RESOLUTION NO. 05-10

A RESOLUTION ADOPTING THE MESA COUNTY, COLORADO HAZARD MITIGATION PLAN

WHEREAS, in order to be eligible for future pre-disaster and post-disaster federal funding for hazard mitigation purposes, the Federal Disaster Mitigation Act of 2000 requires Mesa County to prepare and adopt a Hazard Mitigation Plan to identify and mitigate natural hazards which potentially exist and affect them;

WHEREAS, natural hazards exist in Mesa County;

WHEREAS, natural hazards have the potential for loss of life and significant property damage;

WHEREAS, Mesa County and the City of Grand Junction recognize the importance of eliminating or reducing vulnerability to disasters caused by natural hazards for the overall good and welfare of the community;

WHEREAS, the Emergency Management Department of Mesa County has created a comprehensive, multi-jurisdictional, Hazard Mitigation Plan which identifies, as best as can predicted with the information available, the natural hazards within Mesa County and projects and procedures by which to mitigate those hazards;

WHEREAS, in order to prevent and reduce the vulnerability of persons and property, and to maintain the health, safety, and welfare of Mesa County citizens, there exists adequate justification for the creation and maintenance of the proposed projects and programs identified in the Hazard Mitigation Plan;

WHEREAS, this Hazard Mitigation Plan was prepared after consultation with, and in conjunction with, the other municipalities and communities within Mesa County and therefore is meant to be comprehensive and multi-jurisdiction; and

WHEREAS, adoption of this Hazard Mitigation Plan, while not mandatory, is encouraged to be adopted in its entirety by the governing body of the County of Mesa as well as towns and municipalities, within Mesa County so that mutual implementation of the Hazard Mitigation Plan can take place among these entities.
NOW, THEREFORE, BE IT RESOLVED BY THE CITY OF GRAND JUNCTION, MESA COUNTY, COLORADO:

1. The City of Grand Junction hereby proposes to accept, and by this action does hereby approve and adopt, the Mesa County, Colorado Multi-Jurisdictional Mitigation Plan dated January 2010, a copy of which is attached to this Resolution.

2. The City of Grand Junction, along with Mesa County and other plan participants, shall endeavor to implement the proposals designated with the Mesa County Hazard Mitigation Plan.

3. To assist with implementation of the goals of the Hazard Mitigation Plan, Mesa County staff was instructed, by Resolution of the Board of County Commissioners, to request and pursue available funding opportunities, when necessary and when available, to assist with the implementation of the proposals designated therein.

4. City of Grand Junction staff shall additionally cooperate, when at all possible, with the other plan participants insofar as advising them of funding opportunities available and applicable to them.

5. Moreover, City of Grand Junction staff shall additionally endeavor to advise, cooperate with, and coordinate with the other plan participants in the implementation of the mitigation projects and plans set forth in the Hazard Mitigation Plan.

6. The City of Grand Junction urges the other plan participants to adopt and carry out the Mesa County, Colorado Hazard Mitigation Plan.

PASSED THIS 6th DAY OF January, 2010.

By: /s/: Bruce Hill
Mayor City of Grand Junction

Attest:

/s/: Stephanie Tuin
City Clerk

Mesa County, Colorado

2010 Revision

Authored by: Kimberly Bullen & Andrew Martsolf

Table of Contents

Executive Summary 4
Project Update 10
Plan Requirements 11
Introduction and Planning Area Profile 13
Purpose 13
Background & Scope 13
Planning Area Profile 14
Geography and Climate 15
Population & Demographics 15
Economy 18
Planning Process 19
Multi-Jurisdictional Participation 19
10-Step Planning Process 20
Phase 1 Organize Resources 20
Step 1: Organize the Planning Effort 20
Step 2: Public Involvement 24
Step 3: Departments and Agencies Coordination 25
Phase 2 Assess Risk 26
Step 4: Identify the Hazards 26
Step 5: Assess the Risks 26
Phase 3 Develop the Mitigation Plan 27
Step 6: Set Goals 27
Step 7: Review Possible Activities 27
Step 8: Draft the Plan 27
Phase 4 Implement the Plan and Monitor Progress 27
Step 9: Adopt the Plan 27
Step 10: Implement, Evaluate, and Revise the Plan 27
Risk Assessment 28
Hazard Identification 28
Disaster Declaration History 30
Hazard Profiles 30
Avalanche 32
Dam Failure 33
Drought 36
Earthquake 39
Flood 41
Hazardous Materials 45
Landslide, Rockfall 47
Lightning 53

Severe Winter Weather 55
Wildfire 56
Windstorms/Tornados 59
Hazard Profile Summary 61
Vulnerability Assessment 62
Community Asset Inventory 64
Critical Facilities and Infrastructure 64
Natural, Historic, and Cultural Assets 65
Natural Resources 65
Economic Assets 74
Vulnerability by Hazard 75
Mitigation Strategy 86
Goals and Objectives 86
Identification and Analysis of Mitigation Actions 87
Implementation of Mitigation Actions 87
Plan Implementation and Maintenance 109
Implementation 109
Monitoring, Evaluating, and Updating the Plan 109
Hazard Mitigation Planning Committee 109
Plan Maintenance Schedule 110
Plan Maintenance Process 110
Incorporation into Existing Planning Mechanisms 111
Continued Public Involvement 111
Community Profiles 112
Town of Collbran 112
Community Profile 112
Hazard Identification and Profiles 113
Vulnerability Assessment 113
Community Asset Inventory 114
Capabilities Assessment 115
Town of Palisade 116
Community Profile 116
Hazard Identification and Profiles 117
Vulnerability Assessment 118
Community Asset Inventory 118
Capabilities Assessment 120
City of Grand Junction 121
Community Profile 121
Hazard Identification and Profiles 122
Vulnerability Assessment 123

Community Asset Inventory 123
Capabilities Assessment 125
City of Fruita 126
Community Profile 126
Hazard Identification and Profiles 128
Vulnerability Assessment 128
Community Asset Inventory 128
Capabilities Assessment 130
Fire Protection Districts: 131
District Profile 131
Plateau Valley Fire Protection District 132
Lower Valley Fire Protection District 133
Grand Junction Fire Department & Grand Junction Rural Fire Protection District 134
Hazard Identification and Profiles 134
5-2-1 Drainage Authority 135
Authority Profile 135
Hazard Identification and Profiles 136
Vulnerability Assessment 136
Community Asset Inventory 136
Vulnerability by Hazard 136
Appendix A: Plan Adoption Resolutions 137
Appendix B: Kick-off Meeting Invitation List 139
Appendix C: Invitation Letter to Kick-Off Meeting 144
Appendix D: HMPC Meeting Agendas, Sign-In Sheets, and Sample Worksheets 146
Appendix E: Data Collection Worksheets 157
Appendix F: Mesa County Hazard Mitigation Planning Committee Members 162
Appendix G: Community Open House Press Release 163
Appendix H: Community Open House Meetings (Sign-in Sheets) 165
Appendix I: Table of Figures 168
Works Cited 169

Mesa County Hazard Mitigation Plan

Mesa County, Colorado

Executive Summary

The purpose of natural hazards mitigation is to reduce or eliminate long-term risk to people and property from natural hazards. Mesa County's original Mitigation Plan was completed in 2004 and approved by FEMA in January 2005. This revised plan was prepared pursuant to the requirements of the Disaster Mitigation Act of 2000 which requires a five year revision in order to achieve eligibility for the Federal Emergency Management Agency (FEMA) Flood Mitigation Assistance, Pre-Disaster Mitigation, and Hazard Mitigation Grant Programs.

The Mesa County Hazard Mitigation Plan is a multi-jurisdictional plan that covers the following local governments, special districts, and authorities that participated in the planning process and who identified future mitigation projects for their jurisdiction. Additional jurisdictions participated in the planning process but did not define a specific project (see participant list):

Mesa County	Lower Valley Fire Protection District
City of Grand Junction	5-2-1 Drainage Authority
City of Fruita	Plateau Valley Fire Protection District
Town of Collbran	Grand Junction FD & Grand Junction Rural FPD
Town of Palisade	

The County's planning process followed a methodology prescribed by FEMA, and much of the information contained in this plan was developed using jurisdictional information, plans and documents. Many of the forms used in this planning process were taken from other jurisdictional plans including the Summit County Multi-Hazard Mitigation Plan. (Summit County, 2008)

Mesa County's process began with the formation of a Hazard Mitigation Planning Committee (HMPC) comprised of key stakeholders from Mesa County, participating jurisdictions, and state and federal agencies. The HMPC conducted a risk assessment that identified and profiled hazards that pose a risk to Mesa County, assessed the County's vulnerability to these hazards, and examined the capabilities in place to mitigate them. The County is vulnerable to several hazards that are identified, profiled, and analyzed in this plan. However, floods, wildfires, and rock falls-landslides are among the hazards that can have a significant impact on the County and are the hazards that specific mitigation projects have been identified. Based upon the risk assessment, the HMPC identified goals and objectives for reducing risk to hazards. The goals and objectives of this hazard mitigation plan are to:

Goal 1: Reduce risk to the people, property, and environment of Mesa County from the impacts of natural hazards.

- Minimize the vulnerability of existing and new development to hazards.
- Increase education and awareness of hazards and risk reduction measures.
- Improve comprehensive wildfire planning, funding, and mitigation.
- Strengthen floodplain management programs.
- Enhance assessment of multi-hazard risk to critical facilities and infrastructure.

Goal 2: Minimize economic losses

- Strengthen disaster resistance and resiliency of businesses and employers.
- Promote and conduct continuity of operations and continuity of governance planning.
- Reduce financial exposure of county and municipal governments.

Goal 3: Implement the mitigation actions identified in this plan

- Engage collaborative partners, community organizations, businesses, and others
- Integrate mitigation activities into existing and new community plans and policies.
- Monitor, evaluate, and update the mitigation plan.

To meet identified goals and objectives, the plan recommends the mitigation actions summarized in Table 1. The HMPC also developed an implementation plan for each action, which identifies priority level, background information, and ideas for implementation, responsible agency, timeline, cost estimate, potential funding sources, and more.

The Hazard Mitigation Plan has been formally adopted by the Mesa County Board of County Commissioners and the governing bodies of each participating jurisdiction and will again be revised within a five-year timeframe.

TABLE 1 MITIGATION ACTION MATRIX

Jurisdiction	Action	Priority	Goals Addressed	Hazards Addressed
Multi-jurisdictional	Coordinate annual reviews	High	Goal 3	Multi-Hazard
Multi-jurisdictional	Continue public involvement in mitigation activities	High	Goal 1	Multi-Hazard
Multi-jurisdictional	Coordinate and complete a continuity of operations/continuity of governance (COOP/COOG) Plan	High	Goal 2	Multi-Hazard
Plateau Valley FPD	Develop a Community Wildfire Protection Plan to address issues in the wildland urban interface and develop a fuel reduction program. CWPP is designed to assist the public and agencies with structure development and management of natural resources in the wildland urban interface.	High	Goal 1	Wildfire
Multi-jurisdictional	Identify and prioritize fuel reduction projects around critical facilities and infrastructure in wildfire hazard areas. Community education regarding the risk of wildfires.	High	Goal 1	Wildfire
Multi-jurisdictional	Continue mapping wildfire hazard and vulnerability analysis for wildland-urban interface areas in Mesa County.	High	Goal 1	Wildfire
Town of Palisade: Fire Department	Create a fire mitigation plan to protect vital raw water supplies and infrastructure. Conduct on the ground mitigation to reduce the potential for wildfire.	High	Goal 1,2	Wildfire
Multi-jurisdictional	Orchard Mesa Detention & Conveyance Improvements: Project includes 2 detention basins and 535 feet of improvements to box culvert that will remove 269 structures from 100 year floodplain, including 2 churches and 1 elementary school, and decrease emergency response arterial inundation (Hwy.50)	Medium	Goal 1,2	Flooding
Mesa County	Adobe Creek: Overbank flooding of properties is common during small events. Project will upgrade 13 structures and 2.5 miles of channel to achieve flow capacity for 10 year event level.	Medium	Goal 1,2	Flooding

Multi-Jurisdictional	Project will construct a 75.5 acre-foot reservoir above I-70 on Bosley Wash to reduce peak 100 year discharge from 1727 CFS to 50 CFS, eliminating downstream flooding.	Medium	Goal 1,2	Flooding
Mesa County	Douglas Wash: The existing drainage way/ crossing structures are undersized and cannot convey the 100 year storm event. More than 55 properties are within the flooding area. The recommended solution was to construct detention areas to control the flow within the channel.	Medium	Goal 1,2	Flooding
Multi-Jurisdictional	Lewis Wash: Existing drainage way and crossing structures are undersized and cannot convey the 100 year storm event. More than 200 properties are within the flooding area. A study was completed and the recommended solution is to construct detention areas to control the flow within the channel.	Medium	Goal 1,2	Flooding
City of Grand Junction	Riverside Levee: Flooding occurred in the 1983/84 runoff event in the Colorado River basin. Emergency flood wall was constructed protecting the area north of the river during this flood event. This is not a certified flood levee.	Medium	Goal 1,2	Flooding
Multi-jurisdictional	Mitigation project for the upper and lower portions of the Leach Creek drainage. These projects would provide mitigation to flood events for the area of Leach Creek above the confluence with Ranchmen's Ditch.	Medium	Goal 1,2	Flooding
Multi-Jurisdictional	Identify and map geologic hazard zones and incorporate into master planning.	Medium	Goal 1,3	Landslide-Rockfall-Mudflow
Multi-jurisdictional	Improve information on website about natural hazard risk and mitigation	Medium	Goal 1	Multi-Hazard
Multi-jurisdictional	Real time rainfall data is lacking in Mesa County. An automated rainfall ALERT network would allow real time rainfall data access by local officials and National Weather Service forecasters for more timely flash flood warnings.	Medium	Goal 1,3	Flooding
Multi-Jurisdictional	A Basin Master Plan for Big Salt Wash will be completed in May 2010. The plan will identify at risk properties, conveyance and detention mitigation alternatives and costs.	Low	Goal 1	Flooding

Following is a brief project update, from the goals, objectives and projects identified in the Approved 2004 Plan.

	Status	Reason
Flooding		
Big Pipe Project	Completed	
City of Fruita (Washes: brush and debris removal	Ongoing	
Update Flood Insurance Rate Maps	Completed March 6, 2009	
Public Awareness	Ongoing	Each spring we do PSA's.
Incorporate GIS into risk analysis	Completed	
Winter Storm		
Early Warning and Preparation	Completed Nov. 2008	
Storm Ready Participation	Deferred	
Participate in Winter Weather Awareness Week	Completed Nov. 2008	
Drought		
Improve water conservation practices	Completed by 5-2-1 Drainage Authority	
Educate citizens on water conservation	Completed by 5-2-1 Drainage Authority	
Implement DRIP Program	Completed by 5-2-1 Drainage Authority	
Tornadoes		
Early detection and warning systems	Completed (New Reverse 911 system)	
Public Awareness and Education	Deferred	
Thunderstorms/Severe Weather		
Public Awareness about NOAA Weather Radio	Ongoing	
Participate in Severe Weather Awareness Week	Completed	
Promote crop insurance information	Deferred	
Earthquakes		
Increase public awareness about earthquakes	Deferred	
Provide public campaign on how to prepare for and respond to earthquakes	Deferred	
Update GIS mpas to show faults in Mesa County	Completed	
Conduct liquefaction study	Deferred	
Wildfire		
Continue implementing Firewise Program	Deferred	Not enough resources to complete project.
Fuel Reduction Projects	Ongoing	NPS worked to reduce fuel on NPS lands.
Education on danger of wildfire	Completed/Ongoing	
Watershed Protection	Deferred	Nothing specific was completed.

Public Health		
Public Education on West Nile Virus	Completed	
Public Health Surveillence for West Nile	Completed	
Mosquito Control measures	Conpleted Spraying	
Hazardous Materials		
Site inspections and pre-planning with faciltiies to ID chemicals on site	Completed/Ongoing	
Map high pressure gas lines throughout Mesa County	Completed	
Terrorism		
Public Education on Terrorism	Completed/Ongoing	
Continued planning with Public Health to ID roles & responsibilities	Ongoing	
Conduct exercises to test plans	Completed	Exercises have been completed through the Northwest All Hazard Emergency Management Region
Power Loss		
Identify populations at risk	Deferred	
Identify critical faciltiies that don't have back up power capabilities	Ongoing	Have identified County facilities that don't have back up power.
Identify companies that can provide back up power generation	Ongoing	
Dam Failure		
Identify and map Inundation area of Class I and II dams.	Ongoing	Have mapped location of all Class I and II dams in the County
Early notifications to citizens in the inundation areas	Ongoing	Have mapped some areas.
Noxious Weeds		
Identify and contine weed infestations	Ongoing	
Develop and implement weed management plan	Ongoing	
Projects were deferred primarily due to a change in the Emergency Management personnel.		

Project Update

Goal 1: Reduce the potential for flooding and remove large commercial areas, including Grand Mesa Center, Valley Plaza Shopping Center, and restaurants along the south side of Mesa Mall, from the 100-year floodplain. This would include construction of detention basins in the upper reaches of the Ranchman's Ditch basin and improving conveyance systems through the lower portions of the basin.

City of Grand Junction, Colorado
Ranchmen's Ditch Flood Mitigation Project, also known as the "Big Pipe" project

This project provided a solution to a very complex and vexing flooding problem that affected the greater part of the City of Grand Junction. The solution was nearly ten years in the making and included the expenditure of over $16 million to construct a system that ultimately removed nearly 380 land parcels including homes and commercial buildings from the Ranchmen's Ditch 100 year floodplain by increasing the drainage way conveyance capacity from less than a 2-year event to accommodate the expected 100 year flows.

The main feature of this project, as attested by the moniker ascribed the local newspaper and adopted by the Citizens that financed the project is the "Big Pipe". The first phase of the project included the installation of over 3,900 LF of triple 78-inch diameter RCP, constructed adjacent to (through the parking lot) the Mesa Mall, the Grand Valley's most important and active commercial shopping district. Immediately upstream of the mall, over 5,000-feet of parallel 96 inch and 90 inch RCP storm sewers were installed alongside Patterson Road, (considered to be the busiest arterial roadway on the western slope of Colorado).

Finally, the upper limits of the Big Pipe included the installation of 78-inch and 60-inch RCP storm sewers parallel to an existing 72-inch RCP system in Patterson Road. Due to the overall size and length of the pipe systems, the conveyance system certainly lives up to its' name and now provides an opportunity for future roadway expansion needs. Several other substantial storm water facilities were also designed and constructed to supplement the Big Pipe System. In particular, three regional detention facilities were constructed to provide over 68 acre-feet of detention. The larger of the detention facilities was actually constructed within the boundaries of the Grand Junction Regional Airport, which incorporated specific design elements to reduce the attraction of migratory birds with FAA approval. The ponds also serve to improve water quality by reducing the settable solids content of the "western wash" in the outflow. The Ranchmen's Ditch improvements converge with Leach Creek, prior to discharging into the Colorado River.

To address the increased discharges on Leach Creek and overtopping of major transportation corridors, additional improvements were necessary on Lower Leach Creek, including modification to increase the capacity of the existing Colorado Department of Transportation

(CDOT) Highway, Interstate – 70 (Business) Bridge and constructing a 2,400 feet long open channel with a 3.8-acre wetlands enhancement. Additional culvert and pipe improvements were installed downstream of Interstate-70 (Business) at the crossing with the Union Pacific Railroad (UPRR), where an additional 84-inch RCP was installed in a single day open-cut operation.

The City of Grand Junction received a Pre-Disaster Mitigation Grant from FEMA in the amount of $3 million dollars for the project. The project was completed in April 2009.

Goal 2: Work with Mesa County GIS Department to identify and map critical facilities impacted by flooding events.

Under Homeland Security planning and the Northwest All Hazard Emergency Management (NWAHEM) Region, Mesa County and surrounding jurisdictions have identified a list of critical facilities in our communities. These facilities are considered, "critical" for a variety of reasons including:

1. Recognized as critical infrastructure in the community.
2. Contribute to the community's public safety system.
3. Facility has economic impacts within the community.

After these critical facilities were identified, the Mesa County GIS staff created a mapping layer identifying their locations. Because these facilities were created under Homeland Security directives, this information is sensitive in nature and mapping layers are not included in this plan but are available for review by appropriate personnel.

Plan Requirements

44 CFR requirement 201.6c (5): The local hazard mitigation plan shall include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan. For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.

The following jurisdictions participated in the development of this plan and have adopted the multi-jurisdictional plan. A sample resolution is provided and all signed copies of resolutions can be found in Appendix A of this plan.

Mesa County	Lower Valley Fire Protection District
City of Grand Junction	Plateau Valley Fire Protection District
Town of Palisade	Grand Junction FD. & Grand Junction Rural FPD
City of Fruita	5-2-1 Drainage Authority
Town of Collbran	

RESOLUTION NO. _____

A RESOLUTION ADOPTING THE REVISED MESA COUNTY, COLORADO

MULTI-HAZARD MITIGATION PLAN

WHEREAS, natural hazards in Mesa County have the potential for loss of life and significant property damage,

WHEREAS, the County of Mesa recognizes the importance of reducing or eliminating vulnerability of disasters caused by natural hazards for the overall good and welfare of the community,

WHEREAS, the County of Mesa, Emergency Management Department has revised the comprehensive, multi-jurisdictional, Multi-Hazard Mitigation Plan to identify both natural and manmade disasters and developed strategies to mitigate those hazards,

WHEREAS, the Federal Disaster Mitigation Act of 2000 requires jurisdictions to prepare and adopt a Multi-Hazard Mitigation Plan to be eligible for future pre-disaster and post disaster federal funding for mitigation purposes, and

WHEREAS, the County of Mesa has identified and justified a number of proposed projects and programs needed to mitigate the vulnerabilities of the County to the impacts of future disasters to be included in this revised Multi-Hazard Mitigation Plan.

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF COUNTY COMMISSIONERS OF MESA COUNTY, COLORADO:

Section 1: The County of Mesa hereby proposes to accept and approve the revised Mesa County Multi-Hazard Mitigation Plan.

Section 2: The plan participants are requested and instructed to pursue available funding opportunities for implementation of the proposals designated therein, and

Section 3: The plan participants will, upon receipt of such funding or other necessary resources, seek to implement the proposals contained in its section of the mitigation strategy, and

Section 4: The plan participants will continue to participate in the updating and revision of the Mesa County Multi-Hazard Mitigation Plan with a plan review and revision to occur within a five-year cycle, and designated staff will provide annual progress reports on the status of implementation of the plan to the Board of County Commissioners, and

Section 5: The plan participants will further seek to encourage the businesses, community groups, organizations and other stakeholders within the County of Mesa, to also participate in the updating and revision of this plan.

APPROVED on _____.

