous gusts to near 50 mph. Locally stronger gusts included 86 mph and 80 mph at Mount Abrams and Bald Mountain, respectively. Numerous trees were blown down or snapped off at high elevations above Telluride.
- **May 11, 2004**—Gradient winds ahead of a cold front gusted to 60 mph or greater, mainly at mountain locations. Tree limb damage was reported at several locations.
- **May 21, 2002**—Strong gradient winds gusting in excess of 80 knots snapped off several large ponderosa pine trees and blew them onto U.S. Highway 550 just south of Ouray. The highway was blocked until the trees could be removed. The strong winds also blew rocks off cliffs onto the highway below.
- **April 18, 2000**—An approaching cold front induced strong winds across western Colorado. Gusts of 50 to 60 miles per hour were common. The strong winds downed many trees and a number of power poles in the region. Several vehicles were smashed or damaged by fallen trees. Several mobile homes were destroyed when they were blown from their moorings. Many houses and businesses sustained damage, mostly as a result of being struck by fallen trees or by having the roofs blown off. Within one particular community in La Plata County, 20 houses were damaged. Electrical power and telephone service were disrupted in many areas for up to several hours. Many controlled burns became out-of-control fires.
- **January 28, 2008** - A weather station on the ridge between Red Mountain 3 and McMillan Peak recorded wind of 102 mph and on February 8, 2008 it recorded wind of 96 mph. Another weather station in Senator Beck basin west of Highway 550 recorded a peak over 130 mph, but it is in a location where terrain probably affected the wind speed.
- **May 28, 2013** - A suspected microburst incident occurred northwest of Colona. The Ouray County Sheriff's Office responded to a report of damage from a tornado. The responding officer found a mobile home that had rolled over and landed on its roof. Other damages included shingles blown off a roof and a roof ripped off of a pole barn. No one witnessed or heard a

tornado, so it was suspected that the damages may have been caused by a microburst instead. A tornado was reported on June 3, 2013 in Montrose County, so tornadoes are technically possible in the area but highly unlikely.

9.9. Hazardous Materials Incident

9.9.1. Previous Occurrences

Table 9-6 describes hazardous material releases previous to the 2015 Ouray County Hazard Mitigation Plan.[79]

Table 9-6 Ouray County Hazardous Material Releases Previous Events

Incident Date	Description of Incident	Type of Incident	Nearest City	Location	Medium Affected	Materials
9/10/2008	The caller reported a milky discoloration in a creek. The caller suspected that employees of a local mine were dumping products into the creek.	Fixed	Ouray	Governor Basin, Camper Road	Water	Unknown
2/2008	A truck went off the road and rolled, spilling a small quantity of methanol.	Mobile	Ouray	On Highway 550	Land	Methanol
11/11/2007	Caller stated there was a toxic cloud in the area due to materials being burned by an unknown company. Caller stated this was a controlled fire that had been going on for four days.	Fixed	Ouray	Highway 550, north end of town	Air	Paints, Plastics, PVC pipes, rubber, unknown material

[79] http://nrc.uscg.mil/Default.aspx

Incident Date	Description of Incident	Type of Incident	Nearest City	Location	Medium Affected	Materials
8/15/2007	Caller reported that an owner dumped 55-gallon barrels of diesel onto the ground and was burying metal as well. The owner also had workers washing out paint brushes in the creek.	Fixed	Ouray	Ruby Trust Mine below the Yankee Boy Basin	Water	Oil, fuel: no. 2-d Paint
8/22/2005	A vehicle accident caused the release of radioactive materials from a pickup truck that was carrying a DOT shipping container.	Mobile	Ouray	Mile marker 89 on Highway 550	Soil	Radioactive material (ir- 192, sc-46 & sb-124)
5/30/2001	A vehicle accident caused the release of asphalt from a tanker truck.	Mobile	Ridgway	Mile marker 111 on Highway 550	Land	Asphalt
11/22/1993	55-gallon drums fell into a lake as a result of a vehicle accident	Mobile	Ouray	Highway 550 summit of Red Mountain Pass	Water	Zinc Ash
5/1/1990	Dump truck / truck went off the road and rolled, spilling 8,000 pounds of lead sulfide.	Mobile	Ridgway	On Highway 550	Land	Lead sulfide

10. Appendix D: Jurisdictional Plan Adoptions

U.S. Department of Homeland Security
Region VIII
Denver Federal Center, Building 710
P.O. Box 25267
Denver, CO 80225-0267

FEMA

R8-MT

February 13, 2020

Board of Ouray County Commissioners
P.O. Box C
Ouray, Colorado 81427

Dear County Commissioners:

We are pleased to announce the approval of the Ouray County Multi-Hazard Mitigation Plan update as meeting the requirements of the Stafford Act and Title 44 Code of Federal Regulations §201.6 for a local hazard mitigation plan. The plan approval extends to Ouray County, the City of Ouray, the Town of Ridgway, and Log Hill Mesa Fire Protection District.

The jurisdictions are hereby eligible for FEMA Hazard Mitigation Assistance grant programs. All requests for funding will be evaluated individually according to the specific eligibility and other requirements of the particular programs under which the application is submitted. Approved mitigation plans may be eligible for points under the National Flood Insurance Program Community Rating System.

The plan is approved through February 12, 2025. A local jurisdiction must revise its plan and resubmit it for approval within five years to continue to be eligible for mitigation project grant funding. We have provided recommendations for the next plan update on the enclosed Plan Review Tool.

We wish to thank the jurisdictions for participating in the process and commend your continued commitment to mitigation planning. Please contact Steve Boand, State Hazard Mitigation Officer, Colorado Department of Emergency Services, at steven.boand@state.co.us or (303) 915-6063 with any questions on the plan approval or mitigation grant programs.

Sincerely,

Jeanine D. Petterson
Mitigation Division Director

Enclosure
cc: Steve Boand, State Hazard Mitigation Officer, Colorado Department of Homeland Security and Emergency Management

LOCAL MITIGATION PLAN REVIEW TOOL

The *Local Mitigation Plan Review Tool* demonstrates how the Local Mitigation Plan meets the regulation in 44 CFR §201.6 and offers States and FEMA Mitigation Planners an opportunity to provide feedback to the community.

- The Regulation Checklist provides a summary of FEMA's evaluation of whether the Plan has addressed all requirements.
- The Plan Assessment identifies the plan's strengths as well as documents areas for future improvement.
- The Multi-jurisdiction Summary Sheet is an optional worksheet that can be used to document how each jurisdiction met the requirements of the each Element of the Plan (Planning Process; Hazard Identification and Risk Assessment; Mitigation Strategy; Plan Review, Evaluation, and Implementation; and Plan Adoption).

The FEMA Mitigation Planner must reference this *Local Mitigation Plan Review Guide* when completing the *Local Mitigation Plan Review Tool*.

Jurisdiction: Ouray County	**Title of Plan:** Ouray County Hazard Mitigation Plan	**Date of Plan:** 11/2019
Local Point of Contact: Glenn Boyd	**Address:** PO Box C Ouray County, Colorado 81427	
Title: Emergency Manager		
Agency: Ouray County Emergency Management		
Phone Number: 970-325-7273	**E-Mail:** gboyd@ouraycountyco.gov	

State Reviewer: Patricia L. Gavelda Mark W. Thompson	**Title:** DHSEM Local Hazard Mitigation Planning Program Manager; Mitigation Planning Specialist	**Date:** 11/20/2019; 11/22/2019; 12/7/2019

FEMA Reviewer: Logan Sand, IR Nicole Aimone, QC	**Title:** Community Planner Senior Community Planner	**Date:** 12/19/2019 12/20/2019
Date Received in FEMA Region VIII	12/7/2019	
Plan Not Approved		
Plan Approvable Pending Adoption	12/20/2019	
Plan Approved	2/13/2020	

SECTION 1:
MULTI-JURISDICTION SUMMARY SHEET

MULTI-JURISDICTION SUMMARY SHEET									
#	Jurisdiction Name	Jurisdiction Type	Jurisdiction Contact	Email	Requirements Met (Y/N)				
					A. Planning Process	B. HIRA	C. Mitigation Strategy	D. Update Rqtms.	E. Adoption Resolution
1	Ouray County	County	Glenn Boyd	gboyd@ouraycountyco.gov	Y	Y	Y	Y	Y
2	City of Ouray	City	Justin Perry	administrator@cityofouray.com	Y	Y	Y	Y	Y
3	Town of Ridgway	Town	Shay Coburn	scoburn@town.ridgway.co.us	Y	Y	Y	Y	Y
4	Loghill Mesa Fire Protection District	Fire Protection District	Tom Austin	toma67@aol.com	Y	Y	Y	Y	Y
5									
6									
7									

SECTION 2:
REGULATION CHECKLIST

REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or	Met	Not Met
ELEMENT A. PLANNING PROCESS			
A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1))	Chapter 3; Appendix A	X	
A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §))	Chapter 3.3.1 – Planning Team Kickoff Meetings	X	
A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))	Chapter 3.3.1 – Public Involvement; Appendix B	X	
A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))	Chapter 3.3.1 – Review and Incorporation of Existing Planning Mechanisms; Chapter 4 footnotes	X	
A5. Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii))	Chapter 6.4 – Continued Public Involvement, page 214	X	
A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? (Requirement §201.6(c)(4)(i))	Chapter 3.3.4-page 43; Chapter 6.2 –page 260	X	
ELEMENT B. HAZARD IDENTIFICATION AND RISK ASSESSMENT			
B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)? (Requirement §201.6(c)(2)(i))	Chapter 4.5.4-4.5.19 – Description, Location, and Extent subsections; Appendix C (where applicable)	X	
B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))	Chapter 4.5.4-4.5.19 – Previous Occurrences and Probability subsections; Appendix C (where applicable)	X	

REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or	Met	Not Met
B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii))	Chapter 4.5.2 - 4.5.16 – Vulnerability Assessment subsections; Appendix C (where applicable); Appendix E; Chapter 4.2 – Hazard Ranking	X	
B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))	Chapter 4.5.10 – NFIP Participation subsection-page 105	X	
ELEMENT C. MITIGATION STRATEGY			
C1. Does the plan document each jurisdiction's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement §201.6(c)(3))	Chapter 5.2.1-page 183	X	
C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement §201.6(c)(3)(ii))	Chapter 4.5.10 – NFIP Participation subsection-page 105, Chapter 5.2.2-page 187	X	
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))	Chapter 5.2 page 182	X	
C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? (Requirement §201.6(c)(3)(ii))	Chapter 5.2.5-page 202	X	
C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))	Chapter 5.2.4 pages 201-202	X	
C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement §201.6(c)(4)(ii))	Chapter 6.5 page 214	X	
ELEMENT D. PLAN REVIEW, EVALUATION, AND IMPLEMENTATION			

REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or	Met	Not Met
D1. Was the plan revised to reflect changes in development? (Requirement §201.6(d)(3))	Chapter 2.7; Chapter 4.5.4-4.5.19 Land use and development subsections	X	
D2. Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3))	Chapter 5.2.3 page 187	X	
D3. Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))	Chapter 5.2.4 – Selection of mitigation actions subsection-pages 201-202	X	
ELEMENT D: REQUIRED REVISIONS			
ELEMENT E. PLAN ADOPTION			
E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? (Requirement §201.6(c)(5))	Chapter 6.3; Appendix D-page 264		N/A
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? (Requirement §201.6(c)(5))	Chapter 6.3; Appendix D-page 264	X	
ELEMENT E: REQUIRED REVISIONS			
OPTIONAL: HIGH HAZARD POTENTIAL DAM RISKS			
HHPD1. Did Element A4 (planning process) describe the incorporation of existing plans, studies, reports, and technical information for high hazard potential dams?	Chapter 3.3.1, pages 31-32; Chapter 4.5.5, pages 59-60 and 63-64	X	
HHPD2. Did Element B3 (risk assessment) address HHPDs?	Chapter 4.5.5; Appendix E, Chapter 11.2.2	X	
HHPD3. Did Element C3 (mitigation goals) include mitigation goals to reduce long-term vulnerabilities from high hazard potential dams that pose an unacceptable risk to the public?	Chapter 5.2, pages 189-190	X	
HHPD4. Did Element C4-C5 (mitigation actions) address HHPDs prioritize mitigation actions to reduce vulnerabilities from high hazard potential dams that pose an unacceptable risk to the public?	Chapter 5.2.3, pages 194, 203	X	
REQUIRED REVISIONS			
ELEMENT F. ADDITIONAL STATE REQUIREMENTS (OPTIONAL FOR STATE REVIEWERS ONLY; NOT TO BE COMPLETED BY FEMA)			

REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or	Met	Not Met
F1.			
F2.			
ELEMENT F: REQUIRED REVISIONS			

SECTION 3:
PLAN ASSESSMENT

A. Plan Strengths and Opportunities for Improvement

This section provides a discussion of the strengths of the plan document and identifies areas where these could be improved beyond minimum requirements.