Introduction and Planning Area Profile

Purpose

Mesa County and several other participating jurisdictions prepared this revision of the local Multi-hazard Mitigation Plan to guide hazard mitigation planning to better protect the people and property of the County from effects of hazard events. This plan demonstrates the communities' commitment to reducing risks from hazards and serves as a tool to help decision makers direct mitigation activities and resources.

With the completion of this plan revision, Mesa County and participating jurisdictions are eligible for certain federal disaster assistance, specifically, the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Grant Program, Pre-Disaster Mitigation Program, and Flood Mitigation Assistance Program.

Background & Scope

Each year in the United States, natural 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 dollars only partially reflect the true cost of disasters, because additional expenses to insurance companies and non-governmental organizations are not reimbursed by tax dollars. Many natural disasters are predictable, and much of the damage caused by these events can be reduced 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." On average, each dollar spent on mitigation saves society an average of $4 in avoided future losses in addition to saving lives and preventing injuries. (National Institute of Building Science Multi-Hazard Mitigation Council 2005)

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 Mesa County's hazard mitigation planning process and identifies relevant hazards and vulnerabilities and strategies the County and participating jurisdictions will use to decrease vulnerability and increase resiliency and sustainability in Mesa County.

This revised 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. The 2007 amendments also incorporate mitigation planning requirements of

the Flood Mitigation Assistance (FMA) program authorized by the National Flood Insurance Act of 1968.

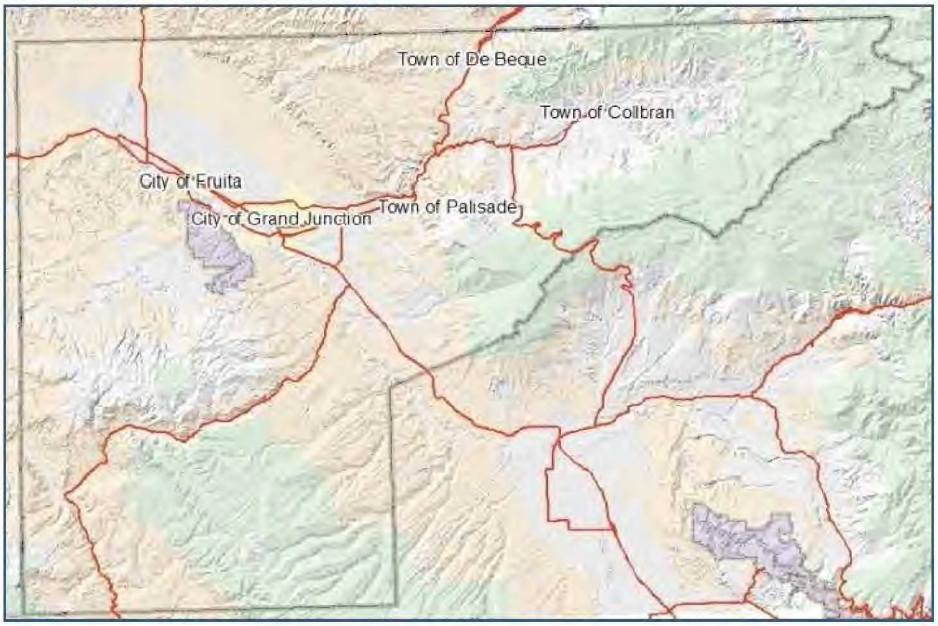
While the Disaster Mitigation Act emphasizes the need for mitigation plans and more coordinated mitigation planning and implementation efforts, the regulations established the requirements that local hazard mitigation plans must meet in order for a local jurisdiction to be eligible for certain federal disaster assistance and hazard mitigation funding under the Robert T. Stafford Disaster Relief and Emergency Act (Public Law 93-288).

This revised plan addresses natural hazards and one manmade hazard—hazardous materials release. Although FEMA encourages communities to integrate manmade hazards into the mitigation planning process, the scope of this plan focused more on natural hazards. Additional plans have been developed to address other manmade hazards such as chemical, biological, and radiological terrorism through the Northwest All Hazard Emergency Management Region (HWAHEMR) and requires sensitivity towards confidentiality.

Planning Area Profile

Figure 1 shows a map of the Mesa County planning area, including the various jurisdictions who participated in the revision of this plan.

FIGURE 1 HAZARD MITIGATION PLANNING AREA



Geography and Climate

Mesa County is located on the western border of Colorado, 250 miles west of Denver. Interstate 70, the state's main east-west transportation corridor travels directly through Mesa County. One of the 64 counties in Colorado, Mesa County encompasses 3,309 square miles, of which approximately 72% is publicly owned and is controlled primarily the U.S. Forest Service and Bureau of Land Management. The City of Grand Junction is the County Seat and is the largest city in Western Colorado. The Grand Junction area serves as the banking center, health care service provider and retail trade center for a large geographical area in western Colorado and eastern Utah.

The landscape of Mesa County has many unique features as it is located in a river valley surrounded by contrasting natural landmarks—such as the Colorado National Monument to the west, the Grand Mesa National Forest to the east, and the Bookcliffs to the north. These natural wonders provide diverse and abundant year-round recreational activities.

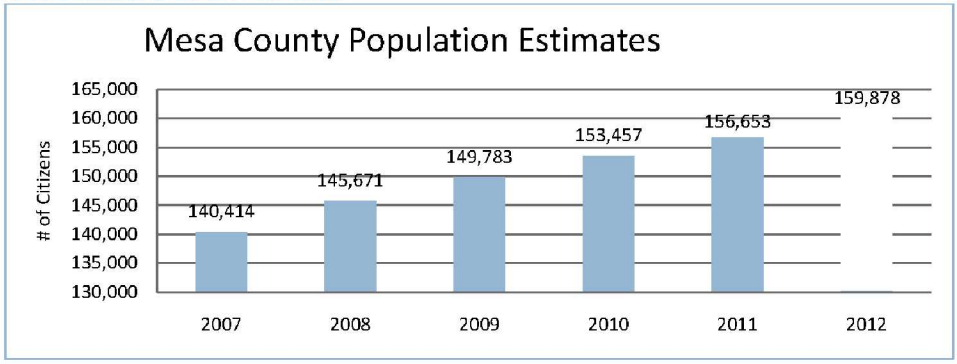
The Colorado National Monument is a beautiful geological display of towering red sandstone monoliths set against deep, shear-walled canyons which are dotted throughout the 20,000 acres of the park. The Grand Mesa National Forest is said to be the largest flat-topped mountain in the world. It has more than 200 lakes and is home to the Powderhorn ski area.

Mesa County's mild climate provides a sharp contrast to the eastern slope of Colorado. Residents enjoy mild winter temperatures with lows averaging only 26F (-3ºC) in January with year-round low humidity. (Mesa County 2008 Budget Book)

Population & Demographics

Mesa County estimates its 2008 population to be 144,440 which ranks it as the 11th largest population of the 64 counties in Colorado. The County estimates include data from the State Demographer's office and includes more up to date information on components of change—births, deaths, and change in group population. Mesa County also considers school enrollment numbers, new housing permits, household increases, and vacancy rate. Mesa County has used a conservative estimate when projecting future population and estimates the 2011 population to be 156,653 which is a 7.5% increase from 2008 as shown in Figure 2. The majority of the County's population is in unincorporated areas and is estimated to be 73,404 based on 2008 data from the Colorado State Demographer's Office; however, the City of Grand Junction's estimated population equals 55,189 as shown in Figure 3.

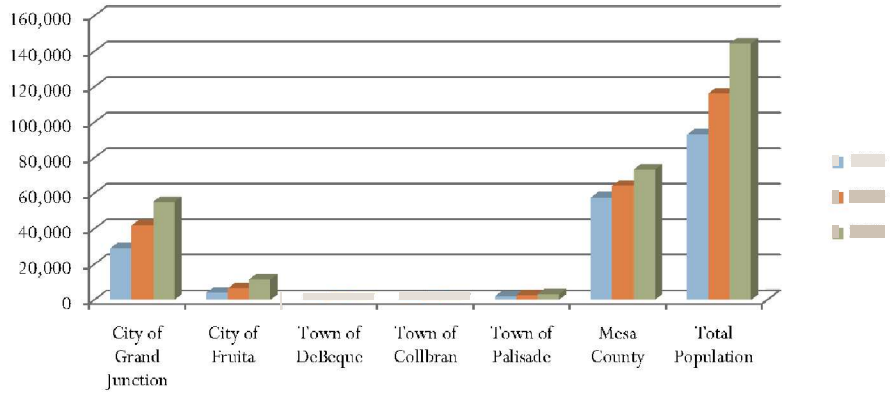
FIGURE 2 ESTIMATED COUNTY POPULATION



(Demographer)

FIGURE 3 JURISDICTION'S POPULATION

Area	*1990 Population*	*2000 Population*	*2008 Population*	*% Change*
City of Grand Junction	29,034	41,986	55,189	31%
City of Fruita	4,045	6,478	11,535	78%
Town of DeBeque	257	451	524	16%
Town of Collbran	228	388	683	76%
Town of Palisade	1,871	2,579	3,105	20%
Mesa County	57,710	64,373	73,404	14%
Total Population	93,145	116,255	144,440	24%



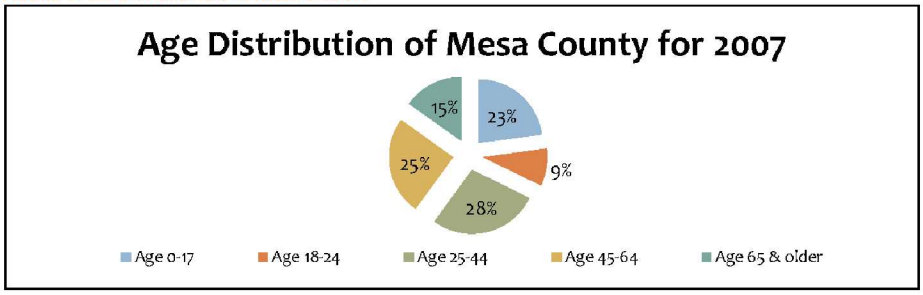
The U.S. Census Bureau demographic and social characteristics for Mesa County are shown in Table 2 and 3 and Figure 4.

TABLE 2 MESA COUNTY DEMOGRAPHIC AND SOCIAL CHARACTERISTICS

American Ind. or Alaskan Native Alone	1,480	12	1.10%	1.10%
Asian Alone	982	12	0.70%	0.70%
Black Alone	1,254	12	0.90%	0.90%
Native Hawaiian and Other Pac. Isl. Alone	166	10	0.10%	0.10%
White Alone	133,360	11	95.90%	95.90%
Two or More Race Groups	1,840	11	1.30%	1.30%
Non-Hispanic or Latino	122,889	10	88.40%	88.40%
Hispanic or Latino	16,193	11	11.60%	11.60%

US Census Bureau

FIGURE 4 AGE DISTRIBUTION IN MESA COUNTY



(U.S. Census Bureau)

Mesa County is served by U.S. Highways 6, 24, and 50; Interstate Highway 70; and several State highways. Most of the communities, including the larger ones, are located along the U.S. and Interstate highway systems. General intra-county access is provided by more than 1,300 miles of county road. The Union Pacific Railroad mainline parallels the U.S. and Interstate highways from east to west through the county, and a branch line parallels U.S. Highway 50 to the south. Limited railroad passenger service by Amtrak is provided, with the bulk of service handling freight. Bus service is available and four major airlines and several commuter-type airlines provide passenger and freight service to Grand Junction.

TABLE 3 MESA COUNTY DEMOGRAPHICS

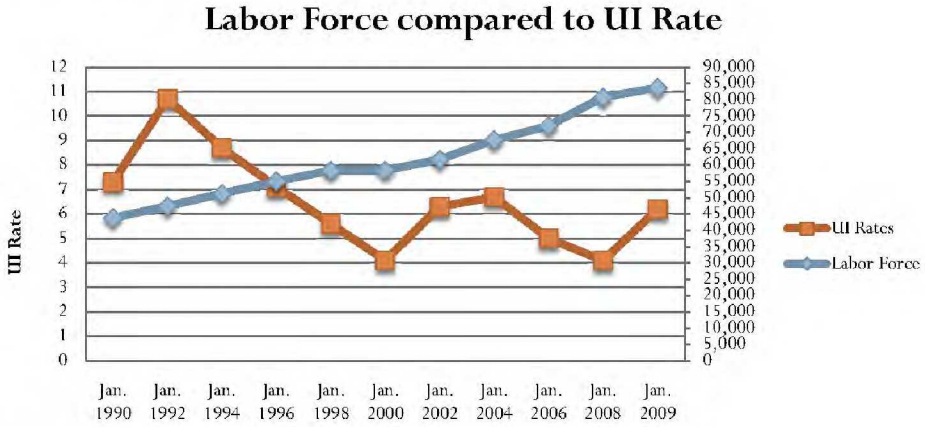
	139,082	11		61,540	10
	49.30%	24		$36,221	20
	45,823	11		5.40%	16
	78,896	10		$38,724	19
	3.2	39		4.10%	5
	$30,746	27		$42,556	20
	$49,926	27		14.00%	3
	12	36		$40,983	12
	85	31		3.60%	12
	22	30		$47,118	21

(U.S. Census Bureau)

Economy

Over the past several years, Mesa County had enjoyed an expanding economy. Job growth had increased to all time highs with renewed mining activity and continued expansion in service producing industries. However, under current economic conditions, the mining industry suffered one of its steepest declines in recent history. The decrease in the energy industry is attributed to a sharp decline in natural gas prices and declining demand as it is tied directly to the national and global economic recession -the worst since the 1929 Great Depression. With the recession, Mesa County projects rising unemployment through at least Q4 2009, (see Figure 5). Mesa County has experienced significantly lower sales tax and use tax receipts, and has experienced lower demand for construction services, declining tourism, recreation activity and revenue.

FIGURE 5 MESA COUNTY LABOR FORCE AND UNEMPLOYMENT



(Tuffin, 2009)

Planning Process

44 CFR Requirement 201.6(c) (1): [The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

As a requirement under the Disaster Mitigation Act of 2000, local jurisdictions are responsible for revising their Pre-Disaster Mitigation Plans every five years. This plan is a revision to the County's Pre-Disaster Mitigation Plan that was completed in 2004 and approved in January 2005 under this requirement.

Multi-Jurisdictional Participation

44 CFR Requirement §201.6(a)(3): Multi-jurisdictional plans may be accepted, as appropriate, as long as each jurisdiction has participated in the process and has officially adopted the plan.

Mesa County invited every incorporated city and special district in the County to participate in the multi-jurisdictional Mesa County Hazard Mitigation Planning process. The Disaster Mitigation Act requires that each jurisdiction participate in the planning process and officially adopt the multi-jurisdictional hazard mitigation plan. Each jurisdiction that chose to participate in the planning process and development of the plan was required to meet plan participation requirements defined at the beginning of the process, which included the following:

- Designate a representative to serve on the HMPC
- Participate in HMPC meetings
- Complete and return worksheets

- Identify mitigation actions for the plan
- Review and comment on plan drafts
- Inform the public, local officials, and other interested parties about the planning process and provide opportunity for them to comment on the plan
- Formally adopt the Hazard Mitigation Plan

10-Step Planning Process

Mesa County used FEMA's Local Multi-Hazard Mitigation Planning Guidance (2008) and the State and Local Mitigation Planning How-To-Guides (2001), which include Multi-Jurisdictional Mitigation Planning (2006). The process used by Mesa County meets the funding eligibility requirements of the Hazard Mitigation Grant Program, Pre-Disaster Mitigation program, Community Rating System, and Flood Mitigation Assistance program. This plan is structured around a four-phase approach; organize resources, assess risks, develop the mitigation plan, and implement the plan and monitor progress.

Phase 1 Organize Resources

Step 1: Organize the Planning Effort

Mesa County's Hazard Mitigation Planning effort started with a kick-off meeting on August 11, 2009. The Mesa County Emergency Management Department mailed letters to county, municipal, district, state, and federal stakeholder representatives inviting representatives to attend the August 11th meeting and participate in the process. This list is located in Appendix B.

A planning committee was created that includes representatives from each participating jurisdiction, departments of the County, and other local, state, and federal agencies responsible for making decisions in the plan. Representatives at the Kick-off meeting agreed to act as the Hazard Mitigation Planning Committee (HMPC).

The following agency representatives participated in the HMPC:

Marty Medina	Colorado Department of Transportation
Dave Wolny	Mesa State College
Vic Sturm	Town of Collbran
Aaron Laing	Colorado State Patrol
Adam Appelhanz	Town of Collbran (Collbran Marshal)
Dave Gitchell	Central Orchard Mesa Fire Protection District
David Smith	City of Grand Junction (Persigo)
Bud Thompson	Mesa County – Engineering
Andi Staley	Mesa County – Engineering/Flood Plain Administrator
Chuck Vale	Colorado Division of Emergency Management
Garrett Jackson	Colorado Division of Water Resources
Kelly Rogers	Colorado State Forest Service

Mark Haynes	Colorado Division of Water Resources Dam Safety
Jim Pringle	National Weather Service (Grand Junction Office)
Andy Scott	Town of Palisade (Police Department)
Richard Rupp	Town of Palisade/Palisade Fire Department
Jane Quimby	Federal Bureau of Investigations
Mike Harvey	Plateau Valley Fire Protection District
Eric Mende	5-2-1 Drainage Authority
Bob Russell	City of Grand Junction (Police Department)
Drew Reekie	City of Grand Junction (Fire Department-Hazardous Materials)
Corey Lovern	City of Grand Junction (Fire Department-Hazardous Materials)
Bill Roth	City of Grand Junction (Fire Department)
Ken Watkins	City of Grand Junction (Fire Department)
Richard Proctor	Grand Valley Water Users Association
Barry Oelrich	Bureau of Land Management-Grand Junction Office
Frank Cavaliere	Lower Valley Fire Protection District
Bret Guillory	City of Grand Junction
Frank Hyde	Colorado National Monument
Steve Grant	Grand Junction Rural Fire Protection District
Kent Holsan	Clifton Fire Protection District
Brandi Manuppella	City of Grand Junction (Fire Department)
Mark Angelo	City of Fruita
Jim Fogg	Mesa County (Sheriff's Office)
Andrew Martsolf	Mesa County Emergency Management
Tristan Nelson	Mesa County GIS Department
Kimberly Bullen	Mesa County Emergency Management/Administration

The role of the HMPC was to collect data, make decisions on plan process and content, submit mitigation action implementation worksheets, review plan drafts, and coordinate and assist with community meetings and plan adoptions.

Four meetings were held with the Hazard Mitigation Planning Committee to gather data, develop mitigation actions, and review the draft plan. The agenda's, sign-in sheets, and sample worksheets used to collect data are included in Appendix D. In addition, three Community meetings were held across the valley to share the information and solicit input to the plan.

Kick-off Meeting	Introduction of planning process and discussion of hazards	August 11, 2009
HMPC #2	Review of risk assessment, identification of goals & Objectives	September 3, 2009
HMPC #3	Identification & prioritization of mitigation actions, discussion of process to monitor, evaluate, and	September 17,

	update plan.	2009
HMPC #4	Review of Draft Plan and Priorities	December 9, 2009
Community Input Meeting #1	Discuss the process used, discuss the hazards in the community, seek input on prioritizations.	December 10, 2009
Community Input Meeting #2	Discuss the process used, discuss the hazards in the community, seek input on prioritizations.	December 11, 2009
Community Input Meeting #3	Discuss the process used, discuss the hazards in the community, seek input on prioritizations.	December 14, 2009

During the Kick-off meeting, Mesa County Emergency Management staff presented information on the scope and purpose of the plan, participation requirements of HMPC members, and the proposed project work plan and schedule. Also discussed were the hazard identification requirements and data. Table 4 shows the analysis of hazards in Mesa County. This table is based on past events, impacts and future probability for each of the hazards required by FEMA for consideration in a local hazard mitigation plan. Emergency Management staff refined the list of hazards relevant to Mesa County.

TABLE 4 HAZARDS IN MESA COUNTY

Avalanche	2	4	6	32	M
Drought	8	4	4	48	M
Earthquake	6	4	4	40	M
Expansive Soils	2	4	2	16	L
Extreme Heat	8	4	2	40	M
Hail Storm	4	4	2	24	L
Land Subsidence	2	4	4	24	L
Lightning	2	8	4	48	M
Tornado	2	4	2	16	L
Wind Storm	4	6	4	48	M
Winter Storm	6	6	2	48	M
Dam Failure	4	4	6	40	M
Hazardous Materials	2	8	4	48	M

Geographic Location	
Large: greater than 50%	8
Medium: 25-50%	6
Small: 10-25%	4
Isolated: less than 10%	2

Magnitude/Severity	
Catastrophic	8
Critical:	6
Limited:	4
Negligible:	2

Occurrence	
Highly Likely:	8
Likely:	6
Occasional:	4
Unlikely:	2

Formula: Total Score = Occurrences x Impacts
Occurrences x (Geographic Location + Magnitude/Severity)
Hazard Level is based on Total
Score.

HMPC representatives were given several worksheets to begin the data collection process. A brief description of each worksheet is provided below and a sample of each worksheet is located in Appendix D. These worksheets were developed by AMEC Earth and Environmental.

Worksheet #1 is the Historical Hazard Event Data Collection Sheet which is used to gather historical events that have occurred in Mesa County.

Worksheet #2 is the Vulnerability worksheet used to determine the vulnerable populations, buildings, critical facilities, and infrastructure for each hazard that affects our jurisdiction. For this specific exercise, Mesa County made the decision to focus on the top three hazards affecting our county which includes, wildfires, floods, and rock falls. This particular information was used to estimate disaster losses which can then be used to gauge potential benefits of mitigation measures.

Worksheet #3 is the Capabilities Matrix which is filled out by each participating jurisdiction identifying various capabilities that exist with each entity.

Worksheet #4, the Mitigation Strategy worksheet, is used to identify possible mitigation actions. Based on the top 3 hazards that impact Mesa County, the HMPC divided into three groups to develop ideas regarding mitigation actions.

Worksheet #5 is the actual Mitigation Project Description. This worksheet is used to develop mitigation projects identified during the planning process and provide additional details about the project.

Step 2: Public Involvement

44 CFR Requirement 201.6(b): An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include: (1) an opportunity for the public to comment on the plan during the drafting stage and prior to plan approval.

The HMPC discussed options for involving the public during the development of this plan. It was decided three Open House meetings would be scheduled once the draft plan was written. These meetings were held in Fruita, Co., Grand Junction, Co., and Palisade Co. and sign-in sheets are located in Appendix H of this plan. The plan was also posted on the County's website at: www.mesacounty.us for review and comment and a press release was sent out to all media outlets in the community. Additional copies of the plan were made available at the following locations from December 1, 2009 to December 15, 2009.

Mesa County Courthouse Reception (544 Rood Ave, Grand Junction, CO)
Mesa County Sheriff's Office (215 Rice Street, Grand Junction, CO)
Mesa County Planning Department (750 Main Street, Grand Junction, CO)

Mesa County Emergency Management presented information on the purpose of the plan and its planning process, the results of the risk assessment, and the mitigation strategy developed by the HMPC. Members of the HMPC then presented the mitigation actions identified for the top three hazards in the community. The mitigation actions were mapped and described on posters around the room. Each attendee was given five sticky dots and asked to vote on their top five mitigation actions by placing their dots next to each one. The input gathered at each of the public meetings was used in the final prioritization of the mitigation actions.