Element A: Planning Process

Strengths

DHSEM: The planning process was very good, with great participation by each of the jurisdictions and relevant partner agencies. Particular emphasis is placed on the participation of elected officials, who may serve as a nexus of the committee's expertise and the communities' political and fiscal realities.

FEMA

- The planning process was very thoughtful and targeted, well done. Throughout the different phases of plan development, there were many opportunities for elected/appointed officials, staff with hazard mitigation expertise, and members of the community to be involved. It is great to see that a Public Involvement Plan (PIP) was developed to assist the planning team members in administering a range of engagement and outreach tools tailored to their communities. A nice approach to engagement was to channel outreach through schools utilizing "Friday folders" students take home. Public outreach was also conducted in conjunction with the City of Ouray Master Plan update process. The PIP obviously proved to be useful and effective as the plan includes insightful narrative surrounding public engagement efforts and key survey results. Keep including information and visuals (i.e., survey graphs and charts, etc.) like this in plans. It will be interesting to see how these results compare to the next plan update.

- Overall, the planning process is very well documented, organized, and structured which makes it transparent and easy for the reader to understand how the plan was developed. Roles and responsibilities for integral participants are also clearly laid out. It was interesting to see a webinar used to go over the plan update process and establish responsibilities and standards for participation as members of the HMP Steering Committee and/or Planning Team. Nice job to think outside-the-box.

Opportunities for Improvement

DHSEM: Although neighboring jurisdictions were invited to participate, they did not do so. Several of Ouray County's hazards either come from neighbors or extend into them. Regularly working with them on cross-boundary hazards may get them to participate in the next plan update.

FEMA

- The listed plans, studies, reports, and technical information listed in the *Review and Incorporation of Existing Planning Mechanisms* section shows the Planning Team clearly considered several other mechanisms. However, a few important documents are missing

that will need to be reviewed and incorporated in the next plan update, such as County and municipal land use and zoning codes. More importantly, for the next update, please add more detailed narrative about how and where each of the listed planning mechanisms was explicitly used in the HMP. For example, describe how you used the Town of Ridgeway Master Plan, and where in the HMP that information may be found.

It is understood the City of Ouray is updating their Master Plan. However, the HMP did not review and incorporate information from the old plan, nor does it specify that it incorporated new draft information. The plan should have reviewed and incorporated information from the old plan since it is still in place as the community's long-range plan, or, it should have reviewed new draft plan sections (if available).

- It is unclear how each member of the Planning Team participated in the process. The Plan does a great job describing the meetings and provides a thorough list of Planning team members, however it is not clear if everyone went to each meeting or what parts of the plan they provided input on without flipping back and forth to the appendix. For the next update, consider making this information more explicit within the body of the plan itself.

- In the next plan update, consider providing minutes or brief summaries of key take-aways from planning discussions as part of the packets for each Steering Committee meeting. Minutes detail useful information and pair well with agendas.

Element B: Hazard Identification and Risk Assessment

Strengths

DHSEM: The HIRA in this plan is very streamlined and makes it a very useful and effective assessment. It contains enough information to make it relevant but not so much information that it become prohibitive to read.

FEMA

- The plan's HIRA Summary (Section 4.5.3) is excellent. This section includes Key Takeaways and Identified Gaps from each hazard profile. The summary is efficient as provides a synthesis of important information about hazard risks and community vulnerabilities in an easy-to-read and comprehendible fashion. Lastly, it is appreciated that the HIRA Summary comes before the hazard profiles detailed in the plan.

- Page 35 of the plan very thoroughly describes how the profiled hazards were selected. Table 4-1 Hazard Profiled neatly presents the previous Ouray County HMP, selected hazards for this plan, and the 2018 Colorado HMP. There is a crystal-clear alignment and prioritization between the plans and hazards.

- The Hazard Rankings table on page 39 clearly defines and presents how each hazard was ranked based on probability of losses and the potential impact to both property/structures and people.

Opportunities for Improvement

FEMA

- Section 4.4, Critical Facilities, states that the critical facilities analysis for both counties are in a confidential appendix. For the next plan update, if the critical facilities analysis is kept confidential again, consider adding more narrative describing what that analysis includes. If a community member were to read this plan, they should at least be able to understand what types of analysis were conducted by each hazard. For example, did you look at what critical facilities were in flood plains? How would being in a flood plain impact the critical facility? While it is acceptable to have the full analysis separate, consider adding more detail to the narrative that is included in the plan.

Element C: Mitigation Strategy

Strengths

FEMA

- The Mitigation Strategy identifies a number of thoughtful and powerful land use and regulatory actions. For example, the Town of Ridgeway will "Define "steep slopes" in the development code, and develop regulations that detail the conditions and performance standards under which such development may be evaluated." Another Town action is to "Review and update the Town code's regulations regarding adequate water supply for new development." A last example of a mitigation action is to "Work with Ouray County Land Use and Planning Commission to develop wildfire regulations for BOCC considerations." It will be great to see if they are accomplished in the next plan update.

  While a number of land use mitigation actions are strong, several others would have benefited with more detail, specificity, and action-oriented language. For example, "Revisit building regulations in identified flood hazard areas including flumes." What will result from "revisiting" building regulations? Will the building regulations be revised and adopted? For other actions, it will be helpful to see more motivation behind the action. Another example, "Develop wildfire protection regulations" for the City of Ouray. It would be more powerful to have "develop and adopt" for this type of action. Lastly, in the next plan update consider pushing mitigation actions that advance local plan integration. The action "Complete the City of Ouray Community Plan update" is already underway and will be completed. A stronger action would have been to identify a specific approach for the HMP to integrate with the new City of Ouray Community Plan (e.g., as a standalone chapter, throughout the plan, etc.).

  In the next plan update, consider developing and including mitigation project worksheets. Worksheets may be used to capture and convey some of the project details that did not make it into the Ouray County 2019 Mitigation Actions (Table 5-6). See FEMA's Local Mitigation Planning Handbook for ideas to create detailed mitigation project worksheets, located: https://www.fema.gov/media-library/assets/documents/31598.

- The table in section 5.2.3 clearly describes the status of past mitigation actions. It was great to see more narrative provided in the Status Summary column explaining why something was ongoing, deferred, or being removed from the Plan.

Opportunities for Improvement

FEMA

- The Capabilities Assessment (Section 5.2.1) clearly demonstrates that the Steering Committee and Planning Team evaluated a range of different types of capabilities for each community. Requirement C1 requires that the plan describes existing authorities, policies, programs, and resources. For the next plan, consider adding more narrative around each, or the major capabilities, instead of only listing them in a table. Doing so will provide greater context and clarity about what is going on in each community. As an example, the City of Ouray and the Town of Ridgeway do not have staff with the specific title of "Resiliency Planner". However, both jurisdictions have staff that may be managing or administering resiliency-related planning activities. Further clarity will be helpful to understand who is doing resiliency planning and what activities are advancing community resilience. Lastly, in the next update, make sure to spell out the acronyms (e.g., BCEGS Rating) for each capability.

Element D: Plan Review, Evaluation, and Implementation (Plan Updates Only)

Strengths

FEMA

- It is clear how the Planning Team included changes in development, local mitigation efforts, and changes in priorities. The Future Development section (2.7) is very informative. The discussion of the Initial Growth Boundary (IGB) and the Urban Growth Boundary (UGB) provides a helpful insight into to jurisdictional decision making for future development.

B. Resources for Implementing Your Approved Plan

FEMA FUNDING SOURCES

Hazard Mitigation Grant Program (HMGP). The HMGP is a post-disaster mitigation program. It is made available to states by FEMA after each Federal disaster declaration. The HMGP can provide up to 75 percent funding for hazard mitigation measures. The HMGP can be used to fund cost-effective projects that will protect public or private property in an area covered by a federal disaster declaration or that will reduce the likely damage from future disasters. Examples of projects include acquisition and demolition of structures in hazard prone areas, flood-proofing or elevation to reduce future damage, minor structural improvements and development of state or local standards. Applicants who are eligible for the HMGP are state and local governments, certain nonprofit organizations or institutions that perform essential government services, and Indian tribes and authorized tribal organizations. Individuals or homeowners cannot apply directly for the HMGP; a local government must apply on their behalf. Applications are submitted to Montana DES and placed in rank order for available funding and submitted to FEMA for final approval. Eligible projects not selected for funding are placed in an inactive status and may be considered as additional HMGP funding becomes available. More information: https://www.fema.gov/hazard-mitigation-grant-program

Flood Mitigation Assistance (FMA) Program. FMA provides funding to assist states and communities in implementing measures to reduce or eliminate the long-term risk of flood damage

to buildings, manufactured homes, and other structures insurable under the NFIP. The FMA is funded annually; no federal disaster declaration is required. Only NFIP insured homes and businesses are eligible for mitigation in this program. Funding for FMA is very limited and, as with the HMGP, individuals cannot apply directly for the program. Applications must come from local governments or other eligible organizations. The federal cost share for an FMA project is 75 percent. At least 25 percent of the total eligible costs must be provided by a non-federal source. Of this 25 percent, no more than half can be provided as in-kind contributions from third parties. FMA funds are distributed from FEMA to the state. Montana DES serves as the grantee and program administrator for FMA. More information: https://www.fema.gov/flood-mitigation-assistance-grant-program

Pre-Disaster Mitigation (PDM) Grant Program. The PDM program is an annually funded, nationwide, competitive grant program. No disaster declaration is required. Federal funds will cover 75 percent of a project's cost up to $3 million. More information: https://www.fema.gov/pre-disaster-mitigation-grant-program

Fire Management Assistance Grant (FMAG) Program. The FMAG program provides grants to states, tribal governments and local governments for the mitigation, management and control of any fire burning on publicly (non-federal) or privately owned forest or grassland that threatens such destruction as would constitute a major disaster. The grants are made in the form of cost sharing with the federal share being 75 percent of total eligible costs. Grant approvals are made within 1 to 72 hours from time of request. More information: http://www.fema.gov/fire-management-assistance-grant-program

Fire Prevention and Safety (FP&S) Grants. FP&S Grants support projects that enhance the safety of the public and firefighters from fire and related hazards. The primary goal is to target high-risk populations and reduce injury and prevent death. Eligibility includes fire departments, national, regional, state, and local organizations, Native American tribal organizations, and/or community organizations recognized for their experience and expertise in fire prevention and safety programs and activities. Private non-profit and public organizations are also eligible. Interested applicants are advised to check the website periodically for announcements of grant availability: https://www.fema.gov/welcome-assistance-firefighters-grant-program

OTHER MITIGATION FUNDING SOURCES

Grant funding is available from a variety of federal and state agencies for training, equipment, and hazard mitigation activities. Several of these programs are described below.

Program 15.228: Wildland Urban Interface Community and Rural Fire Assistance. This program is designed to implement the National Fire Plan and assist communities at risk from catastrophic wildland fires. The program provides grants, technical assistance, and training for community programs that develop local capability, including: Assessment and planning, mitigation activities, and community and homeowner education and action; hazardous fuels reduction activities, including the training, monitoring or maintenance associated with such hazardous fuels reduction activities, on federal land, or on adjacent nonfederal land for activities that mitigate the threat of

catastrophic fire to communities and natural resources in high risk areas; and, enhancement of knowledge and fire protection capability of rural fire districts through assistance in education and training, protective clothing and equipment purchase, and mitigation methods on a cost share basis.

Secure Rural Schools and Community Self-Determination Act - Title III- County Funds. The Self-Determination Act has recently been reauthorized and now includes specific language regarding the Firewise Communities program. Counties seeking funding under Title III must use the funds to perform work under the Firewise Communities program. Counties applying for Title III funds to implement Firewise activities can assist in all aspects of a community's recognition process, including conducting or assisting with community assessments, helping the community create an action plan, assisting with an annual Firewise Day, assisting with local wildfire mitigation projects, and communicating with the state liaison and the national program to ensure a smooth application process. Counties that previously used Title III funds for other wildfire preparation activities such as the Fire Safe Councils or similar would be able to carry out many of the same activities as they had before. However, with the new language, counties would be required to show that funds used for these activities were carried out under the Firewise Communities program. More information: http://www.fs.usda.gov/wps/portal/fsinternet/!ut/p/c4/04_SB8K8xLLM9MSSzPy8xBz9CP0os3gjAwhwtDDw9_AI8zPwhQoY6BdkOyoCAPkATlA!/?ss=119985&navtype=BROWSEBYSUBJECT&cid=FSE_003853&navid=091000000000000&pnavid=null&position=BROWSEBYSUBJECT&ttype=main&pname=Secure%20Rural%20Schools-%20Home

Community Planning Assistance for Wildfire. Established in 2015 by Headwaters Economics and Wildfire Planning International, Community Planning Assistance for Wildfire (CPAW) works with communities to reduce wildfire risks through improved land use planning. CPAW is a grant-funded program providing communities with professional assistance from foresters, planners, economists and wildfire risk modelers to integrate wildfire mitigation into the development planning process. All services and recommendations are site-specific and come at no cost to the community. More information: http://planningforwildfire.org/what-we-do/