Step 3: Departments and Agencies Coordination

44 CFR Requirement 201.6(b): An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include: (2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interested to be involved in the planning process. (3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

There are numerous organizations whose goals and interests align with hazard mitigation in Mesa County. Coordination with these organizations and other community planning efforts is vital to the success of this plan. The Mesa County Office of Emergency Management invited other local, state, and federal departments to participate in this process with several of them serving as representatives on the HMPC. As a component of the coordination with other agencies, the HMPC collected and reviewed existing technical data, reports, and plans. State and federal agency data sources, including the National Weather Service and the Flash Flooding at the Colorado National Monument (1921-2003) Report produced by Professor Gigi Richard of Mesa State were used to collect information.

Mesa County and the participating communities also used a variety of comprehensive planning mechanisms, such as land use and general plans, emergency operations plans, and municipal ordinances and building codes as references. This information was used in the development of the hazard identification, vulnerability assessment, and capability assessment and in the formation of goals, objectives, and mitigation actions.

Phase 2 Assess Risk

Step 4: Identify the Hazards

During the kick-off meeting, the HMPC discussed past events, impacts, and future probability for each of the hazards required by FEMA for consideration in a local hazard mitigation plan. A profile of each hazard was then developed with the help of County GIS staff in developing GIS layers to display the information. The HMPC discussed the rankings as determined by the scores associated with each of the factors, i.e., occurrences, probability of future occurrences, magnitude and severity. The committee concurred with the scoring and the ratings of hazards as either high, medium, or low hazards. The committee then determined the areas affected by the top three hazards and GIS mapped out the areas using a subjective boundary.

Step 5: Assess the Risks

After profiling the hazards that could impact Mesa County, the Emergency Management Department staff collected information to describe the likely impacts of future hazard events in the participating jurisdictions. This step involved two parts: a vulnerability assessment and a capability assessment.

The vulnerability assessment involves an inventory of assets at risk to natural hazards and in particular wildfires, flooding, and rock fall/landslides. These assets included total number and value of structures; critical facilities and infrastructure; natural, historic and cultural assets; and economic assets. Mesa County Emergency Management staff completed detailed analysis for each community participating in this revision of the plan. The analysis was used to determine the proportion of value of buildings in the hazard areas that were identified by the HMPC. The County GIS system was used by first selecting parcels from the Assessor's data that have their center within the City or Town limits and then making a sub-selection of parcels that have their center within the defined hazard area. Structure value is based on the actual value of improvements.

A similar process was completed for each jurisdiction to understand the affected population. This analysis used census tract data in the GIS system. Population numbers were increased by 2.2% per year to adjust for population growth. (Martsolf, 2009)

The capability assessment consists of identifying the existing mitigation capabilities of participating jurisdictions. This includes government programs, policies, regulations, ordinances, and plans that mitigate or could be used to mitigate risk to disasters. Participating jurisdictions collected information on their regulatory, personnel, fiscal, and technical capabilities as well as ongoing initiatives related to interagency coordination and public outreach. This information is included in Appendix E.

Phase 3 Develop the Mitigation Plan

Step 6: Set Goals

The HMPC divided themselves into three groups with each group assigned to develop mitigation goals to one of the three "high" hazards. The groups identified possible locations and possible actions that could be integrated into existing planning.

Step 7: Review Possible Activities

At the third committee meeting, the HMPC identified and prioritized mitigation actions. The HMPC conducted a brainstorming session in which each committee member identified at least one mitigation action to address each of the plans goals.

As with each priority, there is a responsible agency to ensure the project is completed. The HMPC identified the responsible agency for implementing each action. The responsible agency then completed the Mitigation Project Description Worksheet (worksheet #5). These worksheets allow the HMPC to document background information, ideas for implementation, alternatives, responsible agency, partners, potential funding, cost estimates, benefits, and timeline for each identified action.

Step 8: Draft the Plan

A draft of the revised Mesa County Multi-Hazard Mitigation Plan was developed by Mesa County Department of Emergency Management staff and submitted to the HMPC for internal review. Once the committee's comments were incorporated, a complete draft of the plan was made available online and in hard copy for review and comment by the public and other agencies and interested stakeholders. The review period was from December 1, 2009 to December 15, 2009. Public comments were integrated into a final draft for submittal to the Colorado Division of Emergency Management and FEMA Region VIII.

Phase 4 Implement the Plan and Monitor Progress

Step 9: Adopt the Plan

To implement the plan, the governing bodies of each participating jurisdiction adopted the plan with a formal resolution. Scanned copies of resolutions of adoption are included in Appendix A.

Step 10: Implement, Evaluate, and Revise the Plan

The HMPC developed and agreed upon on overall strategy for plan implementation and for monitoring and maintaining the plan over time. This strategy is further described in the plan implementation section.

Risk Assessment

Requirement §201.6(c) (2): [The plan shall include] A risk assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards.

Risk to natural hazards is a combination of hazard, vulnerability, and capability. The risk assessment process identifies and profiles relevant hazards and assesses the exposure of lives, property, and infrastructure to these hazards. The goal of the risk assessment is to estimate the potential loss in Mesa County, including loss of life, personal injury, property damage, and economic loss, from a hazard event. The risk assessment process allows communities in Mesa County to better understand their potential risk to natural hazards and provides a framework for developing and prioritizing mitigation actions to reduce risk from future hazard events.

The risk assessment for Mesa County and its jurisdictions followed the methodology described in the FEMA publication 386-2, *Understanding Your Risks: Identifying Hazards and Estimating Losses (2002)*, which includes a four-step process:

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

This chapter is divided into three parts: hazard identification, hazard profiles, and vulnerability assessments.

Hazard Identification

Requirement §201.6(c) (2) (i): [The risk assessment shall include a] description of the type…of all natural hazards that can affect the jurisdiction.

The Mesa County Hazard Mitigation Planning Committee (HMPC) reviewed data and discussed the impacts of each of the hazards required by FEMA for consideration, which are listed below, to determine the hazards that threaten Mesa County and its jurisdictions:

Avalanche	Expansive Soils	Landslide	Windstorm
Coastal Erosion	Extreme Heat	Severe Winter Storm	
Coastal Storm	Flood	Tornado	
Dam/Levee Failure	Hailstorm	Tsunami	
Drought	Hurricane	Volcano	
Earthquake	Land Subsidence	Wildfire	

Data on past impacts and future probability of these hazards was collected from the following sources:

State of Colorado Natural Hazard Mitigation Plan (2007)
Mesa County Pre-Disaster Mitigation Plan (2004)
Spatial Hazard Event and Loss Database (SHELDUS), a component of the University of South Carolina Hazards Research Lab
National Oceanic and Atmospheric Administration's (NOAA) National Climatic Data Center
Disaster declaration history from FEMA, the Public Entity Risk Institute, and the U.S. Department of Agriculture (USDA) Farm Service Agency

The HMPC eliminated some hazards from further analysis because they do not occur in Mesa County or their impacts were not considered significant in relation to other hazards. Table 5 lists these hazards and the reasoning for their removal from consideration.

TABLE 5REMOVED HAZARDS

Coastal Erosion	Mesa County is not near coastal area.
Coastal Storm	Mesa County is not near coastal area.
Hailstorm	Hailstorms occur, but large-sized damaging hail is rare. Past damage has been negligible.
Hurricane	Mesa County is not near coastal area.
Tsunami	Mesa County is not near coastal area.
Volcano	Dotsero, near Glenwood Canyon, is the only volcano of concern in Colorado. It has not erupted in 4,000 years.

The HMPC identified 13 natural hazards that could affect Mesa County and other jurisdictions. These hazards are profiled in further detail throughout this plan. Although not required by the Disaster Mitigation Act of 2000, the HMPC decided to address one manmade hazard—hazardous materials release. The risk from this hazard is related primarily to the transportation of hazardous materials through the County or from a release generated at any one of the number of facilities that produces or stores chemicals on site.

Disaster Declaration History

Mesa County has received the following disaster declarations:

1984	Presidential	Flooding
1995	State	Flooding
2002	Presidential	Wildfires
2002	USDA Disaster	Drought
2006	USDA Disaster	Drought

Hazard Profiles

Requirement §201.6(c)(2)(i): [The risk assessment shall include a] description of the …location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.

Requirement §201.6(c)(2)(ii): [The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. The description shall include an overall summary of each hazard and its impact on the community.

The hazards identified in this section are profiled individually and a summary of the probability of future occurrence and potential magnitude is provided. Each hazard was also given an overall rating of High—Medium—Low based on the score it received by using the following formula: Total Score = Occurrences x Impacts (Occurrences x [Geographic Location + Magnitude/Severity]) Detailed profiles for each of the identified hazards include the following information:

Hazard Description

This section consists of a general description of the hazard and the general impacts it may have on a community.

Geographic Location

This section describes the geographic extent or location of the hazard in the planning area and identifies the affected area as isolated, small, medium, or large.

- Large—Greater than 50% of the County affected
- Medium—25-50% of the County affected
- Small—10-25% of the County affected
- Isolated—Less than 10% of the County affected

Occurrence

This section includes information on historic incidents, including impacts and costs, if known. A historic incident worksheet (worksheet #1) was used to capture the incident information from participating jurisdictions.

Future Occurrence

The frequency of past events is used to gauge the likelihood of future occurrences. Based on historical data, the probably of future occurrence is categorized as follows and given a corresponding score:

- Highly Likely: (***8***) Near 100% chance of occurrence next year or happens every year.
- Likely: (***6***) 10-100% chance of occurrence in next year or has a recurrence interval of 10 years or less
- Occasional: (***4***) 1-20% chance of occurrence in the next year or has a recurrence interval of 11 to 100 years.
- Unlikely: (***2***) Less than 1% chance of occurrence in next 100 years or has a recurrence interval of greater than every 100 years.

The probability, or chance of occurrence, was calculated where possible based on existing data.

Magnitude/Severity

This section summarizes the magnitude/severity or extent of hazard event in terms of deaths, injuries, property damage, and interruption of essential facilities and services. Magnitude and severity is classified in the following manner and given a corresponding score:

- Catastrophic—Multiple deaths; property destroyed and severely damaged; and/or interruption of essential facilities and service for more than 72 hours.
- Critical—Isolated deaths and/or multiple injuries and illnesses; major or long-term property damage that threatens structural stability; and/or interruption of essential facilities and services for 24-72 hours.
- Limited—Minor injuries and illnesses; minimal property damage that does not threaten structural stability; and/or interruption of essential facilities and services for less than 24 hours.
- Negligible—No or few injuries or illnesses; minor quality of life loss; little or no property damage; and/or brief interruption of essential facilities or services.

Avalanche

Avalanche hazards occur mostly in mountainous regions of Colorado above 8,000 feet. The vast majority of avalanches occur during and shortly after winter storms. Avalanches occur when loading of new snow increases stress at a rate faster than strength develops, and the slope fails. While most avalanches are caused by the weight of accumulated snow, other triggers can be caused by human activities (e.g., skier, snowshoer, and snowmobiler).

Geographic Location

The geographic extent of this hazard in Mesa County is isolated—less than 10% of the County is affected.

The avalanches in Mesa County have primarily occurred on the Grand Mesa which is primarily federally owned land.

Previous Occurrences

According to the National Climatic Data Center Strom Events Database and the CAIC information, Mesa County has had 4 recorded avalanches from 1959-2006.

- January 30, 1999—nine snowmobilers were traversing the north side of the Grand Mesa at the 10,600 foot level. The snowmobiler who was third in line triggered a small hard-slab avalanche which buried him under 5 feet of snow ending with unsuccessful resuscitation efforts.
- February 24, 2002—A snowmobiler triggered a soft-slab avalanche near Flat Top Mountain in extreme northeast Mesa County, about 8 miles south southwest of Sunlight Ski Area. This avalanche was about 300 feet across and 2 feet deep, beginning at an elevation of just below the 10,200 foot level. The avalanche ran approximately 400 vertical feet. The victim was found after having been buried for approximately 30 minutes. Resuscitation efforts were unsuccessful.
- February 4, 2004—Avalanche swept across Highway 65 at mile marker 36 on the Grand Mesa. One vehicle was buried and the road was closed in both directions until the next day. No injuries or fatalities reported, however $5,000 in property damage was reported.
- April 1, 2005—a backcountry skier was killed when he triggered an avalanche at about 10,560 feet above sea level on the Grand Mesa while ascending a slope. The skier was swept over some rocks and down into some trees. His companion notified 911 dispatch of the incident. CDOT employees and Mesa County Search and Rescue responded and found the victim approximately 2 hours after he was buried.

Probability of Future Occurrence

The probability of future occurrence for avalanches in Mesa County is considered occasional or a 1-10% chance of happening in the next year.

Magnitude/Severity

Three out of the four avalanche events recorded resulted in a death, categorizing the magnitude/severity of this hazard as critical.

Dam Failure

Hazard Description

Dams are manmade structures built for a variety of uses, including flood protection, power, agriculture, water supply, and recreation. Dams typically are constructed of earth, rock, concrete, or mine tailings. Two factors that influence the potential severity of a full or partial dam failure are the amount of water impounded and the density, type, and value of development and infrastructure located downstream.

Dam failures can result from any one or a combination of the following causes:

- Prolonged periods of rainfall and flooding, which result in overtopping (overtopping is the primary cause of earthen dam failure)
- Earthquake
- Inadequate spillway capacity resulting in excess overtopping flows
- Internal erosion caused by embankment or foundation leakage or piping or rodent activity
- Improper design
- Improper maintenance
- Negligent operation
- Failure of upstream dams on the same waterway

Geographic Location

The geographic extent of this hazard in Mesa County is small—10-25% of the County is affected.

The Colorado Division of Water Resources provided a list of dams in Mesa County as shown in Table 6 and their classification based on the potential hazard to the downstream area resulting from failure of the dam:

- Class I (High Hazard): Failure of dam would likely result in loss of life.
- Class II: (Significant Hazard): Failure of dam would not cause loss of life, but would cause extensive and/or severe property damage.

Based on theses classifications, there are 23 high hazard dams and 28 significant hazard dams in Mesa County. High and Significant hazard dams all have emergency action plans in place.

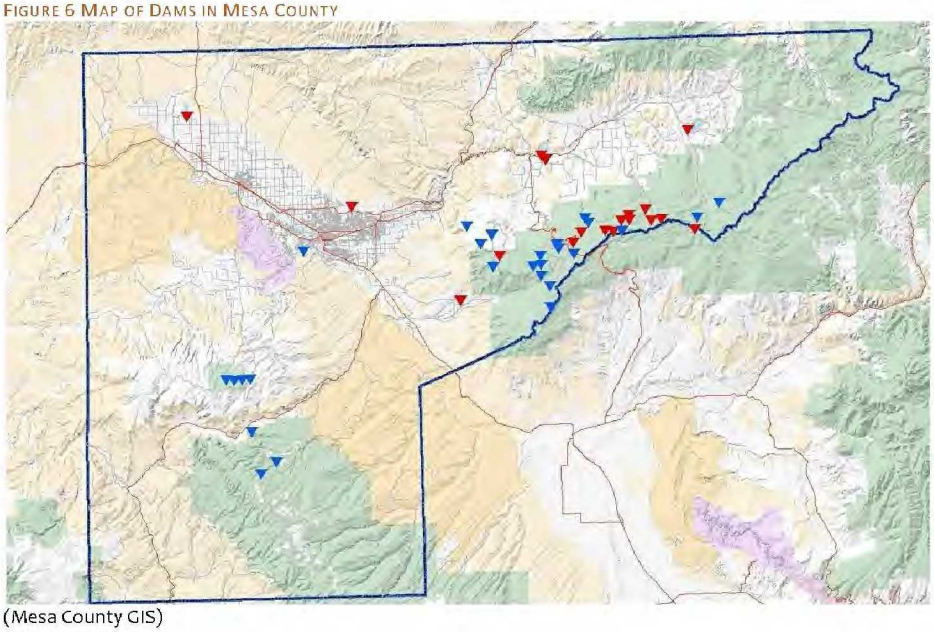
TABLE 6 CLASS I-CLASS II HAZARD DAMS

ALSBURY	1	1996	
BIG CREEK #3	1	1893	17-Nov-05
[illegible]	1	1901	[illegible]
[illegible]	1	1894	[illegible]
COTTONWOOD #5	1	1909	17-Nov-05
INDIAN WASH DET.	1	1965	05-Sep-06
[illegible]	1	1978	[illegible]
[illegible]	1	1979	[illegible]
LEON LAKE	1	1898	09-Sep-05
PARKER BASIN #3	1	1899	17-Nov-05
UPPER HIGHLINE	1	1967	06-Aug-06
Y T RANCH	1	1911	
ANDERSON #2	2	1974	20-Apr-09
BOLEN	2	1973	20-Apr-09
BULL CREEK #5	2	1901	06-Nov-00
COLBY HORSE PARK	2	1956	04-Oct-06
CRAIG #1	2	1951	01-Jan-08
DEEP CREEK #2	2	1906	01-Jan-05
FRUITA #1	2	1949	31-Mar-95
[illegible]	2	1980	[illegible]
[illegible]	2	[illegible]	[illegible]

GRAND MESA #8	2	1901	20-Apr-09
HOGCHUTE	2	1947	01-Jan-05
MESA CREEK #3	2	1890	22-Feb-95

Figure 6 is a map showing locations of the Class I and II Dams in Mesa County.

FIGURE 6 MAP OF DAMS IN MESA COUNTY



(Mesa County GIS)

Previous Occurrences

- June 1983—Grand Mesa Dam #8 overtopped and failed during spring runoff due to emergency spillway being blocked by snow and ice. Snowmelt produced high inflow to the reservoir which overtopped dam. Minor flooding downstream with damage to Highway 65 and Lands End Road. Significant damage was reported to the dam. Dam was repaired and spillway enlarged.
- Spring 1998—Fruita #1 dam located at the head of North East Creek south of Glade Park failed as a result of failing downstream slope. This slope failed on two separate

occasions, reservoir level was restricted until dam was rehabilitated in 2009. Because this failure happened during normal operations, actual flooding was prevented.

- 1996—Upper Highline Dam in unincorporated Mesa County (Mack) suffered settling and deformation of the dam. The dam crest settled several feet at the west end and reservoir was drained so dam could be rehabilitated. This intervention prevented failure and flooding. Significant damage reported to state-owned dam.
- 1983—Vincient #2 dam (above the Town of Palisade) overtopped during spring runoff and failed. When a hazard classification is given to a dam, it is done so based on the consequences of the dam's failure absent flooding conditions, i.e., on a clear day in summer with the stream at a "normal" level. When Vincient #2 failed, the stream below was running bank-full from snowmelt and the resulting failure discharge jumped out of the channel and did more damage downstream than would have normally occurred. It is important to remember that a low hazard dam can still cause a significant amount of damage and possible result in loss of life, depending on the timing of the failure. (Jackson, 2009)

Probability of Future Occurrence

The probability of future occurrence is occasional, meaning there is a 1-10% chance of occurrence in the next year or has a recurrence interval of 11 to 100 years. Due to the documented cases above, there is a possibility of future dam failures.

Magnitude/Severity

Depending on the hazard class of the dam, the magnitude/severity of a dam failure is listed as catastrophic. Multiple deaths, destroyed or severely damaged property, and or interruption of essential facilities and services is possible. As indicated above, Mesa County has several Class 1 (High Hazard) dams which would cause loss of life upon failure of the dam.

Drought

Hazard Description

Drought is a normal, recurrent feature of climate, although some consider it a rare and random event. It occurs in virtually all climatic zones, but characteristics vary significantly from one region to another. It originates from a deficiency of precipitation over an extended period of time, usually a season or more. (University of Nebraska Lincoln, 2009)

Due to Colorado's semiarid conditions, drought is a natural but unpredictable occurrence in the state. The onset of drought in western Colorado counties is usually signaled by a lack of significant winter snowfall.

Geographic Location

The geographic location of this hazard is considered large in Mesa County, with more than 50% of the county is affected.

Previous Occurrence

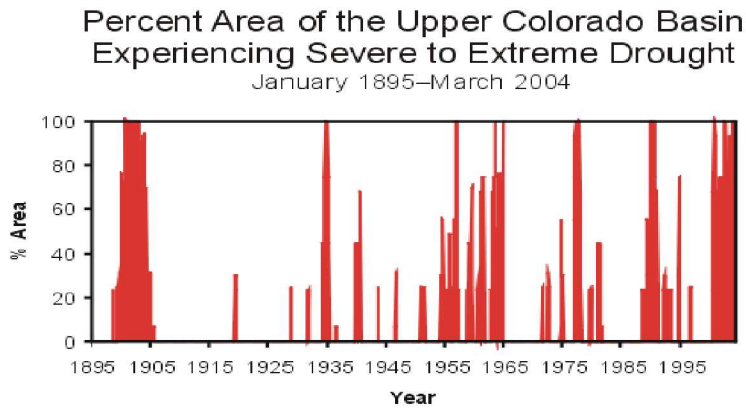
According to the National Climatic Data Center, Mesa County and respective towns and municipalities have experienced several drought periods over time. Since 1999 Mesa County was experiencing multi-year drought conditions and beginning in May of 2002, western Colorado was experiencing its first full month of severe to extreme drought conditions. The most intense drought classification, exceptional drought conditions, had developed. Low elevation snowpack had already melted throughout the area and many seasonal streams dried up by the end of May.

The drought began to have a major impact on agricultural interest and to a lesser degree on the outdoor recreational industry. Perhaps of most importance, the drought created a large potential for major wildfires. Below is a list of drought occurrences as recorded by the National Climatic Data Center.

- May 2002--May was the first full month of severe to extreme drought conditions in western Colorado. The most intense drought classification, exceptional drought conditions, had developed in the southwest corner of the state by the end of the month. Low elevation snowpack had already melted throughout the area before May, with many seasonal streams dried up by the end of May. In May, the drought began to have a major impact on agricultural interests, and to a lesser degree on the outdoor recreation industry. Perhaps of most importance, the drought created a large potential for major wildfires.
- July 2003--Severe to extreme drought conditions continued across western Colorado during the month. Although monsoon moisture did bring thunderstorms to the area, significant rainfall amounts were not widespread in coverage. Additionally, record high temperatures occurred through much of the month.
- July 2004--Surges of subtropical moisture in monsoonal flow resulted in a few bouts of widespread precipitation across western Colorado during the month, with locally heavy rains occurring in some areas. However, this had little impact on the long-term drought situation across the area, and moderate to severe drought continued across most of western Colorado.
- July 2005--Occasional surges of monsoonal moisture resulted in periods of thunderstorms across western Colorado during the month of July, mainly during the second half of the month. However, typical hot conditions persisted for much of the month and the rainfall that did occur had little impact on the drought conditions across

the area. Northwest Colorado remained in moderate to severe drought conditions. Although the remainder of western Colorado was no longer categorized as being in a drought, multiple years of below normal precipitation continued to cause water supply concerns.