Urban and Community Forestry (UCF) Program. A cooperative program of the U.S. Forest Service that focuses on the stewardship of urban natural resources. With 80 percent of the nation's population in urban areas, there are strong environmental, social, and economic cases to be made for the conservation of green spaces to guide growth and revitalize city centers and older suburbs. UCF responds to the needs of urban areas by maintaining, restoring, and improving urban forest ecosystems on more than 70 million acres. Through these efforts the program encourages and promotes the creation of healthier, more livable urban environments across the nation. These grant programs are focused on issues and landscapes of national importance and prioritized through state and regional assessments. Information: http://www.fs.fed.us/managing-land/urban-forests/ucf

Western Wildland Urban Interface Grants. The National Fire Plan (NFP) is a long-term strategy for reducing the effects of catastrophic wildfires throughout the nation. The Division of Forestry's NFP Program is implemented within the Division's Fire and Aviation Program through the existing USDA Forest Service, State & Private Forestry, State Fire Assistance Program.

Congress has provided increased funding assistance to states through the U.S. Forest Service State and Private Forestry programs since 2001. The focus of much of this additional funding was mitigating risk in WUI areas. In the West, the State Fire Assistance funding is available and awarded through a competitive process with emphasis on hazard fuel reduction, information and education, and community and homeowner action. This portion of the National Fire Plan was developed to assist interface communities manage the unique hazards they find around them. Long-term solutions to interface challenges require informing and educating people who live in these areas about what they and their local organizations can do to mitigate these hazards.

The 10-Year Comprehensive Strategy focuses on assisting people and communities in the WUI to moderate the threat of catastrophic fire through the four broad goals of improving prevention and suppression, reducing hazardous fuels, restoring fire-adapted ecosystems, and promoting community assistance. The Western States Wildland Urban Interface Grant may be used to apply for financial assistance towards hazardous fuels and educational projects within the four goals of: improved prevention, reduction of hazardous fuels, and restoration of fire-adapted ecosystems and promotion of community assistance. More information: https://www.westernforesters.org/sites/default/files/2017-WUI-Applications-Instructions-and-Criteria-CLEAN-COPY-002b.pdf

U.S. Fish & Wildlife Service, Rural Fire Assistance Grants. Each year, the U.S. Fish & Wildlife Service (FWS) provides Rural Fire Assistance (RFA) grants to neighboring community fire departments to enhance local wildfire protection, purchase equipment, and train volunteer firefighters. Service fire staff also assist directly with community projects. These efforts reduce the risk to human life and better permit FWS firefighters to interact and work with community fire organizations when fighting wildfires. The Department of the Interior (DOI) receives an appropriated budget each year for an RFA grant program. The maximum award per grant is $20,000. The DOI assistance program targets rural and volunteer fire departments that routinely help fight fire on or near DOI lands. More information: http://www.fws.gov/fire/living_with_fire/rural_fire_assistance.shtml

U.S. Bureau of Land Management, Community Assistance Program. BLM provides funds to communities through assistance agreements to complete mitigation projects, education and planning within the WUI. More information: http://www.blm.gov/nifc/st/en/prog/fire/community_assistance.html

Fire Management Assistance Program. This program is authorized under Section 420 of the Stafford Act. It allows for the mitigation, management, and control of fires burning on publicly or privately owned forest or grasslands that threaten destruction that would constitute a major disaster.

NOAA Office of Education Grants. The Office of Education supports formal, informal and non-formal education projects and programs through competitively awarded grants and cooperative agreements to a variety of educational institutions and organizations in the United States. More information: http://www.noaa.gov/office-education/grants

NRCS Environmental Quality Incentives Program (EQIP). The Environmental Quality Incentives Program, administered through the NRCS, is a cost-share program that provides financial and

technical assistance to agricultural producers to plan and implement conservation practices that improve soil, water, plant, animal, air and related natural resources on agricultural land and non-industrial private forestland. Owners of land in agricultural or forest production or persons who are engaged in livestock, agricultural or forest production on eligible land and that have a natural resource concern on that land may apply to participate in EQIP. Eligible land includes cropland, rangeland, pastureland, non-industrial private forestland and other farm or ranch lands. EQUIP is another funding mechanism for landowner fuel reduction projects. More information: https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/eqip/

U.S. Department of Agriculture, Community Facilities Loans and Grants. Provides grants (and loans) to cities, counties, states and other public entities to improve community facilities for essential services to rural residents. Projects can include fire and rescue services; funds have been provided to purchase fire-fighting equipment for rural areas. No match is required. More information: http://www.usda.gov/wps/portal/usda/usdahome?navid=GRANTS_LOANS

General Services Administration, Sale of Federal Surplus Personal Property. This program sells property no longer needed by the federal government. The program provides individuals, businesses and organizations the opportunity to enter competitive bids for purchase of a wide variety of personal property and equipment. Normally, there are no restrictions on the property purchased. More information: http://www.gsa.gov/portal/category/21045

Hazardous Materials Emergency Preparedness Grants. Grant funds are passed through to local emergency management offices and HazMat teams having functional and active LEPC groups. More information: http://www.phmsa.dot.gov/hazmat/grants

U.S. Department of Homeland Security. Enhances the ability of states, local and tribal jurisdictions, and other regional authorities in the preparation, prevention, and response to terrorist attacks and other disasters, by distributing grant funds. Localities can use grants for planning, equipment, training and exercise needs. These grants include, but are not limited to areas of Critical Infrastructure Protection Equipment and Training for First Responders, and Homeland Security Grants. More information: http://www.dhs.gov/

Community Development Block Grants (CDBG). The U.S. Department of Commerce administers the CDBG program which are intended to provide low and moderate-income households with viable communities, including decent housing, as suitable living environment, and expanded economic opportunities. Eligible activities include community facilities and improvements, roads and infrastructure, housing rehabilitation and preservation, development activities, public services, economic development, planning, and administration. Public improvements may include flood and drainage improvements. In limited instances, and during the times of "urgent need" (e.g. post disaster) as defined by the CDBG National Objectives, CDBG funding may be used to acquire a property located in a floodplain that was severely damaged by a recent flood, demolish a structure severely damaged by an earthquake, or repair a public facility severely damaged by a hazard event. CDBG funds can be used to match FEMA grants. More Information: http://www.hud.gov/offices/cpd/communitydevelopment/programs/

Volunteer Fire Assistance Program Grants. The purpose of these grants is to organize, train and equip local firefighters to prevent and suppress wildfires. Communities under 10,000 in population are eligible for the funding. Smaller communities may join together in a group and or county effort to submit an application, even if their combined population is over 10,000. There is no pre-set award amount. Financial assistance on any project, during any fiscal year, requires a non-federal match for project expenditures. More information: http://dnrc.mt.gov/grants-and-loans

Conservation District Grants. This program provide funds to increase conservation district employee's hours to assist in planning, securing funding, and implementing programs that improve public outreach, improve conservation district administrative capabilities, and implement conservation plans. There is a $10,000 award amount. More information: http://dnrc.mt.gov/grants-and-loans

Hazardous Fuel Reduction Grants. These grants are for hazardous fuel reduction on private lands to protect communities adjacent to National Forest System Lands where prescribed fire activities are planned. Prescribed fire activities must be imminent (to take place within 3 years of the award). Non-profit organizations, conservation districts, county and municipal governments, fire departments are eligible for this funding. Award amounts typically range from $50,000 to $100,000 depending upon availability of funding. More information: http://dnrc.mt.gov/grants-and-loans

Renewable Resource Grant Program. Administered by the Montana DNRC, this program provides both grant and loan funding for public facility and other renewable resource projects. Projects that conserve, manage, develop or protect Montana's renewable resources are eligible for funding. Numerous public facility projects including drinking water, wastewater and solid waste development and improvement projects have received funding through this program. Other projects that have been funded include irrigation rehabilitation, dam repair, soil and water conservation and forest enhancement. More information: http://dnrc.mt.gov/grants-and-loans

Building Blocks for Sustainable Communities. The EPA Office of Sustainable Communities sometimes offers grants to support activities that improve the quality of development and protect human health and the environment. When these grants are offered, they will always be announced on www.grants.gov. More information: https://www.epa.gov/smartgrowth/building-blocks-sustainable-communities#2016

OTHER RESOURCES

FEMA: Grant Application Training. Each year, FEMA partners with the State on training courses designed to help communities be more successful in their applications for grants. Contact your State Hazard Mitigation Officer for course offering schedules. Example Courses:

- Unified Hazard Mitigation Grant Assistance Application Development Course
- Benefit Cost Analysis (BCA) Course

FEMA: Community Assistance Visit. It may be appropriate to set up a Community Assistance Visit with FEMA to provide technical assistance to communities in the review and/or updating of their

floodplain ordinances to meet the new model ordinance. Consider contacting your State NFIP Coordinator for more information.

FEMA: Building Science. The Building Science branch develops and produces multi-hazard mitigation publications, guidance materials, tools, technical bulletins, and recovery advisories that incorporate the most up-to-date building codes, floodproofing requirements, seismic design standards, and wind design requirements for new construction and the repair of existing buildings. To learn more, visit: https://www.fema.gov/building-science

EPA: Smart Growth in Small Towns and Rural Communities. EPA has consolidated resources just for small towns and rural communities to help them achieve their goals for growth and development while maintaining their distinctive rural character. To learn more, visit: https://www.epa.gov/smartgrowth/smart-growth-small-towns-and-rural-communities

EPA: *Hazard Mitigation for Natural Disasters: A Starter Guide for Water and Wastewater Utilities.* The EPA released guidance on how to mitigate natural disasters specifically for water and wastewater utilities. For more information, visit: https://www.epa.gov/waterutilityresponse/hazard-mitigation-natural-disasters

National Integrated Drought Information System. The National Drought Resilience Partnership may provide some additional resources and ideas to mitigate drought hazards and increase awareness of droughts. Visit: https://www.drought.gov/drought/what-nidis/national-drought-resilience-partnership.

STAR Community Rating System. Consider measuring your mitigation success by participating in the STAR Community Rating System. Local leaders can use the STAR Community Rating System to assess how sustainable they are, set goals for moving ahead and measure progress along the way. To get started, go to http://www.starcommunities.org/get-started

Flood Economics. The Economist Intelligence Unit analyzed case studies and state-level mitigation data in order to gain a better understanding of the economic imperatives for investment in flood mitigation. To learn more, visit: http://floodeconomics.com/

Headwaters Economics. Headwaters Economics is an independent, nonprofit research group that works to improve community development and land management decisions in the West. To learn more, visit: https://headwaterseconomics.org/

224407
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Michelle Nauer, Clerk & Recorder
Ouray County, CO
12-17-2019 12:26 PM Recording Fee $0.00

Resolution No. 2019-049

A RESOLUTION OF THE
BOARD OF COUNTY COMMISSIONERS OF OURAY COUNTY, COLORADO

RE: Approving and Adopting the 2020 Multi-Jurisdictional, Multi-Hazard Mitigation Plan

WHEREAS, the Board of County Commissioners by Resolution No. 2008-060 (*"Exhibit B"*) adopted a Multi-Hazard Mitigation Plan ("Plan") (*"Exhibit A"*) in 2008 in accordance with the requirements of the federal Disaster Mitigation Act of 2000; and

WHEREAS, in order to maintain eligibility for emergency and disaster assistance funds from the Federal Emergency Management Agency ("FEMA"), the Plan is required to be updated periodically to incorporate new FEMA guidance, and to update local information, resources and hazard mitigation plans; and

WHEREAS, in 2017 county staff reconvened the Hazard Mitigation Planning Committee ("HMPC") comprised of key stakeholders from Ouray County and the participating jurisdictions, including, the City of Ouray, the Town of Ridgway, and Log Hill Mesa Fire Protection District to review and update identified risks and vulnerabilities, and to develop mitigation plans to anticipate and mitigate these risks and vulnerabilities; and

WHEREAS, funding for the 2020 Plan ("2020 Plan") revisions and review process was shared with the State of Colorado providing a grant of $60,627.11, and the participating Jurisdictions using $15,156.79 in-kind and the County using $4,317.68 from the general fund; and

WHEREAS, following the review and revision process by the HMPC on behalf of the County and participating jurisdictions, the 2020 Plan was vetted through a series of public hearings and committee meetings before its submittal to the Colorado Office of Emergency Management ("COEM") and FMEA; and

WHEREAS, following submittal to COEM and FEMA, each of those agencies reviewed the 2013 Plan and both agencies have approved the 2013 Plan; and

WHEREAS, the 2020 Plan must now be approved and adopted by the County and participating jurisdictions so that the goals and objectives of the 2020 Plan can be pursued and accomplished;

NOW, THEREFORE, Be It Resolved by the Board of County Commissioners of Ouray County, Colorado, that:

1. The 2020 Multi-Jurisdictional, Multi-Hazard Mitigation Plan, attached hereto as Exhibit A, is hereby approved and County staff, elected and appointed officials are hereby directed to take necessary actions to implement the goals and objectives, to the extent that funding is available to carry out such goals and objectives.
2. County staff, elected and appointed officials are hereby authorized to implement the 2020 Plan in cooperation with the other participating jurisdictions, and to continue cooperative efforts toward a plan revision, as required by law, in five (5) years.