- March 2007-- Below normal precipitation through the month caused an increase in the dryness and drought conditions across western Colorado.



Based on data provided by the National Climatic Data Center, NOAA

Probability of Future Occurrence

The probability of future occurrence is occasional, meaning there is a 1-10% chance of occurrence in next year or has a recurrence interval of 11-100 years. According to the Colorado Drought Mitigation and Response Plan, Colorado was in a drought for 48 of the past 115 years (1893-2007). Therefore a 42% chance exists that a drought will happen in Colorado in any given year. (J. Truby, January 2001)

Magnitude/Severity

The magnitude/severity of drought conditions is limited. Drought impacts in Mesa County can be wide reaching: economic, environmental, and societal. The most significant impacts in Mesa County and respective jurisdictions are related to wildfire protection and agriculture. Mesa County economy consists of a number of fruit and vegetable growers who are heavily impacted by drought conditions.

Earthquake

Hazard Description

Earthquakes are defined as the sudden release of energy occurring from the collision or shifting of crustal plates on the earth's surface or from the fracture of stressed rock formations in that crust. The release of energy results in the earth shaking, rocking, rolling, jarring and jolting; having the potential to cause minimal to great damage. Earthquakes are measured by units of magnitude, which is a logarithmic measure of earthquake size. This means that at the same distance from the earthquake, the shaking will be 10 times as large during a magnitude 5 earthquake as it would during a magnitude 4 earthquake. (EHP Web Team, 2009)

Earthquakes can cause structural damage, injury, and loss of life, as well as damage to infrastructure networks, such as water, power, communication and transportation systems. Secondary impacts can include landslides, liquefaction, fires, and dam failure.

Geographic Location

Colorado is comprised of areas with low to moderate potential for damaging earthquakes, based on research by geologists and geophysicists who specialize in seismology. There are about 90 potentially active faults that have been identified in Colorado, with documented movement within the last 1.6 million years. However, there are several thousand other faults that have been mapped in Colorado that have not been sufficiently studied to know whether they are capable of generating earthquakes or not.

It is not possible to accurately estimate the timing or location of future dangerous earthquakes in Colorado. The lack of an adequate network of seismometers in Colorado makes it difficult to detect and locate earthquakes. Moreover, the historical record is quite short (~150 years). Nevertheless, the available seismic hazard information can provide a basis for a reasoned and prudent approach to seismic safety. (Subcommittee, 1999)

Mesa County has a considerable amount of fault lines as shown in Figure 7 that are located within the county but has not recently experienced a significant earthquake event.

Previous Occurrences

Many of Colorado's earthquakes occur in mountainous regions of the state with some having been located in the western valley and plateau region. The Colorado Geological Survey has estimated that the largest earthquake possible on the Western Slope of Colorado is magnitude 6.5. This estimate is based on studies of the fault systems in Western Colorado. The two largest fault systems in Western Colorado area associated with the Uncompahgre Uplift and the White River Uplift.

The areas of most concern are the Uncompahgre Plateau and Paradox Valley. The Uncompahgre has the greatest potential for producing a large natural event. The Paradox Valley has the greatest potential for creating a large man-made seismic event. Below are the two significant events that have occurred in Mesa County.

- 1971—4.5 magnitude earthquake, Glade Park Fault (unincorporated Mesa County)
- 1975—4.4 magnitude earthquake northeast of Fruita, Co. (Mesa County)

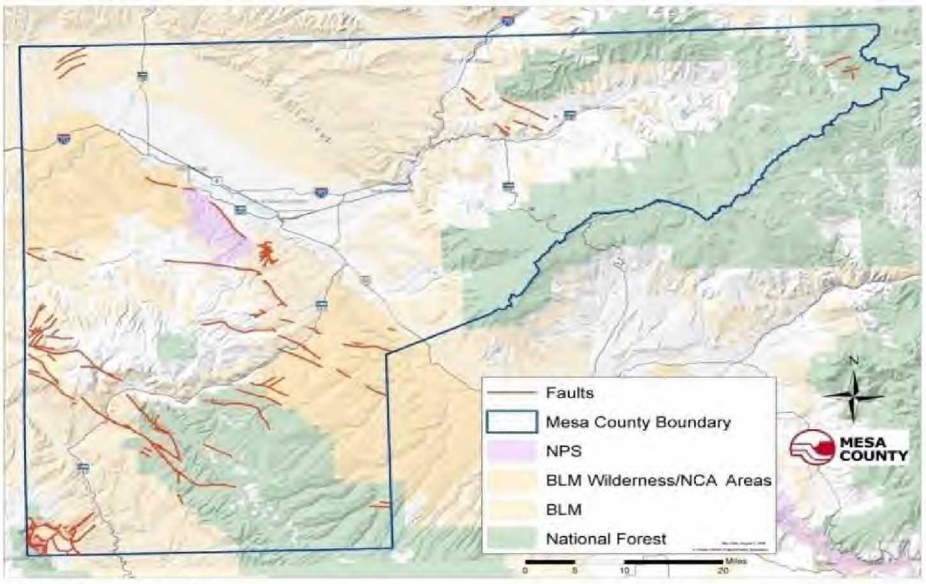
Probability of Future Occurrence

The probability of future occurrence for an earthquake in Mesa County or neighboring jurisdictions is occasional resulting in a 1-10% chance of occurrence in the next year or has a recurrence interval of 11 to 100 years.

Magnitude/Severity

The magnitude/severity of an earthquake is limited resulting in minor injuries and illnesses, minimal property damage that does not threaten structural stability and/or interruption of essential facilities and services for less than 24 hours.

FIGURE 7 FAULTS IN MESA COUNTY



Source: Mesa County GIS

Flood

Hazard Description

Flooding has occurred repeatedly throughout Mesa County and will continue to occur. FEMA defines flooding as, "a partial or complete inundation of normally dry land areas from 1)the overland flow of a lake, river, stream, ditch, etc.; 2)the unusual and rapid accumulation or runoff of surface waters; and 3)mudflows or the sudden collapse of shoreline land". (www.training.fema.gov/EMIWeb/IS/IS394A/glossary-0306.doc)

Snowmelt flooding is characterized by moderate peak flows, large volume, and long duration, and is marked by a diurnal fluctuation in flow. Rainfall on melting snow may speed up the melting process and increase flood flow. General rain floods are caused by prolonged heavy rainfall over large areas and are characterized by high peak flows of moderate duration. Cloudburst floods characteristically have high peak flows, high velocities, short durations, and small volumes of runoff. (FEMA, Flood Insurance Study, Mesa County Colorado, 2009)

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 percent 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, dam failure floods (see Dam Failure section), and local drainage floods. The 100 year flood is the national standard to which communities regulate their floodplains through the National Flood Insurance Program.

The potential for flooding can change and increase through various land use changes. 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 occur as the result of other events such as wildfires. Wildfires create hydrophobic soils, in which the soils harden preventing rainfall from being absorbed into the ground.

FEMA also defines flash flooding as, "Flood that arises very quickly, occurring suddenly, within a short time (from minutes to less than 6 hours), and usually is characterized by high flow velocities. Flash floods often result from intense rainfall over a small area, usually in areas of steep terrain". (www.training.fema.gov/EMIWeb/IS/IS394A/glossary-0306.doc)

Flooding in Mesa County is caused mainly by snowmelt in the larger drainage basins and by cloudbursts over the smaller drainage basins. However, general rainstorms constitute the principle flood hazard on Roan Creek, while general rain on snowpack creates the most hazardous conditions in the basins of Plateau and Buzzard Creek. Major floods on the Colorado and Gunnison Rivers result from rapid melting of the mountain snowpack during May, June,

and July and the Dolores River experiences flooding from both snowmelt and general rainstorms.

Mesa County has received a copy of the preliminary, March 6, 2009 Flood Insurance Study that covers the Town of Collbran, Town of DeBeque, City of Fruita, City of Grand Junction, Mesa County Unincorporated Areas, and Town of Palisade. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates. This information will also be used by Mesa County to update existing floodplain regulations as part of the Regular Phase of the National Flood Insurance Program (NFIP), and by local and regional planners to further promote sound land use and floodplain development.

In unincorporated Mesa County there are 156 propertiesAccording to the 2009 repetitive loss info from FEMA, within the unincorporated portions of the County we have approximately 156 properties with flood insurance policies and have had 16 paid flood claims since 1983 (note, 10 of those were during the 1983 and 1984 major flooding events, the other 6 are since that time). There is 1 repetitive loss property (parcel # 2697-273-00-063) with the following claims: claim #1: 6/8/95 in the amount of $750; claim #2: 7/1/99 in the amount of $2,267; and claim # 3: 7/10/01 in the amount of $1,973. This property is partially within the FEMA regulatory floodway and partially within the regulatory flood fringe (Staley, 2009).

There are 84 active flood policies in the City of Grand Junction and no repetitive loss properties (Guillory, 2009).

Geographic Location

All streams in Mesa County are either direct or indirect tributaries of the Colorado River, which traverses the north-central and north-western sectors. From the northern county line, the river flows southwesterly for 41 miles to its confluence with the Gunnison River, thence northwesterly 27 miles, and again southwesterly for 15 miles in its remaining course in the county.

In general, the Dolores River, Gunnison River, and West Creek systems drain the western, southwestern, and south-central portions of the county. The plateau Creek system drains the eastern sector, except for the eastern most portion, which is drained by the Divide Creek system, which flows northerly to the Colorado River in Garfield County. A group of minor creeks and washes flowing southerly from the Roan and Bookcliffs regions drain the northwestern portion of the county, and a group of similar stream ways convey drainage to the river from the north-central portion.

Plateau Creek has its headwaters in the Grand Mesa National Forest, approximately 18 miles southeast of the Town of Collbran. The stream flows northwesterly from its origin near Chalk

Mountain into Vega Reservoir, approximately 11 miles upstream from Collbran. Plateau Creek than continues westerly from Vega Reservoir through Collbran to its confluence with the Colorado River.

Mesa County is subject to major stream flooding caused by rapid snowmelt, usually associated with rising temperatures and flash flooding caused by rains associated with thunderstorms. Spring runoff usually reaches its peak in June and recedes to a normal flow by mid July. Mesa County typically experiences the monsoonal weather patterns in late July and August that create the potential for flash flood events found in the steeper drainage areas of the County. It is these events that have the greatest potential for causing major flooding in Mesa County and typically involve localized flooding and debris-flow issues.

Previous Occurrences

Mesa County has a long history of flooding from summer cloudburst storms and from snowmelt runoff. Seven major flood events have occurred on the Colorado River, four on the Gunnison River, and four on the Dolores River. Floods occurred in 1884, 1917, 1920, 1921, 1935, 1952, 1957, 1983, and 1984 on the Colorado River; in 1884, 1920, 1921, and 1957 on the Gunnison River; and in 1884, 1909, 1911, and 1958 on the Dolores River. Most known floods in Mesa County resulted from snowmelt, sometimes augmented by general rain. The largest snowmelt flood runoff of record on the Colorado River occurred in June 1921. Heavy rain on June 14th and 15th augmented runoff to produce a peak flow of 81,000 cfs near Fruita.

Flooding from general rain occurred on the Dolores River in September 1909 and October 1911. Snowmelt flooding on the Dolores River in April 1958 inundated 1,100 acres in the Gateway area and resulted in damage estimated at $230,000.

Recorded cloudburst floods occurred on Indian Wash (Grand Junction area) in June 1958 and on West Creek (Gateway area) in July 1940. The West Creek cloudburst covered approximately 25 square miles of the drainage area and produced a peak flow estimated at 11,700 cfs.

The most recent serious floods on the Colorado River occurred in 1983 and 1984. Peak flows on the Colorado River at the State Line were approximately 61,000 and 70,000 cfs in 1983 and 1984 respectively. Colorado River flood flows in the Grand Junction area inundated streets, lawns, and gardens; deposited sand, silt, and debris; and flooded basements and lower floors in residential areas in the Riverside Park, Rosevale and Connected Lakes area southwest of the City in 1983 and 1984 but has not caused significant damage since these events. The flooding events in 1984 resulted in loss of life as did the flooding event that occurred on I-70 when Bosley Wash flooded in 2008 resulting in a drowning.

The Riverside Park area has experienced repeated flood danger as the erosion and undermining of protective levees has necessitated extensive flood fighting and levee repair. This non-certified levee and storm drain system improvements serve to mitigate potential flooding.

The principle cause of flooding on Plateau Creek and Buzzard Creek is a rapidly melting heavy snowpack during May, June, and July. Rainfall on melting snow may hasten the melting process and increase flood flows. A major flood occurred on Plateau Creek in 1922. Based on the record from a stream gage on Plateau Creek located approximately 6 miles east of Collbran, this flood had an estimated discharge of 3,080 cfs which corresponds to a frequency in excess of 100 years.

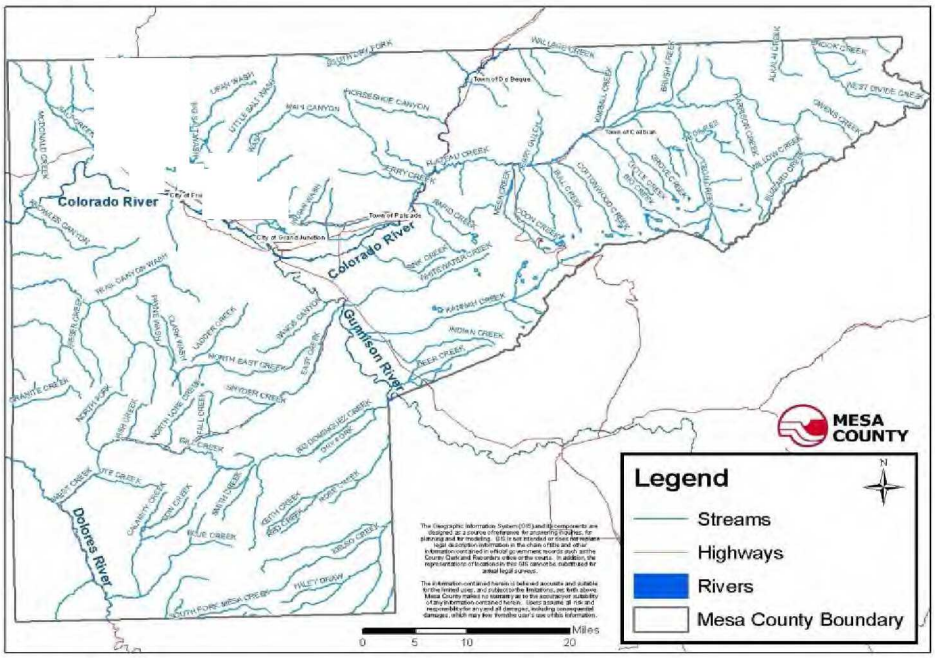
Probability of Future Occurrence

The probability of future occurrence is highly likely with a near 100% chance of occurrence next year or happens every year. Due to the documented cases above and the information collected on events that were smaller in size, Mesa County and the various towns/municipalities will continue to deal with flood related activities in the future.

Magnitude/Severity

The magnitude/severity of a flood event is limited resulting in minor injuries and illnesses, minimal property damage that does not threaten structural stability and/or interruption of essential facilities and services for less than 24 hours. Most of the flood events that have occurred in Mesa County over the past 10 years have been limited with respect to injuries and property damage. Figure 8 shows the major rivers and tributaries within Mesa County.

FIGURE 8 RIVERS AND TRIBUTARIES



(Nelson, 2009)

Hazardous Materials

Hazard Description

A hazardous material is any item or agent (biological, chemical, physical, radiological) that has the potential to cause harm to humans, animals, or the environment, either by itself or through interaction with other factors. The release of hazardous materials can happen either by accident or as a result of criminal activity and can threaten people and natural resources in the immediate vicinity of the accident, including residences and businesses along transportation routes.

Geographic Location

Mesa County is a center of commerce in western Colorado and hazardous materials are commonly transported through the county by truck and rail. Designated truck routes are State Highways 139, 141, 50 and U.S. Interstate 70. The Union Pacific Railroad operates two rail lines in Mesa County. Their main line is located primarily along the Colorado River through the

County. The secondary line (southern leg) branches off the main line near the confluence of the Gunnison and Colorado Rivers and is located along the Gunnison River.

It is observed that the majority of the products transported through Mesa County belong to the hazard classes of 2 (Flammable and Combustible Gases), 3 (Flammable and Combustible Liquids), 8 (Corrosive Materials), and 9 (Miscellaneous Hazardous Materials). There are currently 139 Tier II reporting fixed site facilities in Mesa County. These facilities either produce, store, and/or use hazardous materials and are required by the Environmental Protection Agency to report these quantities under Tier II reporting requirements.

Previous Occurrences

Two significant incidents have occurred in Mesa County as a result of illegal dumping of hazardous material. The first incident involved illegal dumping in the Cactus Park area of Mesa County of (3) 150 pound cylinders of liquid chlorine with safety caps removed. This case resulted in a felony conviction of a 30 year old male who received (8) years in the Colorado State Corrections System. This case was the first successful prosecution of the "Clean Air Act" in the State of Colorado. (Reekie, 2009)

The second case occurred in 2001 and was the result of illegal discharging of ethylene glycol into the Colorado River. The facility was discharging through the conveyance of storm water system piping directly into the Colorado River. The illegal discharges resulted in a substantial "fish kill" to native aquatic life. This case resulted in a felony conviction of the corporation and individuals responsible. The environmental remediation was conducted by the Environmental Protection Agency. Remediation costs were approximately $1.5 million dollars. The business was charged with felony charges resulting in significant fines and imprisonment. This case was the first successful prosecution of the "Clean Water Act" in the State of Colorado. (Reekie, 2009)

The Grand Junction Fire Department that serves as the Designated Emergency Response Authority for the entire planning area identified the following as significant incidents in Mesa County:

- 1990 – Motor Carrier 338 carrying 70,000 lbs. of liquid oxygen caused 1 injury and $70,000 in damage.
- 1991 – Motor Carrier 331 carrying propane caused $100,000 in damage due to remediation of highway shoulder from diesel contamination.
- 1991 – Illegal dumping of (3) 150 pound cylinders of liquid chlorine with safety caps removed in Cactus Park area.
- 1992 – Two tractor trailer 40' cargo trailers (MC 331 carrying propane) collide causing 2 injuries and $200,000 in damage.

- 1992 – Motor Carrier 306 with 7000 gallons of naptha crashes into rock wall on Hwy. 141. Hwy closed for 36 hours. $200,000 in damage.
- 1995 – Hazardous materials release at fixed facility. Nitric acid tank endothermic reaction at fixed facility. Resulted in $60,000 in damages.
- 2001 – Illegal discharge of ethylene glycol into the Colorado River.
- 2002 – Hazardous materials release from Amtrak derailment in Ruby Canyon with 123 passengers on board. $300,000 in property damage and $20,000 in environmental remediation.
- 2008 – Hazardous materials release with (2) tractor trailers with coal and hydrochloric acid with property damage of $250,000 and $80,000 in environmental remediation.

Probability of Future Occurrence

Highly Likely – Near 100% chance of occurrence next year or happens every year. Hazardous materials related incidents occur in Mesa County every year. Most often these incidents involve the transportation sector and are often fuel spills or cargo that is being transported.

Magnitude/Severity

The magnitude/severity of a hazardous materials incident in Mesa County has been limited with impacts to the environment, property destroyed or severely damaged, and/or interruption of essential facilities and service for more than 72 hours.

Impacts in the past have been limited but depending on the type and quantity of material released an event could have serious consequences to the public. Humans and animals are affected through inhalation, ingestion, or direct contact with the skin. Air releases can prompt large-scale population evacuations and spills into water or onto the ground can adversely affect public water and sewer systems.

Landslide, Rockfall

Hazard Description

The Colorado Geological Survey department defines landslides as the downward and outward movement of slopes composed of natural rock, soils, artificial fills, or combination thereof. Landslides move by falling, sliding, and flowing along surfaces marked by difference in soil or rock characteristics. A landslide is the result of a decrease in resisting forces that hold the earth mass in place and/or an increase in the driving forces that facilitate its movement.

Landslides as defined above include two major types: 1) Rotational slides which refer to all landslides having a concave upward, curved failure surface and involving a backward rotation of the original slide mass; and 2) translational slides in which the surface of rupture along which displacement occurs is essentially planar. Either type of landslides can involve various

combinations of bedrock, broken bedrock, and unconsolidated superficial material, and the displaced material in either type of slide may be either greatly deformed or nearly intact.

Rate of movement of landslides varies from very slow to very rapid. They may be extremely small in extent or measurable in miles. Volumes of material involved may range from a few cubic feet to millions of cubic yards. Landslides result from some change in the physical condition of an unstable slope area (see section of guidelines on potentially unstable slopes). Such changes may be natural or man-induced.

A rock fall is the falling of a detached mass of rock from a cliff or down a steep slope. Weathering and decomposition of geological materials produce conditions favorable to rock falls. Rock falls occur most frequently in mountains or other steep areas during the early spring when there is an abundant of moisture and repeated freezing and thawing. (Survey, 2004)

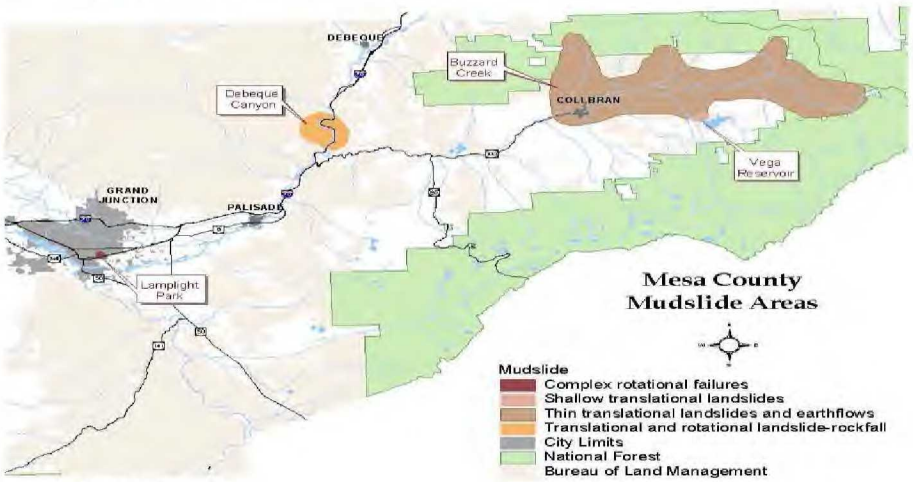
Geographic Location

The geographic location of landslides and rock falls throughout Mesa County is isolated—which is less than 10% of the area.

The landslides and rock-falls that have occurred in Mesa County are most typically associated with canyons. The areas most affected by landslides-rock falls include; Interstate 70 in DeBeque Canyon and along the Bookcliffs, Highway 65 in Plateau Canyon, Highway 141 in John Brown Canyon near Gateway, Co., and the area encompassing the Colorado National Monument.