APPROVED AND ADOPTED THIS 17TH DAY OF DECEMBER, 2019.

Voting for: Commissioners Peters, Tisdel, + Batchelder
Voting against: NONE

BOARD OF COUNTY COMMISSIONERS
OF OURAY COUNTY, COLORADO

Attest:

John E. Peters, Chair

Ben Tisdel, Vice-Chair

Michelle Nauer, Clerk and Recorder
By: Hannah Hollenbeck, Deputy Clerk of the Board

Don Batchelder, Commissioner

SEAL

Ouray City Council Regular Meeting
Summarized Minutes
Monday, January 6, 2020 at 6:00pm
MASSARD ROOM – Ouray Community Center

1. **CALL TO ORDER**

Mayor Nelson called the meeting to order at 6:00 p.m.

2. **ROLL CALL**

Mayor Greg Nelson - Present
Mayor Pro Tem John Wood – Present
Councilor Glenn Boyd – Present
Councilor Ethan Funk – Present
Councilor Peggy Lindsey – Present

Also present were City Administrator Justin Perry, City Resources Director Rick Noll, Public Works Director Joe Coleman, Community Development Coordinator Chris Hawkins, and Finance and Administration Director Melissa Drake

3. **THE PLEDGE OF ALLEGIANCE WAS RECITED**

4. **CEREMONIAL/INFORMATIONAL** – Ice Park Pre-season Report

Administrator Perry stated that Ouray Ice Park Inc. Executive Director Dan Chehayl requested a delay on this report.

5. **APPROVAL OF MINUTES**

   a. **December 2, 2019**

   Mayor Nelson asked if there were any corrections to the minutes. There were none. He stated that the minutes stand approved.

   b. **December 16, 2019**

   Mayor Nelson asked if there were any corrections to the minutes. There were none. He stated that the minutes stand approved.

6. CITIZENS' COMMUNICATION

Bette Maurer requested changes to snow removal policies so people can more easily remove snow from their properties.

Pam Larson spoke about the charter regarding Councilor Funk's appointment. She noted that Council upheld the Charter in this situation. She also stated that Councilor Funk has done a great job.

Dan Chehayl apologized for not being able to present his report tonight. He noted that the Ice Park is doing very well and gearing up for the Ice Fest.

Sally Clifford stated that the flag at Miner's Park needs to be replaced and offered to purchase a new one if needed.

Tom Tyler asked why the upper pools have ice on them. Rick Noll, City Resources Director, stated that there are new maintenance staff and they are working on it.

7. CITY COUNCIL REPORTS/INFORMATION

a. **Mayor Pro Tem Wood** – CEDC met briefly to review applications, the IPAT will meet on Thursday, and he asked for updated information to be sent to the pool for council and committee members to get in free

b. **Councilor Ethan Funk** – none, there were no committee meetings due to the holidays

c. **Councilor Peggy Lindsey** – none, there were no committee meetings due to the holidays

d. **Councilor Boyd** – committees haven't met due to the holidays

e. **Mayor Greg Nelson** – He and Administrator Perry will begin negotiations with OTO

8. DEPARTMENT REPORTS

a. City Administrator

City Administrator Justin Perry asked Council when we can reschedule the budget review work session. Council chose January 27th at 8:30am.

He asked Finance and Administration Director Melissa Drake to update council on the OTO audit. She stated that Blair and Associates should be finished at the end of January and may be able to present findings in February.

Administrator Perry presented a plaque to Gary Ray for his work as acting Police Chief for most of 2019.

b. Police Chief

Chief Jeff Wood is excused from the meeting since he is at the Chiefs Conference.

c. Public Works Director

Nothing to add to the packet

d. City Resources Director

Nothing to add to the packet

9. CONSENT AGENDA

a. Special Events Permit Application – OIPI, Ice Festival, Box Canyon Park, January 24th & 25th
b. Special Events Permit Application – BPOE Lodge #492, Burns Supper, January 18th
c. Liquor License Renewal – Brickhouse 737
d. Liquor License Renewal – Thai Chili
e. Liquor License Renewal – Goldbelt Bar & Grill

Councilor Boyd made a motion to approve the Consent Agenda. Councilor Funk seconded the motion and it was approved on unanimous vote.

10. ACTION ITEMS

a. Resolution 1, Series 2020 – Designating a Posting Place

Mayor Pro Tem Wood made a motion to approve the Resolution to designate the official posting place as the bulletin board in City Hall. Councilor Lindsey seconded the motion. The motion was approved on unanimous vote.

b. Ordinance 1, Series 2020 – Modifying Council Meeting Times – First Reading

Councilor Boyd made motion to approve the Resolution changing the meeting time of the second meeting of the month to 1pm instead of 6pm in an effort to attract citizens with varied work schedules. Councilor Funk seconded the motion and it passed on unanimous vote.

c. Approval of Letter of Agreement with JVA Consulting Engineers regarding WWTF Final Design & Permitting

Mayor Nelson noted that discussion of this item was covered in the public work session. Mayor Pro Tem Wood made a motion to table this item Councilor Boyd seconded the motion and it was approved on unanimous vote.

d. Approval of Letter of Agreement with JVA regarding WWTF Discharge Monitoring Report Assistance

Councilor Boyd made a motion to approve this letter of agreement. Councilor Lindsey seconded the motion and it was approved on unanimous vote.

e. OTO Contract – 3 Month Extension

Mayor Pro Tem Wood made a motion to approve the extension agreement. Councilor Funk seconded the motion and it was approved on unanimous vote.

f. Viner Law Fee Agreement

Administrator Perry gave an overview of the history of City Attorney contracts. Council discussed with Administrator Perry and Attorney Viner.

Councilor Boyd made a motion to approve the agreement. Mayor Pro Tem Wood seconded the motion and it was approved on unanimous vote.

g. Victim Services IGA

Administrator Perry gave an overview of the history of this agreement and the services needed.

Councilor Boyd made a motion to approve the IGA. Mayor Pro Tem Wood seconded the motion. Glenn Boyd, speaking as County Emergency Manager and Deputy Coroner, stated the services are invaluable. Administrator Perry stated that it is also required by law. The motion was approved on unanimous vote.

h. Multi-hazard Mitigation Plan

Councilor Boyd stated that all corrections have been incorporated and this is the final version

Councilor Funk made a motion to approve the plan. Councilor Lindsey seconded the motion.

Council discussed the plan. The motion was approved on unanimous vote.

i. Water Rights Ratification

Administrator Perry spoke about a decision he made in participation with Ouray County and the Town of Ridgway regarding water rights for the entire County. City Attorney Carol Viner stated that an application was filed regarding drought years going back to 2002. The application is to create water storage for the City of Ouray, Ouray County, and Tri-County Water

Mayor Pro Tem Wood made a motion to ratify the decision. Councilor Funk seconded the motion and it was approved on unanimous vote.

j. CEDC Appointment(s)

Community Development Coordinator Chris Hawkins stated that the CEDC recommended approval of these candidates. Council discussed

Councilor Boyd made a motion to appoint the candidates listed with plans to appoint more members to get to an odd number of members. Mayor Pro Tem Wood seconded the motion.

Council discussed participation in the by OTO staff and that the new Director of OTO will also be a member. Councilor Boyd modified his motion to appoint Deedra Williams, Travis Cossitt, and Lou Hart and not include Dawn Glanc, so that she may apply as a member at large instead of as part of OTO. Mayor Pro Tem Wood agreed to the modification of the motion.

The motion was approved on unanimous vote.

11. DISCUSSION ITEMS

a. Parking within the City

Mayor Pro Tem Wood spoke about difficulties with parking within the City to include snow plowing, camping in cars on the streets, etc. Council discussed with staff and citizens.

b. Sidewalks

Mayor Nelson spoke about issues with sidewalks in the City. He spoke about the fact that the Flume tax sunsets this year and maybe we should put a new ballot issue out in the fall to replace the Flume tax with something that can be used to replace sidewalks, curbs, etc. on Main Street.

c. Transparency

Councilor Boyd spoke about complaints during the election period about transparency with the City organization. He asked Council to give ideas about improving transparency. Council discussed options.

d. Future Agenda Items

Wood – snow removal
Nelson – sound system for Community Center
Boyd – ballot issues

12. ADJOURNMENT

At 8:08pm, Mayor Pro Tem Wood made a motion to adjourn the meeting. Councilor Lindsey seconded the motion and it was approved on unanimous vote.

02/05/2020

Greg Nelson, Mayor Date

ATTEST:

Melissa M. Drake

Melissa M. Drake, City Clerk

CERTIFICATION

I, Melissa M. Drake, do hereby certify that I am the City Clerk of the City of Ouray, Ouray County, State of Colorado, and that the above minutes are a true and correct summary of the meeting of the Ouray City Council held on January 6, 2020. I further certify that the meeting was duly called and held, and that a quorum was present.

Dated this 24th day of January 2020.

Melissa M. Drake

Melissa M. Drake, City Clerk

Resolution No. 19-19

Resolution 19-19 of the Town Council of Ridgway, Colorado, Adopting the Ouray County Multi-Hazard Mitigation Plan, Comprehensive Update 2019

WHEREAS, the Town of Ridgway recognizes the threat that natural caused hazards pose to people, property, and infrastructure within the community; and

WHEREAS, the Town of Ridgway recognizes the importance of reducing or eliminating the vulnerability to natural hazards for the overall good and welfare of the community; and

WHEREAS, the Federal Disaster Mitigation Act of 2000 placed emphasis on state and local mitigation planning for natural hazards and requires communities to adopt a local hazard mitigation plan to be eligible for pre-disaster and post-disaster federal funding for mitigation purposes; and

WHEREAS, the Town of Ridgway initially adopted the Ouray County Multi-Hazard Mitigation Plan in 2008 and the Comprehensive Update dated September 2014 and understands that Federal Emergency Management Agency's (FEMA) goals are to update these plans no less than every five years; and

WHEREAS, the Ouray County Multi-Hazard Mitigation Plan, Comprehensive Update 2019 was prepared by CDR Maguire with input from participating jurisdictions in accordance with FEMA requirements at 44 CFR §201.6; and

WHEREAS, the Town of Ridgway resides within the Planning Area, and fully participated in the mitigation planning process to prepare this Multi-Hazard Mitigation Plan, Comprehensive Update 2019; and

WHEREAS, the Colorado Division of Homeland Security and Emergency Management, and FEMA Region VIII officials will review the Ouray County Multi-Hazard Mitigation Plan, Comprehensive Update 2019.

NOW, THEREFORE, BE IT RESOLVED the Town Council of the Town of Ridgway, Colorado does hereby adopt the Ouray County Multi-Hazard Mitigation Plan, Comprehensive Update 2019, as attached hereto and as approved by FEMA, and resolves to work toward execution of targeted actions in the plan.

APPROVED AND ADOPTED this 11th day of December, 2019.

John Clark, Mayor

ATTEST:

Pam Kraft, MMC
Town Clerk

Log Hill Mesa Fire Protection District

PO Box 747, Montrose, CO. 81402 (970) 626-4095

January 14, 2020

Resolution Adopting the Ouray County Multi-Hazard Mitigation Plan

Whereas, the Log Hill Mesa Fire Protection District recognizes the threat that natural hazards pose to people and property within our community; and

Whereas, undertaking hazard mitigation actions will reduce the potential for harm to people and property from future hazard occurrences; and

Whereas, the U.S. Congress passed the Disaster Mitigation Act of 2000 ("Disaster Mitigation Act") emphasizing the need for pre-disaster mitigation of potential hazards;

Whereas, the Disaster Mitigation Act made available hazard mitigation grants to state and local governments;

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

Whereas, the Log Hill Mesa Fire Protection District fully participated in the FEMA-prescribed mitigation planning process to prepare this Multi-Hazard Mitigation Plan; and

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

Whereas, the Log Hill Mesa Fire Protection District desires to comply with the requirements of the Disaster Mitigation Act and to augment its emergency planning efforts by formally adopting the Ouray County Multi-Hazard Mitigation Plan.

Whereas, adoption by the governing body for the Log Hill Mesa Fire Protection District demonstrates the jurisdiction's commitment to fulfilling the mitigation goals and objectives outlined in this Multi-Hazard Mitigation Plan.

Whereas, adoption of this legitimizes the plan and authorizes responsible agencies to carry out their responsibilities under the plan.

Now, therefore, be it resolved, that the Log Hill Mesa Fire Protection District adopts the Ouray County Multi-Hazard Mitigation Plan

Passed: January 14, 2020

Dave Wiens, Vice Chairman, Log Hill Mesa Fire Protection District