The DeBeque Canyon Landslide is a major landslide complex in western Colorado that has historically impacted the east-west highway and railway corridor on the Colorado River as shown in Figures 9 and 10.

FIGURE 9 MESA COUNTY LANDSLIDE MAP



Source: Mesa County GIS

FIGURE 10 DEBEQUE CANYON SLIDE AREA

(Survey, 2004)

FIGURE 11 PHOTO OF DEBEQUE CANYON SLIDE AREA- INTERSTATE 70

FIGURE 12 PHOTO OF DEBEQUE CANYON SLIDE AREA- INTERSTATE 70

(Photos taken by Mesa County Emergency Management--1998 Slide in DeBeque Canyon)

FIGURE 13 ROCKFALL WEST OF PALISADE ALONG INTERSTATE 70

(Photos taken by Mesa County Emergency Management, July 8, 2009)

FIGURE 14 ROCKFALL EVENT IN DEBEQUE CANYON AT BEAVER TAIL TUNNEL ON INTERSTATE 70

FIGURE 15 ROCKFALL EVENT IN DEBEQUE CANYON AT BEAVER TAIL TUNNEL ON INTERSTATE 70

(Photos taken by Mesa County Emergency Management 10/26/09)

Previous Occurrences

The DeBeque Canyon Landslide which is considered a major landslide complex has had three significant reactivations or ground movements during the past century. The precise date of the first major movement is unknown but occurred in the late 1890s or early 1900s. That slide movement was the largest and reportedly shifted the river channel and damaged railroad facilities on the north bank of the Colorado River.

The second noteworthy movement occurred in February 1958 when the roadway was widened for a modern 2-lane highway. The widening resulted in further cutting and destabilizing of the landslide toe, with subsequent movements resulting in the heaving of the roadway 23 vertical feet. In April 1998, the third major movement occurred and caused Interstate 70, constructed in the mid-1980s, to heave 14 vertical feet. The highway also shifted 5 to 6 feet laterally towards the river during this event as shown in Figures 11 and 12. (Survey, 2004)

In 2004, rain and snow loosened several rocks resulting in several injuries to motorists travelling on Interstate 70. In 2006 a rock fall along Interstate 70 just outside of the Town of Palisade resulted in a 300 lb. boulder hitting several cars travelling on Interstate 70, injuring several

motorists who required medical treatment. Additional rock fall activity has occurred in the DeBeque Canyon resulting in isolated deaths and injuries.

In July of 2009 a significant rock fall occurred on the Bookcliffs approximately two miles west of the Town of Palisade, see Figure 13. What was unique about this rock fall was the amount of energy associated with it. This particular event registered a 2.6 on the Richter scale and was first thought to have been an earthquake. After hours of analysis it was determined that the event was actually a rock fall event, possibly triggered due to the moisture in the soil.

Most recently was a rockfall event that occurred in DeBeque Canyon near the Beaver Tail tunnel on Interstate 70. A significant amount of large boulders landed on the interstate closing all lanes of traffic for a period of time as seen in Figures 14 and 15. No injuries were reported.

Probability of Future Occurrence

The probability of future occurrence is considered highly likely based on past events.

Magnitude/Severity

The magnitude/severity of a landslide—rock fall event in Mesa County is Critical. Past events have resulted in isolated deaths and/or multiple injuries as well as major or long term property damage that threatens structural stability; and/or interruption of essential facilities for 24-72 hours.

Lightning

Hazard Description

Lightning is defined as "An abrupt, discontinuous natural electric discharge in the atmosphere". The rising air in a thunderstorm cloud causes various types of frozen precipitation to form within the cloud. Included in these precipitation types are very small ice crystals and much larger pellets of snow and ice. The smaller ice crystals are carried upward toward the top of the clouds by the rising air while the heavier and denser pellets are either suspended by the rising air or start falling toward the ground. Collisions occur between the ice crystals and the pellets, and these collisions serve as the charging mechanism of the thunderstorm. The small ice crystals become positively charged while the pellets become negatively charged. As a result, the top of the cloud becomes positively charged and the middle to lower part of the storm becomes negatively charged. At the same time, the ground underneath the cloud becomes charged oppositely of the charges directly overhead.

When the charge difference between the ground and the cloud becomes too large, a conductive channel of air develops between the cloud and the ground, and a small amount of charge (step leader) starts moving toward the ground. When it nears the ground, an upward leader of opposite charge connects with the step leader. At that instant this connection is

made, a powerful discharge occurs between the cloud and the ground. We see this discharge as a bright visible flash of lightning. (NWS, 2008)

Each year in the United States, more than 400 people are struck by lightning. On average, between 55 and 60 people are killed; hundreds of others suffer permanent neurological disabilities.

Geographic Location

The geographic location of this hazard is considered large as it can happen anywhere in the County. However, lightning strikes are isolated in that the area that is affected by a lightning strike is less than 10% of the planning area.

Previous Occurrences

Data from the National Lightning Network ranks Colorado 2nd in the number of deaths (28) from 1999-2008 for deaths caused by lightning. While lightning is a regular occurrence in Mesa County, there are few documented cases where lightning has caused structural damage.

- September 13, 1996—Lightning hit a tree and then traveled into an adjacent house causing some fire and electrical damage. Estimated damage was reported at $4000.
- September 6, 1997—Lightning struck a house on the north side of the Grand Mesa destroying some electrical items and blackening a wall on the side of the house.
- September 13, 1997—Lightning struck a tree and power pole, starting the tree on fire and destroying a power transformer. Some electrical damage was also incurred at a nearby home.
- September 21, 1997—Lightning strike of a two story house, causing the house to catch on fire.
- September 9, 1998—A man was injured when lightning struck a 12 foot high pole on a trailer next to the man. The lightning also struck the man who was jolted off the trailer, landing 20 feet away. He suffered minor burns.
- August 20, 2000—Lightning struck two horses, killing one and paralyzing the other. The two horses were found 50 feet apart from each other.

Many of the lightning strikes that occur in Mesa County are the cause of wildland fires throughout the County and many strikes go unreported.

Probability of Future Occurrence

The probability of lightning strikes in Mesa County is highly likely with a near 100% chance of occurrence next year or it happens every year.

Magnitude/Severity

The magnitude/severity of lightning throughout Mesa County is limited with minor injuries and illnesses; minimal property damage that does not threaten structural stability; and/or interruption of essential facilities and services for less than 24 hours.

It is recognized that lightning can cause deaths, injuries, and property damage, including damage to buildings, communications systems, power lines, and electrical systems.

Severe Winter Weather

Hazard Description

Severe winter weather can include heavy snow, ice, wind chill, blowing snow, freezing rain, sleet, and extremely cold temperatures. Any of these conditions can immobilize our community. These conditions can strand commuters, stop supplies and disrupt power and communication sources. The cost of snow removal, damage repair, and business losses can have a significant impact on the community.

Severe winter storms are usually accompanied by high winds, creating blizzard conditions causing snow to drift making travel dangerous. Extreme cold temperatures are often associated with winter weather and prolonged exposure can be life threatening. The months of December, January, and February are the most likely time of the year for severe winter weather.

Grand Junction receives about 2 feet of snow per year and it generally falls a few inches at a time and then melts off. The ground is usually not covered in snow and there is generally no need to shovel snow constantly. The winter months dip down into the teens and occasionally lower. Most years will see a maximum low temperature for the year of about 0 to 5 degrees F. The average December - January high is 39 with an average low of 16 degrees F. The coldest months on average in Mesa County are January and February and Mesa County's record minimum temperature was recorded as -23°F in 1963. (NWS, 2008)

Geographic Location

The geographic location of severe winter weather in Mesa County is small with approximately 25-50% of the county affected. Primarily severe winter weather is found in the higher elevations of the County and include; Grand Mesa, Colorado National Monument, and the

Uncompahgre areas. The valley area of the county can see severe winter weather in snowfall, icy conditions, cold temperatures and wind.

Previous Occurrences

The National Climatic Data Center Storm Events Database was used to determine the 287 recorded winter weather events that included some portion of Mesa County. These events ranged from heavy snowfall to blowing and drifting snow from significant wind gusts. (Hinson, National Climatic Data Center, 2009)

Probability of Future Occurrence

The probability of future occurrence is likely with a 10- 100% chance of occurrence in next year or has a recurrence interval of 10 years or less. However, it should be noted that Mesa County on average has much milder winter seasons than other parts of the state.

Magnitude/Severity

The magnitude and severity of severe winter weather in Mesa County is limited—resulting in minor injuries and illnesses; minimal property damage that does not threaten structural stability; and/or interruption of essential facilities and services for less than 24 hours.

Severe winter weather in Mesa County can result in property damage, localized power outages and force the closure of streets, highways, schools and businesses. Severe winter weather can escalate, creating life threatening situations when emergency response is limited due to the conditions or when individuals are caught in the backcountry unprepared. Snow removal costs can also greatly impact local budgets.

Wildfire

Hazard Description

"Wildfire" is the term applied to any unwanted, unplanned, damaging fire burning in forest, shrub or grass and is one of the most powerful natural forces known to humans. While sometimes caused by lightning, nine out of ten wildfires are human-caused from smoking, campfires, equipment use, and arson.

On public lands in Mesa County, 84% of the wildfires started are from lightning and 26% are human caused. However, many of the more destructive and costly fires have been human caused. Most of these human caused fires are started near areas where people congregate. This can include towns, subdivisions, or campgrounds. Undoubtedly, human caused fires on public lands have the potential to threaten human life as well as property. (Paul, 2009)

Due to fuel accumulation in the form of fallen leaves, branches, and excessive plant overgrowth in forest and wildland areas, increasing hot weather, changing weather patterns, and increased

residential development in the wildland/urban interface areas, the potential for wildfires to occur has increased. The potential for major loss of property and structures has also significantly increased with the wildland-urban interface. The risk to firefighters can be high. Similar fuels/fire/terrain was responsible for 17 firefighter deaths in neighboring Garfield County. (Paul, 2009)

Based on information contained in the State of Colorado Natural Hazards Mitigation Plan, a century of aggressive fire suppression combined with cycles of drought and changing land management practices has left many of Colorado's forests unnaturally dense and ready to burn. Furthermore, the threat of wildfire and potential losses are constantly increasing as human development and population increases and the wildland-urban interface expands.

Many other areas of Mesa County now have an increased wildfire threat in areas where fire was not a problem in the past. This is due to a combination of irrigation and the introduction of non-native plants. Non-native tamarisk and Russian olive have invaded drainage areas. Excess, undrained irrigation water has created thick, unbroken, stands of vegetation throughout the Grand Valley. The stands of tamarisk and Russian olive burn readily and pose a threat to homes and other structures. The spring 2009 Preserve Fire on the Redlands is a good example of this kind of fire. (Paul, 2009)

Geographic Location

The geographic extent of this hazard in Mesa County is medium—25-50% of the planning area affected.

Previous Occurrences

According to data collected from the various Fire Protection Districts, the Mesa County Wildland Fire Team, the Bureau of Land Management, and the Colorado State Forest Service, Mesa County has had several significant wildfire events that have either burned a large amount of acres, structures, or involved a multi-agency response. These significant fires include the following:

- June 9, 2002 – Lightning strike resulting in wildfire known as the Miracle Complex Fire that burned 3,951 acres.
- July 21, 2008 – Lightning caused fire known as the Housetop Fire burned 143 acres and threatened multiple gas wells in the area.
- July 29, 2005 – Human caused fire known as the Turkey Track Fire burned 348 acres, a camp trailer, and the fire protection district's water tender. This fire also forced the evacuation of approximately 20 people.
- July 4, 2004 – Human caused fire known as the 22 ½ Road Fire burned 110 acres and threatened 20 homes.

- June 10, 2002 – Human caused fire known as the Dierich Creek Fire burned 3,951 acres and forced the evacuation of 57 homes.
- July 4, 2000 – Lightning caused wildfire known as Cone Mountain Fire burned 4,960 acres. No homes were threatened but forced road closure of John Brown Canyon.
- July 31, 1995 – Lightning caused wildfire known as Triangle Fire burned 5,343 acres and forced evacuation of 50 people.
- July 1, 1989 – Lightning caused wildfire burned 1,233 acres with approximately 100 homes evacuated.
- April , 1978 – Human caused wildfire known as Mesa Creek Fire (Easter Fire) burned 1 home with several others damaged.
- June 21, 2007 – Human caused wildfire with 3 homes destroyed.
- August 2, 2008 – Human caused wildfire known as the 48 ¼ Road Fire with one injury and one residence partially burned.
- April 3, 1956 – Human caused wildfire at the intersection of Mesa Street and U.S. Hwy 65 with three structures destroyed.

Probability of Future Occurrence

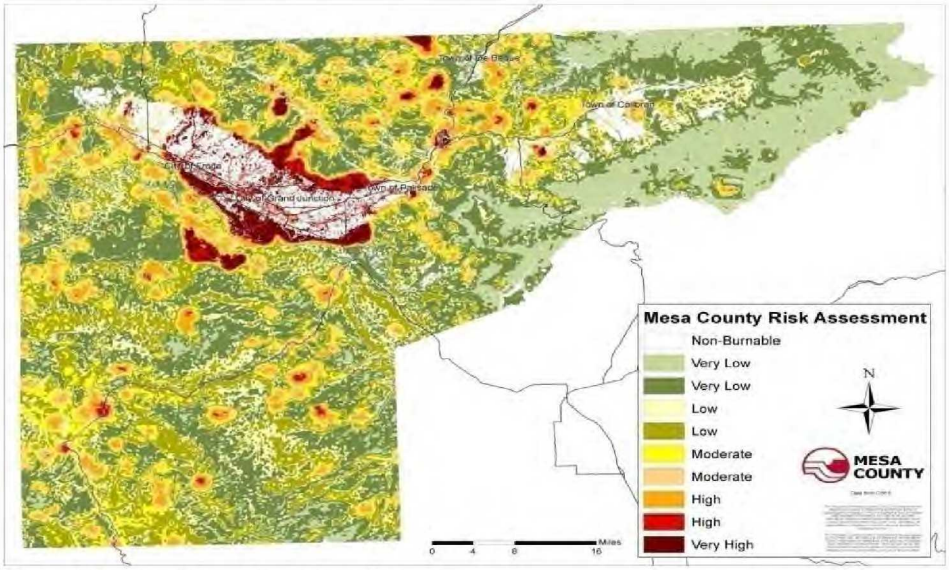
Highly Likely—Near 100% chance of occurrence next year or happens every year.

Magnitude/Severity

Critical—Isolated deaths and /or multiple injuries and illnesses; major or long-term property damage that threatens structural stability; and/or interruption of essential facilities and services for 24-72 hours.

Based on data received from the Bureau of Land Management and Mesa County GIS Department the following risk assessment has been mapped out for the planning area. Figure 16 illustrates the areas where risk is significant if a wildfire were to occur.

FIGURE 16 MESA COUNTY WILDFIRE RISK ASSESSMENT



(Source: Bureau of Land Management)

Windstorms/Tornados

Hazard Description

High winds occur year round in Mesa County. In the spring and summer, high winds often accompany severe thunderstorms. These winds are typically straight-line winds, which are generally any thunderstorm wind that is not associated with rotation. It is these winds, which can exceed 80 miles per hour (mph) that represent the most common type of severe weather and are responsible for most wind damage related to thunderstorms.

Geographic Location

The geographic extent of this hazard in Mesa County is large—more than 50% of the planning area affected.

Previous Occurrences

Historical data from SHELDUS, NCDC Storm Data, and the National Weather Service, Grand Junction Office reported 48 recorded wind events in Mesa County between 1974 and 2008. These wind events also include tornado events that have occurred in Mesa County.

Probability of Future Occurrence

Likely—10-100 percent chance of occurrence in the next year or has a recurrence interval of 10 years or less.

There were 48 recorded wind events in the past 34 years in Mesa County which equals one wind event every 1.4 years on average, or a 71% chance of occurrence in any given year.

Magnitude/Severity

Limited—Minor injuries and illnesses; minimal property damage that does not threaten structural stability; interruption of essential facilities and services for less than 24 hours.

Wind storms in Mesa County are rarely life threatening, but do threaten public safety, disrupt daily activities, cause damage to buildings and structures, increase the potential for other hazards (e.g., wildfire), and have adverse economic impacts from business closures and power loss. Although windstorms are likely to occur in the future, data indicates the past losses have not been significant, and the overall magnitude of this hazard is limited.

Hazard Profile Summary

This section summarizes the results of the hazard profiles and assigns a level of overall planning significance to each hazard of low, moderate, or high as indicated in Table 7. Significance was determined based on the hazard profile, focusing on key criteria such as geographic location, occurrences, magnitude and severity. This assessment was used by the HMPC to prioritize the hazards that present the greatest risk to the planning area. The hazards that occur infrequently or have little or no impact to the planning area were determined to be of low significance. Those determined to be of high significance were identified as priority hazards that require additional evaluation in the Vulnerability Assessment.

TABLE 7 HAZARDS PROFILE

Avalanche	2	4	6	32	M
Drought	8	4	4	48	M
Earthquake	6	4	4	40	M
Expansive Soils	2	4	2	16	L
Extreme Heat	8	4	2	40	M
Hail Storm	4	4	2	24	L
Land Subsidence	2	4	4	24	L
Lightning	2	8	4	48	M
Tornado	2	4	2	16	L
Wind Storm	4	6	4	48	M
Winter Storm	6	6	2	48	M
Dam Failure	4	4	6	40	M
Hazardous Materials	2	8	4	48	M

Vulnerability Assessment

Requirement § 201.6©(2)(ii)(A): The plan should describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard area.

Requirement §201.6©(2)(ii)(B): [The plan should describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(i)(A) of this section and a description of the methodology used to prepare the estimate.

Requirement §201.6(c)(2)(ii)(C): [The plan should describe vulnerability in terms of] providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.

The vulnerability assessment further defines and quantifies populations, buildings, critical facilities and infrastructure, and other community assets at risk to natural hazards. The vulnerability assessment for this plan followed the methodology described in the FEMA publication Understanding Your Risks—Identifying Hazards and Estimating Losses (2002).

The vulnerability assessment is based on the best available data and the overall planning significance of the hazard. Data to support the vulnerability assessment was collected from the same sources identified for the hazard identification and hazard profile sections.

The vulnerability assessment includes three sections:

Community Asset Inventory – This section is an inventory of assets exposed to hazards in Mesa County, including the total exposure of people and property; critical facilities and infrastructure; natural, cultural, and historic resources; and economic assets.

Vulnerability By Hazard – This section describes the County's overall vulnerability to each hazard; identifies existing and future structures, critical facilities, and infrastructure in identified hazard areas; and estimates potential losses to vulnerable structures, where data is available. Only hazards of moderate or high significance, or that have identified hazard areas are addressed in the vulnerability assessment.

Development and Land Use Trends – The final section analyzes trends in population growth, housing demand, and land use pattern.

In addition, a capability assessment was conducted for each jurisdiction as part of the risk assessment process. A capability assessment identifies the existing programs, policies, and plans that mitigate or could be used to mitigate risk to disasters. From a Countywide perspective the following capabilities are identified in Table 8. Jurisdiction specific information regarding capabilities is found in the Jurisdictional Annex of this plan.

TABLE 8 CAPABILITIES MATRIX

		s
Comp Plan/General Plan	No	Mesa County
Special Plans	Yes	Pubic Improvement District Info.
Subdivision Ordinance	Yes	Floodplain Only
Zoning Ordinance	Yes	Floodplain Only
NFIP/FPM Ordinance	Yes	
Substantial Damage Language	Yes	
Administrator/Certified Floodplain Mgr.	Yes	
# of Flood threatened Buildings	Yes	
# of Flood Insurance Policies	Yes	
# of Repetitive Losses	Yes	
Maintain Elevation Certificates	Yes	
CRS Rating, if applicable	Yes	
Stormwater Program	No	5-2-1 Drainage Authority
Erosion or Sediment Controls	No	5-2-1 Drainage Authority
Building Code Version	Yes	Mesa County Building Dept.
Full-Time Building Official	Yes	Mesa County Building Dept.
Conduct "as-built" Inspections	Yes	Mesa County Building Dept.
BCEGS Rating	Yes	Mesa County Building Dept.
Local Emergency Operations Plan	Yes	Mesa County Emergency Management
Fire Department ISO Rating	No	
Fire Safe Programs	No	
Hazard Mitigation Plans	Yes	Mesa County
Warning Systems/Services	Yes	GJRCC
Storm Ready Certified	No	
Weather Radio Reception	Yes	
Outdoor Warning Sirens	No	
Emergency Notification (R-911)	Yes	GJRCC
Other (e.g., cable over-ride)	Yes	GJRCC/NWS- EAS System
GIS System	Yes	Mesa County
Hazard Data	Yes	
Building Footprints	Yes	Mesa County Building Dept./GIS
Links to Assessor Data	Yes	Access Only
Land-Use Designations	Yes	Access Only
Structural Protection Projects	No	
Property Protection Projects	No	
Critical Facilities Protected	Yes	
Natural/Cultural Resources Inventory	Yes	
Public Information Program/Outlet	Yes	
Environmental Education Program	No	

Community Asset Inventory

This section assesses the population, structures, critical facilities and infrastructure, and other important assets in Mesa County at risk to natural hazards.

Critical Facilities and Infrastructure

A critical facility may be defined as one that is essential in providing utility or direction either during the response to an emergency or during the recovery operation. Table 9 displays the inventory of critical facilities in Mesa County. The information is based on available date from the Northwest All Hazard Emergency Management Region.

TABLE 9 CRITICAL FACILITIES AND INFRASTRUCTURE

Facility Type	Unincorporated Mesa County	Grand Junction	Collbran	Palisade	Fruita	DeBeque
Ambulance	7	7	2	2	3	2
Bridge	104	27	3	-	6	1
Dam	47	1	-	-	-	-
EOC	1 (not 24/7)	-	-	-	-	-
Communication Towers	40	21	1	-	1	-
Fire Station	6	5	2	1	2	1
Govt. Building	-	14	1	1	1	1
Helicopter Staging	-	1	-	-	-	-
9-1-1 Communications Center	-	1	-	-	-	-
Medical Facility	-	3	-	-	1	-
Schools District 51 Private	 15 3	 19 5	1	2	5	1
Water - Wastewater	1	1	1	1	1	1
College - University	-	1	-	-	-	-
Airport	-	1	-	-	-	-

Note: Communication Towers includes cell towers, radio sites & T.V. Translators. Other facilities in Mesa County, such as locations that hold concerts, sporting events, and other events that attract large numbers of people, may also be at higher risk due to concentrations of people. These events have been identified as part of the Northwest All Hazard Emergency Management regional planning required under Homeland Security.

Natural, Historic, and Cultural Assets

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

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

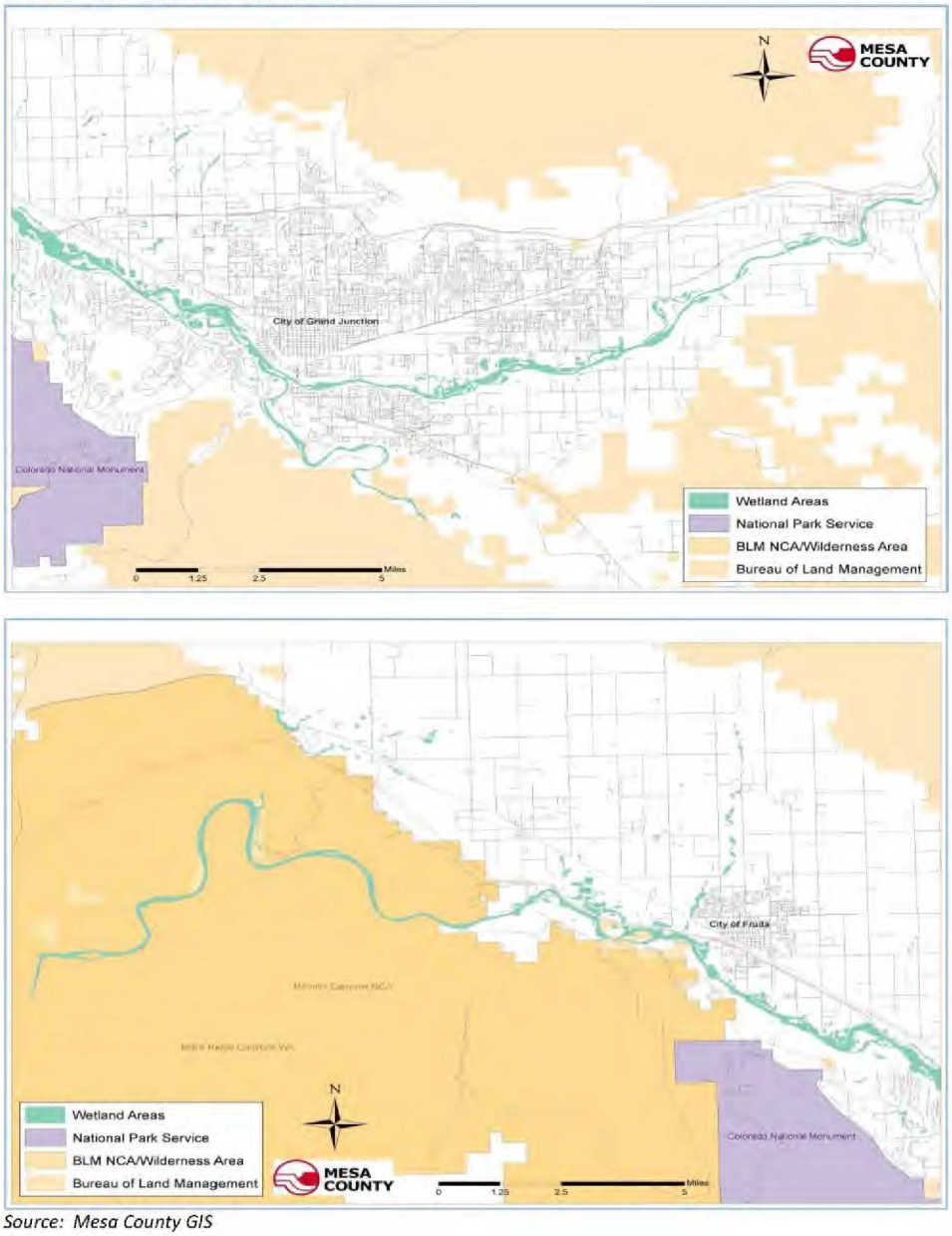
Natural Resources

Natural resources are important to include in benefit-cost analyses for future projects and may be used to leverage additional funding for projects that also contribute to community goals for protecting sensitive natural resources. Awareness of natural assets can lead to opportunities for meeting multiple objectives. For instance, protecting wetlands areas protects sensitive habitat as well as attenuates and stores floodwaters. A number of natural resources exist in Mesa County, including wetlands, endangered species, and imperiled plant communities.

Wetlands

Wetlands area a valuable natural resource for communities, due to their benefits to water quality, wildlife protection, recreation, and education, and play an important role in hazard mitigation. Wetlands reduce flood peaks and slowly release floodwaters to downstream areas. When surface runoff is dampened, the erosive powers of the water are greatly diminished. Furthermore, the reduction in the velocity of inflowing water as it passes through a wetland helps remove sediment being transported by the water. They also provide drought relief in water-scarce areas where the relationship between water storage and stream flow regulation are vital. Figure 17 shows the wetlands that have been identified throughout Mesa County.

FIGURE 17 MESA COUNTY WETLANDS AREAS

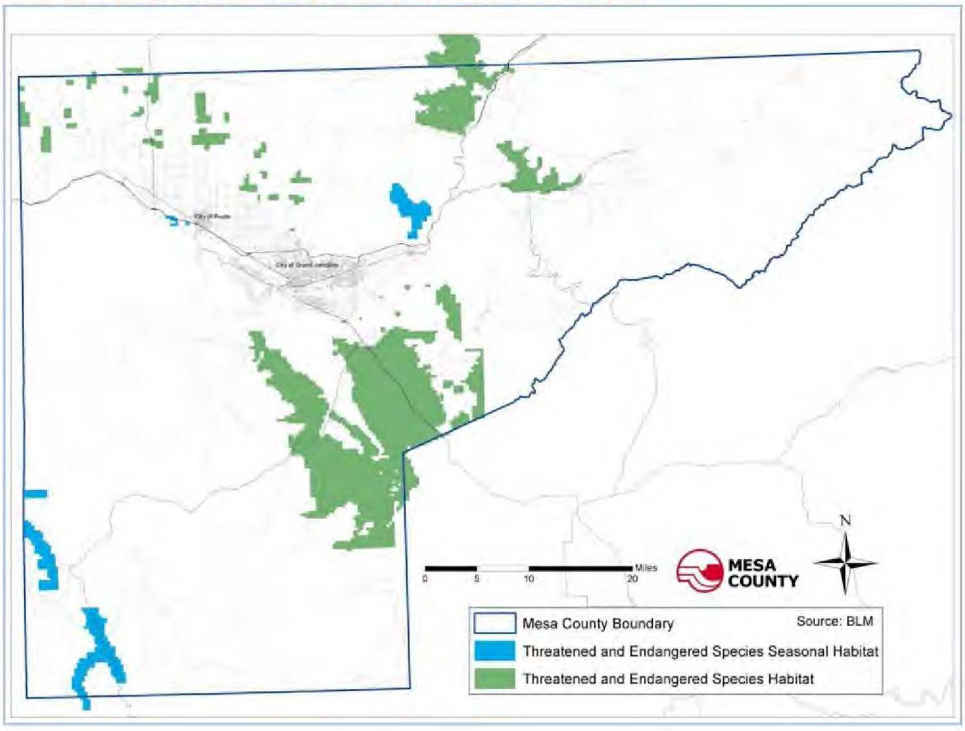


Source: Mesa County GIS

Endangered Species

An endangered species is any species of fish, plant life, or wildlife that is in danger of extinction throughout all or most of its range. A threatened species is a species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. Both endangered and threatened species are protected by law and any future hazard mitigation projects are subject to these laws. Candidate species are plants and animals that have been proposed as endangered or threatened but are not currently listed. Figure 18 is a map showing habitats for threatened and endangered species in Mesa County. (Nelson, 2009)

FIGURE 18 MESA COUNTY HABITATS FOR THREATENED AND ENDANGERED SPECIES



The Colorado Division of Wildlife provided the following information of wildlife species found in Mesa County that have been given special designations, see Table 10 .

TABLE 10 ENDANGERED WILDLIFE

Amphibians	Boreal Toad	Bufo boreas	Known to occur	Unknown	State Endangered
Amphibians	Woodhouse's Toad	Bufo woodhousii	Known to occur	Common	State Monitored
					es of
Birds	Bald Eagle	Haliaeetus leucocephalus	Known to occur	Casual/Accidental	State Threatened
Birds	Greater Sandhill Crane	Grus canadensis tabida	Known to occur	Very Rare	State Species of Concern
Birds	Least Tern	Sterna antillarum	Known to occur	Unknown	Federal Endangered, State Endangered
Birds	Mountain Plover	Charadrius montanus	Known to occur	Unknown	State Species of Concern
Birds	Southwestern Willow Flycatcher	Empidonax traillii extiums	Known to occur	Rare	Federal Endangered, State Endangered
Birds	Whooping Crane	Grus americana	Known to occur	Unknown	Federal Endangered, State Endangered

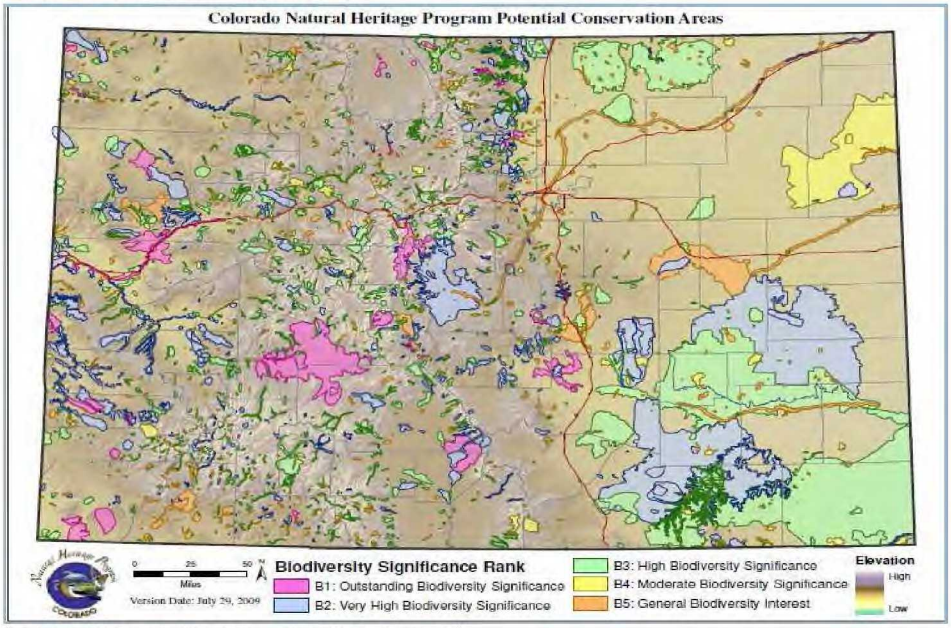
	Bo				
Fish	Razorback Sucker	Xyrauchen texanus	County Fish Data Not Kept by NDIS		Federal Endangered, State Endangered
Fish	Colorado Pikeminnow	Ptychocheilus lucius	County Fish Data Not Kept by NDIS		Federal Endangered, State Endangered
	Flannelmouth Sucker	Catostomus latipinnis	County Fish Data Not Kept by NDIS		
Fish	Colorado Roundtail Chub	Gila robusta	County Fish Data Not Kept by NDIS		State Species of Concern
Mammals	Kit Fox	Vulpes macrotis	Known to occur	Very Rare	State Endangered
Mammals	Northern Pocket Gopher	Thomomystalpoides	Known to occur	Common	State Species of Concern
Mammals	Townsend's Big-eared Bat	Plecotus townsendii	Known to occur	Uncommon	State Species of Concern
Mammals	Wolverine	Gulo gulo	Likely to occur	Extirpated	State Endangered
Reptiles	Midget Faded Rattlesnake	Crotalus viridis concolor	Known to occur	Uncommon	State Species of Concern

(Hampton, 2009)

Imperiled Natural Plant Communities

The Colorado Natural Heritage Program (CNHP) tracks and ranks Colorado's rare and imperiled species and habitats, and provides information and expertise on these topics to promote the conservation of Colorado's valuable biological resources. The Statewide Potential Conservation Areas (PCA) map in Figure 19 shows CNHP's best estimate of the primary area required to support the long-term survival of targeted species or natural communities. (About Us: Colorado Natural Heritage Program, 2009)

FIGURE 19 POTENTIAL CONSERVATION AREAS

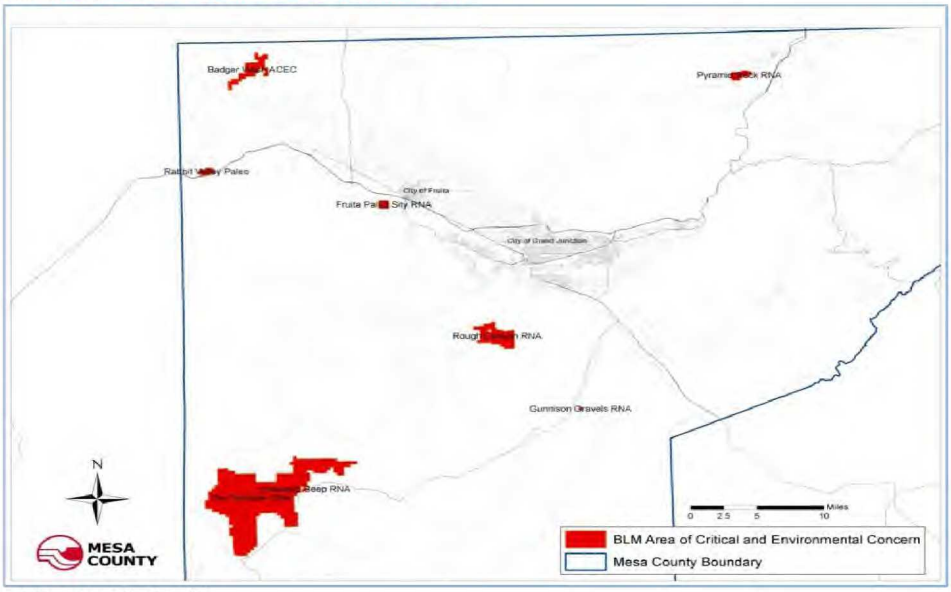


(About Us: Colorado Natural Heritage Program, 2009)

Ecologically Sensitive Areas

Figure 20 shows the ecologically sensitive areas in Mesa County where threatened and endangered species and imperiled natural plan communities are most likely found.

FIGURE 20 MESA COUNTY ECOLOGICALLY SENSITIVE AREAS



Source: Mesa County GIS

Historical and Cultural Resources

Several national and state historic inventories were reviewed to identify historic and cultural assets in Mesa County:

- The National Register of Historic Places is the Nation's official list of cultural resources. The National Register is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect historic and archeological resources. Properties listed include districts, sites, buildings, structures, and objects that are significant in American history, architecture, archeology, engineering, and culture. The National Register is administered by the National Park Service, which is part of the U.S. Department of Interior.
- The Colorado State Register of Historic Properties is a listing of the state's significant cultural resources worthy of preservation. Properties listed in the Colorado State Register include individual buildings, structures, objects, districts, and historic and archaeological sites.

Table 11 lists the properties and districts in Mesa County that are on the National Register of Historic Places.

TABLE 11 NATIONAL REGISTER OF HISTORIC PLACES IN MESA COUNTY

Colorado National Monument Visitor Center Complex	Mesa County	Colorado National Monument	07/15/2003
Colorado River Bridge	Mesa County	DeBeque Vicinity	10/15/2002
Clifton Community Center & Church	Mesa County	Clifton	06/30/1982
Coates Creek Schoolhouse	Mesa County	Glade Park	02/03/1993
Convicts' Bread Oven	Mesa County	Molina	12/31/1974
Crissey, Herbert and Edith, House	Palisade	218 W. 1st St.	05/18/2003
Cross Land and Fruit Company Orchards and Ranch	Mesa County	3079 F Road	03/28/1980
DeBeque House	DeBeque	233 Denver Ave.	07/28/1995
Denver and Rio Grande Western Railroad Depot	Grand Junction	119 Pitkin Ave.	09/08/1992
Devils Kitchen Picnic Shelter	Mesa County	Colorado National Monument	04/21/01994
Fruita Bridge	Mesa County	Cty. Rd. 17.50 over Co. River	02/04/1985
Fruita Museum	Fruita	432 E. Aspen	10/10/1996
Grand Valley Diversion Dam	Mesa County	8 mi. NE of Palisade	10/08/1991
Handy Chapel	Grand Junction	202 White Ave.	08/19/1994
Hotel St. Regis	Grand Junction	359 Colorado Ave.	10/22/1992
IOOF Hall	DeBeque	4th St. and Curtis Ave.	03/25/1993
Kettle-Jens House	Mesa County	498 32nd Road	05/06/1983
Land's End Observatory	Mesa County	Land's End Road, 10 miles W of CO 65	02/28/1997
Loma Community Hall	Mesa County	1341 Co. Rd. 13, Loma	11/22/1995
Margery Building	Grand Junction	519-527 Main Street	02/24/1993
North 7th Street Historic Residential District	Grand Junction	7th St. between Hill and White Aves.	01/05/1984
Phillips, Harry and Lilly House	Fruita	798 N. Mesa St.	11/13/1997
Pipe Line School	Mesa County	101 16.5 Rd. Glade Park	04/29/1999
Rim Rock Drive Historic District	Grand Junction	Colorado National Monument	04/21/1994
Saddlehorn Caretaker's House and Garage	Grand Junction	Colorado National Monument	04/21/1994
Saddlehorn Comfort Station	Grand Junction	Colorado National Monument	04/21/1994
Saddlehorn Utility Area Historic District	Grand Junction	Colorado National Monument	04/21/1994
Serpents Trail	Grand Junction	Colorado National Monument	04/21/1994
U.S. Post Office	Grand Junction	400 Rood Ave.	01/31/1980

(National Register of Historic Places, 2009)

Table 12 identifies the properties and districts in Mesa County that are on the Colorado Office of Archaeology and Historic Preservation site. Those properties listed above were also listed on the State list.

TABLE 12 MESA COUNTY PROPERTIES LISTED AS ARCHAEOLOGY AND HISTORIC PRESERVATIONS SITES

Stockmens Bank	Collbran	111 Main St.	03/08/1995
Circle Park	Fruita	Fruita Park Sq.	05/14/1997
Fruita Elementary	Fruita	325 E. Aspen St.	03/10/1993
Weckel House	Mesa County	1620 Hwy. 6 & 50	03/13/1996
Driggs Mansion	Mesa County	24505 State Highway 141	09/14/2005
Grand Junction Country Club	Grand Junction	2463 Broadway	09/13/1995
Hurlburt-Knowles House	Mesa County	1151 13 Rd. Loma	08/09/2000
Harlow Gravesite	Mesa County	869 Rapid Creek Rd.	09/13/1995
Bloomfield Site	Mesa County	Whitewater Vicinity	01/20/1983
Coffman House	Mesa County	4000 US Hwy. 50	12/12/2001
Land's End Aboriginal Site	Mesa County	Land's End Road	03/11/1998
Raber Cow Camp	Mesa County	Land's End Road	03/10/1993

(National and State Registers)

Economic Assets

Economic assets at risk may include major employers or primary economic sectors, such as, agriculture, whose losses or inoperability would have severe impacts on the community and its ability to recover from disaster. After a disaster, economic vitality is the engine that drives recovery. Every community has a specific set of economic drivers, which are important to understand when planning ahead to reduce disaster impacts to the economy. When major employers are unable to return to normal operations, impacts ripple throughout the community. Table 13 lists the major employers in Mesa County based on the number of employees.

TABLE 13 MAJOR EMPLOYERS IN MESA COUNTY

G	Mesa County School District #51	3,000	970-254-5100	www.mesa.k12.co.us
S	St. Mary's Hospital & Medical Center	2,191	970-244-2273	www.stmarygj.org
G	City of Grand Junction	700	970-244-1501	www.gjcity.org
G	State of Colorado	1212	303-866-2431	www.state.co.us
R	Wal-Mart	980	970-241-6061	www.walmart.com
G	Mesa County- All Departments	978	970-244-1800	www.co.mesa.co.us
S	Mesa State College	718	970-248-1020	www.mesastate.edu
S	City Markets, Inc	677	970-241-0750	www.citymarket.com
S	StarTek USA, Inc	595	970-263-7676	www.startek.com
S	Community Hospital	588	970-242-0920	www.yourcommunityhospital.org
S	Hilltop Community Resources, Inc.	530	970-242-4400	www.htop.org
S	Family Health West	422	970-858-9871	www.familyhealthwest.org
S	Rocky Mountain Health Plans	350	970-244-7800	www.rmhp.org
S	Mesa Developmental Services	293	970-243-3702	www.mesadev.org
S	West Star Aviation	290	970-243-7500	www.weststaraviation.com
S	United Companies	266	970-243-4900	www.united-gj.com
S	Choice Hotels	265	970-245-3355	www.choicehotels.com
S	Daily Sentinel	230	970-242-5050	www.gjsentinel.com
S	Union Pacific Railroad	197	402-544-1188	www.up.com
S	Schlumberger Tech Corp	165	970-683-4000	www.slb.com
R	McDonald's	150	970-245-6420	www.mcdonaldsgrandjunction.com
S	GJ Pipe and Supply	135	970-243-4604	www.gjpipe.com
R	Home Depot	120	970-244-8577	www.homedepot.com
S	Leitner-Poma of America	84	970-241-4442	www.leitner-poma.com
S	BJ Services	77	970-241-0592	www.bjservices.com

(S = Service, R = Retail, G = Government) (Data & Demographics: Grand Junction Economic Partnership, 2009)

Vulnerability by Hazard

This section describes overall vulnerability and identifies structures and estimates potential losses to buildings, infrastructure, and critical facilities located in identified hazard areas. This assessment was limited to the hazards that were considered moderate or high in planning significance, based on HMPC input and the hazard profiles. Hazards that ranked as "low significance" are not included in the vulnerability assessment. These include the following: Expansive soils, Hail Storm, Land Subsidence, and Tornado.

Many of the identified hazards, particularly weather related hazards, affect the entire planning area, and specific hazard areas cannot be mapped geographically. For those hazards, which include drought, lightning, and winter weather, the vulnerability is mainly discussed in qualitative terms because data on potential losses to structures is not available.

Avalanche

Mesa County's vulnerability to avalanches is moderate due to the historical events where loss of life has occurred. Thousands of people are exposed to avalanche risk in Mesa County every winter and spring due to the recreational use of backcountry areas. Motorists along highways are also at risk of injury or death if avalanches sweep across roadways.

Existing Development

Mesa County does not have comprehensive information or mapping of avalanche hazard areas, therefore limiting available data on specific structures at risk or estimate potential losses to structures.

Future Development

There are no immediate plans to map avalanches in Mesa County.

Dam Failure

Mesa County has a considerable amount of high hazard dams that if a failure of one of these high hazard dams occurred, it would result in loss of life. There is no specific evidence at the time this plan was written to indicate a failure of any dams in Mesa County.

Vulnerability to dam failure is greatest on the Grand Mesa where most of the dams are located and specifically the Town of Collbran which is downstream from many of the dams. A catastrophic dam failure would challenge local response capabilities and require evacuations to save lives. Impacts to life safety will depend on the timely warning of people in the area. Without immediate warning, loss of life could result as well as potentially catastrophic effects to roads, bridges, and homes.

Existing Development

The Mesa County Department of Emergency Management retains copies of emergency action plans for all Class I and Class II dams in the County. The Mesa County Emergency Management Department has also worked with the Grand Junction Regional Communications Center to identify potential evacuation areas if a dam failure were to occur that is built into the reverse 911 system for notification purposes. Due to ongoing security concerns of the dam operators, Mesa County Emergency Management Department requests that inundation maps not be made part of this public planning process.

Future Development

Efforts to map out additional evacuation areas that would be inundated in the event of a dam failure will continue with the Grand Junction Regional Communications Center. The County and towns should consider the dam failure hazard when permitting development downstream of the Class I and Class II dams.

Drought

Drought has been a significant issue in Mesa County. It is the one hazard that cannot be controlled yet it has devastating effects that can last for several years. Drought has several impacts to Mesa County including but not limited to; air quality, wildfires, reduction of tourism and recreation activities, and damage to the agriculture industry.

Existing Development

The impacts from drought are non-structural and generally affect the economy and environment the most. A drought event normally does not impact structures and can be difficult to identify specific hazard areas. Many of the towns use public education efforts to encourage water conservation during the summer months.

Future Development

Vulnerability to drought will increase as population growth increases putting more demands on existing water supplies. Future water use planning should consider increase in population as well as potential impacts of climate change.

Earthquake

Past earthquake activity in Mesa County has been minimal and most earthquake activity has low magnitude and severity. Earthquake data in Mesa County is limited but some historical information is available through Mesa State College.

Existing Development

By using data from the HAZUS-MH software, information on potential economic and social losses due to an earthquake in Mesa County can be determined. This particular information produces "what if" scenarios (e.g., determines what would happen if an earthquake of a certain

magnitude occurred on a particular fault) The earthquake magnitudes used for each fault were the "maximum credible earthquake" as determined by the U.S. Geological Survey.

There are 16 Quaternary aged faults identified by the USGS in Mesa County. There are innumerable older faults that have been identified and presumably older faults which remain hidden from view. The Quaternary aged faults are associated with the Uncompahgre Plateau. The Uncompahgre Plateau extends from Grand County, Utah northwest of Grand Junction to near the town of Ridgway, Colorado. The Uncompahgre has as much as 640 m of uplift. The faults associated with the uplift are in two groups, bordering both the southwest flank and northeast flank of the uplift.

The northeast flank of the Uncompahgre Plateau, near Grand Junction, contains the Redlands Fault complex. This fault shows as much as 240 m of displacement and can be seen most vividly in the Colorado National Monument. The Colorado Geological Survey has estimated that the largest earthquake possible on the Western Slope of Colorado is magnitude 6.5.

Using the HAZUS-MH program, Emergency Management staff and a Mesa State College faculty member designed and analyzed the following earthquake scenario on the Bridgeport/Cactus Park fault complex in southern Mesa County:

Type: Deterministic, arbitrary

Attenuation Function: Western US Shallow Crustal Event – Non Extensional

Magnitude: 5.5

Epicenter: Latitude 38.875, Longitude -108.438
Depth: 1 Kilometer
Width: 6 Kilometers

Fault Mechanism: Reverse Slip

Rupture: Subsurface Length: 5.88844 Kilometers
Surface Length: 4.02717 Kilometers
Orientation: 120 degrees
Dip Angle: 75 Kilometers

While this is not the worst-case scenario for an earthquake event in Mesa County, it is believed to be a more plausible scenario (Wolny, Martsolf, 2009). Figure 21 provides an illustration of potential ground acceleration from this scenario.

FIGURE 21 HAZUS EARTHQUAKE SCENARIO

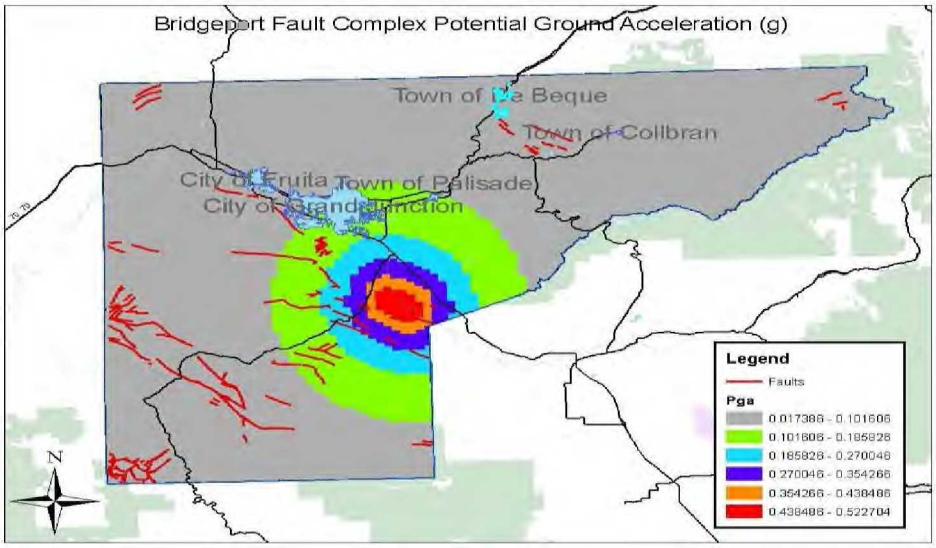


Figure 22 shows how far reaching this type of earthquake would be felt in Mesa County and Figure 23 identifies the area with displaced homes.

FIGURE 22 BRIDGEPORT EARTHQUAKE GROUND MOTION

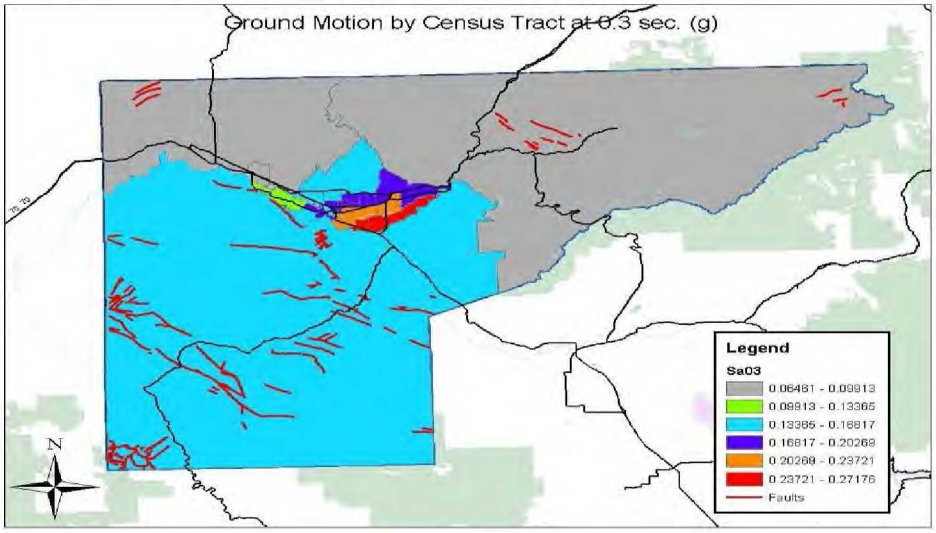
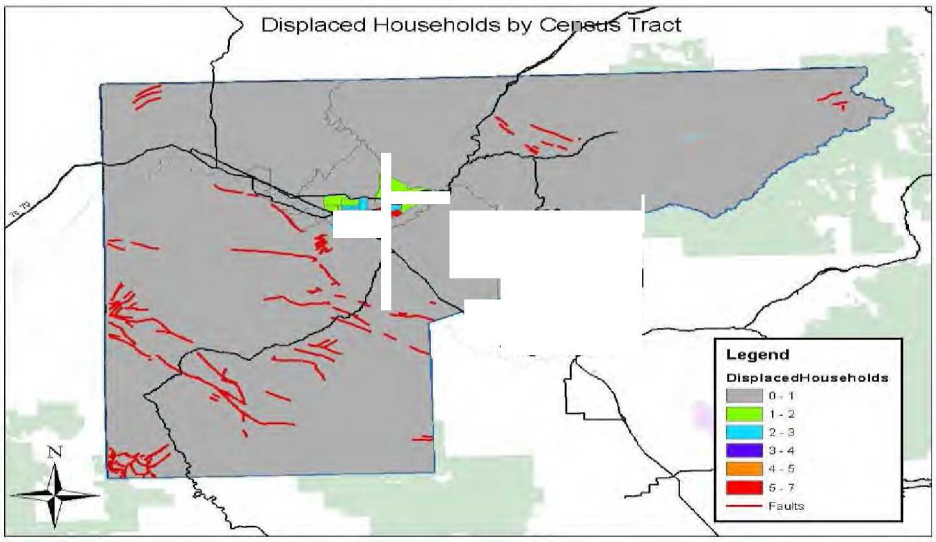


FIGURE 23 BRIDGEPORT EARTHQUAKE SCENARIO, DISPLACED HOMES



In calculating building damage associated with this type of earthquake, the following Hazus definitions were used:

Slight Damage: Small plaster or gypsum board cracks at corners of doors and window openings and wall-ceiling intersections, small cracks in masonry chimneys and masonry veneer.

Moderate Damage: Larger plaster or gypsum board cracks at corners of door and window openings; small diagonal cracks across shear wall panels exhibited by small cracks in stucco and gypsum wall panels; large cracks in brick chimneys' toppling of tall masonry chimneys.

Extensive Damage: Large diagonal cracks across shear wall panels or large cracks at plywood joints; permanent lateral movement of floors and roof; toppling of most brick chimneys' cracks in foundations; splitting of wood sill plates and/or slippage of structure over foundations; partial collapse of room-over garage or other soft-story configurations; small foundation cracks.

Complete Damage: Structure may have large permanent lateral displacement, may collapse, or be in imminent danger of collapse due to cripple wall failure or the failure of lateral load resisting system; some structures may slip and fall off the foundations; large foundation cracks.

Table 14 provides an estimated number of buildings damaged and the extent of damage to the various types of structures using this scenario.

TABLE 14 ESTIMATED BUILDING DAMAGE FROM EARTHQUAKE

Number of Buildings

Wood	28677	2296	384	25	0	31382
Steel	177	10	5	1	0	193
Concrete	367	27	10	1	0	405
Precast	192	16	13	3	0	224
Reinforced Masonry	3234	202	133	20	0	3589
Manufactured Home	2086	295	156	16	0	2553
Total	**34733**	**2846**	**701**	**66**	**0**	**38346**

Table 15 identifies the possible economic loss due to the number of damaged or destroyed buildings as a result of this type of earthquake.

TABLE 15 DIRECT ECONOMIC LOSS

Structural Damage Loss	Non-structural Damage Cost	Contents Damage Cost	Inventory Loss
$ 11,819,000.00	**$ 37,667,000.00**	**$ 15,472,000.00**	**$ 539,000.00**

Relocation Loss	Capital Related Loss	Wage Losses	Rental Income Loss
$ 315,000.00	**$ 2,977,000.00**	**$ 3,944,000.00**	**$ 4,520,000.00**

Total Loss
$ 65,497,000.00

Much of the County's recent development has building codes in place which reduce the risk of structural damage. However, historical buildings constructed of unreinforced masonry are most vulnerable to seismic ground shaking. Downtown Grand Junction is one of the areas most vulnerable to a seismic event due to older construction.

Similar to calculating damage to buildings, the analysis also allows us to estimate possible injuries sustained during a 5.5 magnitude earthquake in this area as shown in Table 16. Hazus Injury definitions are defined as the following:

Severity 1: Injuries requiring basic medical aid without requiring hospitalization.

Severity 2: Injuries requiring a greater degree of medical care and hospitalization, but not expected to progress to a life threatening status.

Severity 3: Injuries that pose an immediate life threatening condition if not treated adequately and expeditiously. The majority of these injuries are the result of structural collapse and subsequent collapse of impairment of the occupants.

Severity 4: Instantaneously killed or mortally injured.

TABLE 16 POSSIBLE INJURIES SUSTAINED IN EARTHQUAKE

	Injury Severity Level				
	Severity 1	Severity 2			Total
Commuting	0	0	0	0	0
Commercial	0	0	0	0	0
Educational	0	0	0	0	0
Hotels	0	0	0	0	0
Industrial	0	0	0	0	0
Other-Residential	7	1	0	0	8
Single Family	14	2	0	0	16
Total Casualties - 2:00 AM	21	3	0	0	24

	Severity 1	Severity 2	Severity 3		Total
Commuting	0	0	0	0	0
Commercial	13	2	0	0	15
Educational	3	0	0	0	3
Hotels	0	0	0	0	0
Industrial	2	0	0	0	2
Other-Residential	1	0	0	0	1
Single Family	3	0	0	0	3
Total Casualties - 2:00 PM	22	2	0	0	24

		Severity 2	Severity 3		Total
Commuting	0	0	0	0	0
Commercial	10	1	0	0	11
Educational	0	0	0	0	0
Hotels	0	0	0	0	0
Industrial	1	0	0	0	1
Other-Residential	3	1	0	0	4
Single Family	5	1	0	0	6
Total Casualties - 5:00 PM	19	3	0	0	22

Future Development

All jurisdictions within Mesa County have adopted building codes. Building codes substantially reduce the costs of damage to future structures from earthquakes. It is highly recommended that a specific study be done on the liquefaction hazards found within the Grand Valley. This is the single most important unknown in assessing the vulnerability of earthquakes in Mesa County.

Floods

Floods affect most of the communities in Mesa County and will continue to occur in the future. Floods can be critical in their magnitude and may cause deaths and damage to property and infrastructure.

Existing Development

In 2005, Mesa County entered FEMA's map modernization program to develop digital flood insurance rate maps (DFIRMS) in partnership with state and federal agencies. Mesa County has received a copy of the preliminary copies of the Digital Flood Insurance Rate Map (DFIRM) and Flood Insurance Study (FIS) report. The preliminary report is in a countywide format, which means that flood hazard information for all jurisdictions within Mesa County have been included on one DFIRM and one FIS report.

Analysis was done for each community in Mesa County to determine the proportion of value of buildings in the hazard areas that were identified by the HMPC. The GIS system was used by selecting parcels that have their center within the city or town limits, then by making a sub-selection of parcels that have their center within the areas subject to flooding. Structure value is based on the actual value of improvements. Specific information regarding flood losses is identified in the jurisdiction's annex.

Floodplain Management

The purpose of the Mesa County Floodplain Management program is to assist property owners with any improvements in the floodplain. The County's goal is to help minimize property damage to residents of Mesa County during flood events. Mesa County wants to ensure that life, property including natural resource values, and/or new improvements are safe during flood events and that any structures or improvements in the floodplain will not cause additional drainage problems.

Regulations are in place to ensure that proposed improvements will not cause flooding problems upstream and/or downstream. Every man made structure or improvement constructed within the floodplain area requires a Floodplain Development Permit prior to beginning construction. A Floodplain Development Permit authorizes a specific activity within

the regulatory floodplain while minimizing the likelihood of property damage to buildings or improvements in the event of a flood. (County, 2009)

The National Flood Insurance Program (NFIP) is a federal program enabling property owners in participating communities to purchase insurance as a protection against flood losses. A jurisdiction's eligibility to participate is premised on their adoption and enforcement of state and community floodplain management regulations intended to prevent unsafe development in the floodplain, thereby reducing future flood damages. Thus, participation in the NFIP is based on an agreement between communities and the federal government. If a community adopts and enforces a floodplain management ordinance to reduce future flood risk to new construction in floodplains, the federal government will make flood insurance available within the community as a financial protection against flood losses. Currently all of the communities in and including Mesa County participate in the National Flood Insurance Program.

Future Development

Management of stormwater is important to the communities in Mesa County. As mandated under the Clean Water Act, the U.S. Environmental Protection Agency has developed a National Pollutant Discharge Elimination System stormwater permitting program. Phase II of this program addresses smaller urbanized areas, such as the Grand Valley. Currently the jurisdictions in Mesa County have identified areas where Phase II regulations are to be implemented, requiring stormwater construction permits. (County, 2009)

Landslide, Mudflow/Debris Fall, Rock Fall

In Mesa County, vulnerability to landslides primarily occurs along roadways, where the hazard could cause deaths or injuries. Road closures due to landslide events also affect the County economically.

Existing Development

Under the Mesa County Land Development Code, Chapter 7, any proposed land use or development must identify hazard areas, i.e., floodplains, drainage areas, steep slope areas, geological fault areas, and other areas hazardous to life or property. Such proposals will require an evaluation to determine the degree to which the proposed activity will:

- Expose any person, including occupants or users of the proposed use or development to any undue natural hazard.
- Create or increase the effects of natural hazard areas or other improvements, activities or lands.
- Impact the natural environment and be unduly destructive to the natural resources of an area.

Regulations also require proposed land uses address soil, erosion, and surface geologic characteristics of the development site through proper design, engineering and construction. (County, Mesa County Planning and Economic Development, 2009)

Potential losses for the landslide areas in Mesa County were estimated using Mesa County GIS and assessor's data and were examined in terms of values and critical facilities at risk. Detailed information pertaining to specific jurisdictions is found in that jurisdiction's annex.

Future Development

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. Most of these areas are adjacent to roadway systems that are heavily used. Continue adherence to the Land Development Code is necessary.

Lightning

Lightning events are likely to occur throughout Mesa County and can result in deaths and destruction of property. Consequences of lightning may have destructive effects on power and information systems. Failure of these systems would have cascading effects throughout the County and could possibly disrupt other critical infrastructure such as water treatment facilities. Because lightning can occur anywhere in the County, data was not available to identify specific structures at risk or estimate potential losses.

Severe Winter Weather

Existing Development

Winter storms can create significant public safety concerns and cause significant impacts to the local economy due to a disruption in the transportation of goods. On occasion, winter storms can overwhelm snow removal efforts, transportation, livestock management and business and commercial activities.

From previous events, Mesa County Emergency Management staff has identified the County's elderly population is a significantly vulnerable population during winter storms especially when utility outages are associated with winter storms.

Future Development

Population growth in the county will increase potential problems with traffic and snow removal, thereby putting pressure on local governments and emergency services. The Grand Valley doesn't typically experience significant winter storms, however it has experienced utility

outages associated with severe weather. Future efforts should be made to identify populations at risk and determine special needs.

Wildfire

Existing Development

Past mitigation projects include a detailed, on the ground, wildfire hazard risk assessment for approximately 450 structures including private residences and outbuildings within the jurisdictions of Lower Valley Fire Protection District, Grand Junction Rural Fire Protection District and unincorporated Mesa County. Each structure was evaluated based on potential fuels, slope, aspect, fire disturbance regimes, access/egress, water supply, and structure ignitability. This data was compiled and incorporated into the County's GIS system.

The GIS data shows structures that have been rated as to overall risk of wildfire, as well as those areas deemed most appropriate for wildland fire hazard mitigation efforts on both federal and non-federal lands within this area. This information is used to aid local fire departments and federal agencies in preparing fuels mitigation projects and preplanning fire prevention and protection strategies. This assessment also serves as the basis for public information and education efforts directed primarily by the Colorado State Forest Service and participating jurisdictions to encourage private property owners to participate in Firewise and other mitigation efforts to protect their property.

Mesa County Land Development Code specifically addresses development standards in hazard areas. All new development located on lands rated as medium or higher wildfire hazard shall be developed using defensible spacing standards. (County, Mesa County Planning and Economic Development, 2009)

Future Development

Many areas in Mesa County now have an increased wildfire threat in areas where fire was not a problem in the past. This is due to a combination of irrigation and the introduction of non-native plants. Non-native tamarisk and Russian olive have invaded drainage areas. Excess un-drained irrigation water has created thick unbroken stands of vegetation throughout the Grand Valley. These stands of tamarisk and Russian olive burn readily and pose a threat to homes and other structures. (Paul, 2009)

Additional wildfire assessments need to be conducted across Mesa County. Several areas are at significant risk to wildland fire and more education of property owners on how to create a defensible space around their homes and other structures is needed. Once the assessments have been completed, on the ground efforts to create defensible spacing or thinning of areas with substantial overgrowth need to be completed.

Mitigation Strategy

44 CFR Requirement §201.6(c)(3); The plan shall include a mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.

This section presents the mitigation strategy developed by the Mesa County Hazard Mitigation Planning Committee (HMPC) based on the County's risk assessment. The mitigation strategy was developed through a collaborative group process and consists of goals, objectives, and mitigation actions. The following definitions are based upon those found in FEMA publication 386-3, Developing a Mitigation Plan (2002):

- Goals: General guidelines that explain what you want to achieve. Goals are defined before considering how to accomplish them so that they are not dependent on the means of achievement: They are usually long-term, broad, policy-type statements.
- Objectives: Define strategies or implementation steps to attain the identified goals and are specific and measurable.
- Mitigation Actions: Specific actions that help achieve goals and objectives.

Goals and Objectives

The HMPC developed goals and objectives to provide direction for reducing hazard-related losses in Mesa County that were based on the results of the risk assessment. Through discussions at the second planning meeting, the HMPC identified a variety of possible goals.

Goal 1: Reduce risk to the people, property, and environment of Mesa County from the impacts of natural hazards.

- Minimize the vulnerability of existing and new development to hazards.
- Increase education and awareness of hazards and risk reduction measures.
- Improve comprehensive wildfire planning, funding, and mitigation.
- Strengthen floodplain management programs.
- Enhance assessment of multi-hazard risk to critical facilities and infrastructure.

Goal 2: Minimize economic losses

- Strengthen disaster resistance and resiliency of businesses and employers.
- Promote and conduct continuity of operations and continuity of governance planning.
- Reduce financial exposure of county and municipal governments.

Goal 3: Implement the mitigation actions identified in this plan

- Engage collaborative partners, including community organizations, businesses, and others
- Integrate mitigation activities into existing and new community plans and policies.
- Monitor, evaluate, and update the mitigation plan.

Identification and Analysis of Mitigation Actions

44 CFR Requirement §201.6(c)(3)(ii): The mitigation strategy shall include a section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.

The HMPC representatives present at the third meeting identified, discussed, and prioritized potential mitigation actions. Representatives chose to focus on the top three hazards with an overall ranking of "High" to develop hazard specific mitigation actions. The three high hazards are: Flooding, Wildfire, and Landslides-Rockfalls. At the time the mitigation actions are complete, additional mitigation goals and actions will be developed for the remaining hazards. The additional hazards include: Avalanche, Dam Failure, Drought, Hazardous Materials, Lightning, and Severe Winter Weather. It is important to note that many of the final mitigation actions are multi-hazard actions designed to reduce potential losses from all types of hazard events.

The HMPC discussed the key issues for each priority hazard and discussed potential mitigation alternatives. The mitigation strategy worksheet (worksheet #4) was used to identify all possible mitigation actions for each of the three high hazards. Possible actions were discussed and eventually prioritized for the appropriate jurisdictions.

Implementation of Mitigation Actions

44 CFR Requirement §201.6(c)(3)(ii): The mitigation strategy shall include an action strategy describing how the actions identified in paragraph (c)(2)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefits review of the proposed projects and their associated costs.

Representatives prioritized the various mitigation actions based on the hazard that would be mitigated, cost estimate, and benefits to completing the mitigation actions preventing further loss, and possible funding opportunities for the actions. The process of identification and analysis of mitigation alternatives allowed the HMPC to come to consensus and to prioritize the recommended actions.

The Disaster Mitigation Act regulations state that cost-benefit review is the primary method for mitigation projects to be prioritized. Recognizing the federal regulatory requirement to prioritize by cost-benefit, and the need for any publicly funded project to be cost-effective, the HMPC decided to pursue implementation according to when and where damage occurs, available funding, political will, and jurisdictional priority.

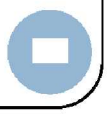
The mitigation actions developed by the HMPC are listed in Table 17. The HMPC came to consensus on which departments and representatives are responsible for completing an implementation worksheet for each identified mitigation action. The worksheets document background information, cost estimates, benefits, and timeline for each action.

TABLE 17 MITIGATION ACTION MATRIX

Jurisdiction	Action	Priority	Goals Addressed	Hazards Addressed
Multi-jurisdictional	Coordinate annual reviews	High	Goal 3	Multi-Hazard
Multi-jurisdictional	Continue public involvement in mitigation activities	High	Goal 1	Multi-Hazard
Multi-jurisdictional	Coordinate and complete a continuity of operations/continuity of governance (COOP/COOG) Plan	High	Goal 2	Multi-Hazard
Plateau Valley FPD	Development of a Community Wildfire Protection Plan to address issues in the wildland urban interface and develop a fuel reduction program. CWPP is designed to assist the public and agencies having jurisdiction a guideline for the mitigation, structure development and management of natural resources in the wildland urban interface.	High	Goal 1	Wildfire
Multi-jurisdictional	Identify and prioritize fuel reduction projects around critical facilities and infrastructure in wildfire hazard areas. Community education regarding the risk of wildfires.	High	Goal 1	Wildfire
Multi-jurisdictional	Continue to map wildfire hazard and vulnerability analysis for wildland-urban interface areas in Mesa County.	High	Goal 1	Wildfire

Town of Palisade: Fire Department	Create a fire mitigation plan to protect vital raw water supplies and infrastructure. Conduct on the ground mitigation to reduce the potential for wildfire.	High	Goal 1,2	Wildfire
Multi-jurisdictional	Project includes 2 detention basins and 535 feet of box culvert improvements that will remove 269 structures from 100 year floodplain, including 2 churches and 1 elementary school, and decrease emergency response arterial inundation (Hwy.50) by .43 feet (Orchard Mesa Detention & Conveyance Improvements.	Medium	Goal 1,2	Flooding
Mesa County	Adobe Creek: Overbank flooding of properties is common during small events. Project will upgrade 13 structures and 2.5 miles of channel to achieve flow capacity for 10 year event level.	Medium	Goal 1,2	Flooding
Multi-Jurisdictional	Project will construct a 75.5 acre-foot reservoir above I-70 on Bosley Wash to reduce peak 100 year discharge from 1727 CFS to 50 CFS, thereby eliminating downstream flooding.	Medium	Goal 1,2	Flooding
Mesa County	Douglas Wash: The existing drainage way and crossing structures are undersized and cannot convey the 100 year storm event. More than 55 properties are within the flooding area as a result. A study was completed and the recommended solution was to construct detention areas to control the flow within the channel.	Medium	Goal 1,2	Flooding
Multi-Jurisdictional	Lewis Wash: Existing drainage way and crossing structures are undersized and cannot convey the 100 year storm event. More than 200 properties are within the flooding area as a result. A study was completed and the recommended solution was to construct detention areas to control the flow within the channel.	Medium	Goal 1,2	Flooding
City of Grand Junction	Riverside Levee: Flooding occurred in the 1983/84 runoff event in the Colorado River basin. Emergency flood wall was constructed protecting the area north of the river during this flood event. This is not a certified flood levee.	Medium	Goal 1,2	Flooding

Multi-jurisdictional	Mitigation project for the upper and lower portions of the Leach Creek drainage. These projects would provide mitigation to flood events for the area of Leach Creek above the confluence with Ranchmen's Ditch.	Medium	Goal 1,2	Flooding
Multi-Jurisdictional	Identify and map geologic hazard zones and incorporate into master planning.	Medium	Goal 1,3	Landslide-Rockfall-Mudflow-Debris flow
Multi-jurisdictional	Improve information on website about natural hazard risk and mitigation	Medium	Goal 1	Multi-Hazard
Multi-jurisdictional	Real time rainfall data is lacking in Mesa County. An automated rainfall ALERT network would allow real time rainfall data access by local officials and National Weather Service forecasters for more timely flash flood warnings.	Medium	Goal 1,3	Flooding
Multi-Jurisdictional	A Basin Master Plan for Big Salt Wash will be completed in May 2010. The plan will identify at risk properties, conveyance and detention mitigation alternatives and costs.	Low	Goal 1	Flooding



Mitigation Action: Multi-Jurisdictional – 1 Plan Maintenance and Implementation

Jurisdiction:	Multi-Jurisdictional
Action Item:	Coordinate biannual reviews of the Mesa County Multi-Hazard Mitigation Plan to monitor, evaluate, and update the plan.
Priority:	High
Issue/Background:	The Hazard Mitigation Planning Committee formed to develop the Mesa County Multi-Hazard Mitigation Plan needs to continue to exist and be comprised of a broad base of stakeholders. Holding biannual meetings will help keep the plan action-oriented and will assist in a more effective fire-year update process. This action will also implement the process for monitoring, evaluating, and updating the plan.
Implementation:	The Mesa County Emergency Manager will schedule and facilitate these meetings. The Committee will need to establish a meeting schedule and framework for continuity. These concepts will be presented to the group by email with a meeting date planned for the future. The first meeting will occur in January 2011.
Responsible Agency:	Mesa County Emergency Management Department
Partners:	All agencies and jurisdictions identified as the Hazard Mitigation Planning Committee.
Potential Funding:	Mesa County Emergency Management
Cost Estimate:	Staff Time
Benefits:	Continue to build relationships and understanding of the important issues involved in mitigation planning. Improve communication and coordination between the County and participating jurisdictions/agencies. Keep plan current and accurate.
Timeline:	First meeting scheduled for January 2011 and every six months after.

Mitigation Action: Multi-Jurisdictional – 2 Public Involvement in Mitigation Activities

Jurisdiction:	Multi-Jurisdictional
Action Title:	Continue public involvement process in mitigation activities.
Priority:	High
Implementation:	The Mesa County Emergency Management Department will prepare and conduct a series of presentations focused upon coordination and improvements of mitigation activities. Through Mesa County's Public Relations Director, local media will be used to announce progress on the mitigation plan and future mitigation activities. Additional educational information materials will be used and will include; fact sheets, public service announcements, and presentations to specific groups. Flooding, Landslides/Rockfall, and Wildfires are priority hazards for such information.
Responsible Agency:	Mesa County Emergency Management Department
Partners:	All participating local governments, special districts, authorities and local media sources.
Potential Funding:	Mesa County and participating jurisdictions/agencies.
Cost Estimate:	Staff Time and media costs
Benefits:	Increases public education and awareness Improves communication and coordination Build relationships and encourage a better understanding of the important issues involved in mitigation planning.
Timeline:	Within first 6 months after the adoption of the plan. Ongoing.

Mitigation Action: Multi-Jurisdictional – 3 Coordination of a Continuity of Operations/Continuity of Governance Plan

Jurisdiction:	Multi-Jurisdictional
Action Title:	Complete a comprehensive inventory and vulnerability analysis of critical infrastructure and coordinate multi-jurisdictional continuity of operations/continuity of governance (COOP/COOG) planning.
Priority:	High
Issue/Background:	The Mesa County Emergency Management Department and City of Grand Junction staff has been engaged in a COOP/COG planning process, which should be completed for the County government by December 2009.
Implementation:	The County will work with local governments and special districts to encourage their investment and implementation of similar work for their organizations and critical infrastructure. The Mesa County and City of Grand Junction is invested in this planning.
Responsible Agency:	Mesa County Emergency Management Department/City of Grand Junction
Partners:	All local governments and special districts
Potential Funding:	Mesa County and participating jurisdictions
Cost Estimate:	Staff Time
Benefits:	Identify critical functions/services provided by local government/special districts. Prevent loss of service. Protect human health and safety.
Timeline:	Draft plans are currently being written at both the County and City of Grand Junction level. Plans should be completed by December 2009. Mesa County Department of Emergency Management will begin working with other jurisdictions beginning June 2010.

Mitigation Action: Plateau Valley Fire Protection District - 1 Community Wildfire Protection Plan (CWPP)

Jurisdiction:	Plateau Valley Fire Protection District
Action Title:	Development of a Community Wildfire Protection Plan to address issues in the wildland urban interface area.
Priority:	High
Issue/Background:	Increasing rural development increases the wildland urban interface problem. The Community Wildfire Protection Plan is designed to assist the public and agencies having jurisdiction address mitigation, structure development and management of natural resources.
Implementation:	Organize a core team of agency representatives from the Plateau Valley Fire Protection District, Mesa County Emergency Management Department, Colorado State Forest Service, Bureau of Land Management, and the Mesa County Sheriff's Office Wildland Team to begin identifying components of plan and determine planning schedule.
Responsible Agency:	Plateau Valley Fire Protection District
Partners:	Bureau of Land Management, Colorado State Forest Service, Mesa County Sheriff's Office, Mesa County Emergency Management Department.
Potential Funding:	Bureau of Land Management Grant, Plateau Valley FPD.
Cost Estimate:	$20,000
Benefits:	Develop mitigation actions to reduce the potential for a wildland fire. Improve communication and coordination. Reduce future losses due to wildfire. Protect public health and safety. Provide education to the Community regarding the wildfire hazard.
Timeline:	2010-2011

Mitigation Action: Multi-Jurisdictional – 4 Community Education Regarding The Risk of Wildfires

Jurisdiction:	Multi-Jurisdictional
Action Title:	Identification of fuel reduction projects around critical facilities and infrastructure in wildland urban interface areas.
Priority:	High
Issue/Background:	At present times, wildfires are caused mainly by humans and lightning. Each year significant issues arise for Fire Protection Districts/Agencies regarding agriculture burning without proper permits.
Implementation:	Fire Protection Districts/Agencies will pull together information discussing the process for obtaining an agriculture burn permit and discuss the advantages to ensuring property owners use defensible spacing around structures on their property.
Responsible Agency:	All Fire Districts/Departments
Partners:	All Fire Districts, Colorado State Forest Service, Bureau of Land Management, and Mesa County Sheriff's Department.
Potential Funding:	Fire Districts/Departments, Grants.
Cost Estimate:	$4,400 for ad campaigns and permits.
Benefits:	Improve communication and coordination. Protect public health and safety. Reduce future losses. Prevent duplication of efforts.
Timeline:	Ongoing

Mitigation Action: Multi-Jurisdictional -5 Wildfire Hazard and Vulnerability Analysis

Jurisdiction:	Multi-Jurisdictional
Action Title:	Conduct additional wildfire hazard and vulnerability analysis in wildfire prone areas of Mesa County.
Priority:	Medium
Issue/Background:	Approximately two years ago, a wildfire assessment and mapping project was done in conjunction with the Colorado National Monument, Mesa County Sheriff's Office Wildfire Team, Lower Valley Fire Protection District and the Colorado State Forest Service. This assessment was done using the "Red Zone" software that gives a property a rating based on the risk and vulnerability to wildfire.
Implementation:	Identify areas within Mesa County that are prone to wildfire activity and complete assessment.
Responsible Agency:	Area Fire Districts/Departments
Partners:	Bureau of Land Management, Colorado State Forest Service, and Mesa County Sheriff's Office Wildland Team.
Potential Funding:	Grant Funding
Cost Estimate:	Staff Time
Benefits:	Improve communication and coordination. Education of property owners regarding the risk of wildfire. Protect public health, safety, and property.
Timeline:	Completed by fall months 2013

Mitigation Action: Town of Palisade-Fire Department -1 Fire Mitigation Plan for Town's Watershed

Jurisdiction:	Town of Palisade
Action Title:	Implementation of a fire mitigation plan to reduce fuels and protect vital raw water supplies and infrastructure.
Priority:	High
Issue/Background:	The Town of Palisade's watershed has been threatened by wildfire in recent years. The Town of Palisade has developed a plan to reduce fuel sources that threaten the watershed if a wildfire were to start in the area.
Implementation:	Mechanical thinning and pruning will be used where practical with hand work applied to areas of steep terrain or poor vehicle access. Prescribed burning will be applied as appropriate and existing roads and pipeline routes will provide for fuel breaks. All slash will be removed, burned or mulched.
Responsible Agency:	Town of Palisade-Fire Department
Partners:	Town of Palisade Road and Bridge Department, Colorado State Forest Service, Bureau of Land Management, Private Land Owners.
Potential Funding:	Colorado State Forest Service Grant, Town of Palisade
Cost Estimate:	$150,000
Benefits:	Protection of the Town of Palisade's Watershed. Prevent future losses to the Town of Palisade. Protect public health and safety. Creates habitat and an improved environment.
Timeline:	Spring, 2010

Mitigation Action: Multi-Jurisdictional – 6 Orchard Mesa Detention & Conveyance Improvements

Jurisdiction:	Multi-Jurisdictional
Action Title:	Build two detention basins and make improvements to culvert.
Priority:	Medium
Issue/Background:	With the construction of two detention basins and 535 feet of box culvert improvements, 269 structures including two churches and one elementary school will be removed from the 100 year floodplain. This will also decrease emergency response arterial inundation (Hwy. 50) by .43 feet.
Implementation:	The 5-2-1 Drainage Authority will make application to the Pre-Disaster Mitigation Grant funds and begin design phases.
Responsible Agency:	5-2-1 Drainage Authority
Partners:	City of Grand Junction and Mesa County governments
Potential Funding:	Request $3.0 million from PDM Grant, $1.150 million from City of Grand Junction/Mesa County.
Cost Estimate:	$4.150 million
Benefits:	Removes a significant amount of structures out of the 100 year floodplain. Decreases emergency response arterial inundation.

Mitigation Action: Multi-Jurisdictional – 7 Increase Flow Capacity on Adobe Creek with Conveyance Improvements

Jurisdiction:	Multi-Jurisdictional
Action Title:	Increase Adobe Creek flow capacity
Priority:	Medium
Issue/Background:	Overbank flooding of properties is common during small events. This project will upgrade 13 structures and 2.5 miles of channel to achieve flow capacity for ten year event level.
Implementation:	5-2-1 Drainage Authority will identify the 13 structures that will be updated in this project and begin developing design standards to increase flow capacity.
Responsible Agency:	5-2-1 Drainage Authority
Partners:	City of Fruita and Mesa County
Potential Funding:	City of Fruita, Mesa County CIP, Grants.
Cost Estimate:	$7,873,000
Benefits:	Increase flow capacity along Adobe Creek and reduce overbank flooding. 13 structures will be upgraded.
Timeline:	Not yet determined.

Mitigation Action: Multi-Jurisdictional – 8 Construction of reservoir on Bosley Wash

Jurisdiction:	Multi-Jurisdictional
Action Title:	Construct reservoir to reduce peak discharge to eliminate downstream flooding.
Priority:	Medium
Issue/Background:	Project will consist of constructing a 75.5 acre-foot reservoir above Interstate Highway 70 on Bosley Wash to reduce peak 100 year discharge from 1727 CFS to 50 CFS, ultimately eliminating downstream flooding.
Implementation:	5-2-1 Drainage Authority will pursue funding to begin the design phase in 2010, with construction beginning in 2010-2011.
Responsible Agency:	5-2-1 Drainage Authority
Partners:	Mesas County
Potential Funding:	County Capital Improvement Plan, Grants
Cost Estimate:	$2.157 million dollars
Benefits:	Elimination of downstream flooding
Timeline:	2010-2011

Mitigation Action: Multi-Jurisdictional – 1 Douglas Wash Improvements

Jurisdiction:	Mesa County
Action Title:	Construction of detention area to control the flow within the channel.
Priority:	Medium
Issue/Background:	The existing drainage way and crossing structure are undersized and cannot convey the 100 year storm event. More than 55 properties are within the flooding area as a result. A study was completed and the recommended solution was to construct detention areas to control the flow within the channel.
Implementation:	Unknown at this time.
Responsible Agency:	5-2-1 Drainage Authority
Partners:	Mesa County, Grand Junction Drainage District
Potential Funding:	None identified at this time.
Cost Estimate:	$8.286 million dollars
Benefits:	Reduce future losses
	Protect public health and environment
Timeline:	Not identified at this time.

Mitigation Action: Multi-Jurisdictional – 2 Lewis Wash Improvements

Jurisdiction:	Mesa County
Action Title:	Construction of detention areas along Lewis Wash to control the flow within the channel.
Priority:	Medium
Issue/Background:	Existing drainage way and crossing structures are undersized and cannot convey the 100 year storm event. More than 200 properties are within the flooding areas as a result. A study was completed and the recommended solution is to construct detention areas to control the flow within the channel.
Implementation:	Unknown at this time.
Responsible Agency:	Mesa County
Partners:	5-2-1 Drainage Authority, City of Grand Junction, Grand Junction Drainage District
Potential Funding:	Mesa County Capital Improvement Project, City of Grand Junction, Grand Junction Drainage District, Grants.
Cost Estimate:	$5.690 million dollars
Benefits:	Protect public health and safety. Reduce property damage. Improve communication and coordination.
Timeline:	Not identified at this time.

Mitigation Action: City of Grand Junction -1 Riverside Levee

Jurisdiction:	City of Grand Junction
Action Title:	Redesign and construct a certified flood levee in the Riverside area.
Priority:	Medium
Issue/Background:	Flooding occurred in 1983-1984 runoff event in the Colorado River Basin. Emergency flood wall was constructed protecting the area north of the river during this flood event. This emergency flood wall is not a certified levee.
Implementation:	Unknown at this time.
Responsible Agency:	City of Grand Junction
Partners:	None listed at this time.
Potential Funding:	City of Grand Junction currently has this project tentatively budgeted for 2011, US Army Corps of Engineers
Cost Estimate:	$1.650 million dollars
Benefits:	Benefits are identified in the Section 205 Report (1991) US Army Corps of Engineers.
Timeline:	Begin design phase in 2015 with the construction phase beginning in 2016 or later.

Mitigation Action: Multi-Jurisdictional -9 Leach Creek Drainage Detention Ponds

Jurisdiction:	Multi-Jurisdictional
Action Title:	Construction of regional detention ponds for Leach Creek Drainage.
Priority:	Medium
Issue/Background:	These projects would provide mitigation to flood events for the area of Leach Creek above the confluence with Ranchmens Ditch. Other alternatives would be to purchase all properties with structures impacted by flood.
Implementation:	Unknown at this time.
Responsible Party:	5-2-1 Drainage Authority
Partners:	City of Grand Junction
Potential Funding:	5-2-1 Drainage Authority, City of Grand Junction
Cost Estimate:	$3.5 million dollars
Benefits:	Remove approximately 500 acres of commercial and residential zone properties from flood plain. Protect public health and safety. Reduce future losses.
Timeline:	Not in the Capital Improvement Budget for the next ten years. Unknown at this time when project might be completed.

Mitigation Action: Mesa County -10 Landslide-Rockfall-Mudflow-Debris Flow Mapping

Jurisdiction:	Multi-Jurisdictional
Action Title:	Identify and map landslide-rockfall-mudflow-debris flow areas in Mesa County and identify possible mitigation actions.
Priority:	Medium
Issue/Background:	Additional identification and mapping of landslide-rockfall-mudflow-debris flow is needed throughout Mesa County and as important is the need for possible mitigation efforts.
Responsible Agency:	Mesa County Emergency Management Department
Partners:	Mesa County Public Works Department, Colorado Department of Transportation.
Potential Funding:	Nothing identified at this time.
Cost Estimate:	Staff Time
Benefits:	Reduce geologic hazard risk. Increase public awareness of hazard. Protect public health and safety.
Timeline:	2012

Mitigation Action: Mesa County –3 Natural Hazard Education

Jurisdiction:	Mesa County
Action Title:	Improve education and information on the natural hazards in Mesa County.
Priority:	Medium
Issue/Background:	The Mesa County website currently does not provide a significant amount of information on the natural hazards in Mesa County and what citizens can do to protect themselves and their property.
Implementation:	Based on the information gathered in this Mitigation Plan, information about the natural hazards in Mesa County and preventative information will be provided on the County website.
Responsible Party:	Mesa County Emergency Management Department
Partners:	Mesa County Information Technology and GIS Department
Potential Funding:	Mesa County
Cost Estimate:	Staff Time
Benefits:	Increase public awareness of natural hazards in community. Protect public health and safety.
Timeline:	Project completed by July 2010.

Mitigation Action: Multi-Jurisdictional -11 Automated Rainfall ALERT Network

Jurisdiction:	Mesa County
Action Title:	Automated Rainfall Alert Network
Priority:	Medium
Issue/Background:	Real time rainfall data is lacking in Mesa County, with only one exception being the Grand Junction Regional Airport. An automated rainfall Alert network would allow real time rainfall data access by local officials and National Weather Service forecasters for more timely flash flood warnings.
Implementation:	Identification of system components and vendors.
Responsible Agency:	Mesa County Emergency Management Department
Partners:	National Weather Service
Potential Funding:	Grants
Cost Estimate:	$625,000 for installation and $150,000 annual maintenance.
Benefits:	Enhanced monitoring of flood potential. Increase lead time of flash flood warnings for the general public. Protect public health and safety.
Timeline:	Unknown at this time.

Mitigation Action: Multi-Jurisdictional – 12 Big Salt Wash Detention & Conveyance

Jurisdiction:	Multi-Jurisdictional
Action Title:	Create a Basin Master Plan to identify properties at risk and develop mitigation alternatives.
Priority:	Low
Issue/Background:	Some flooding has occurred along Big Salt Wash. A better understanding of what properties are at risk and identification of mitigation actions/alternatives is required.
Implementation:	A Basin Master Plan is needed to identify at risk properties and determine what conveyance and detention mitigation actions will prevent future flooding.
Responsible Agency:	5-2-1 Drainage Authority
Partners:	City of Fruita, Mesa County
Potential Funding:	City of Fruita, Mesa County Capital Improvement Plan
Cost Estimate:	Unknown at this time.
Benefits:	Improve communication and coordination. Protect infrastructure and other properties. Protect public health and safety.
Timeline:	Not identified at this time.

Plan Implementation and Maintenance

This section provides an overview of the overall strategy for plan implementation and maintenance and outlines the method and schedule for monitoring, updating, and evaluating the plan.

Implementation

Implementation and maintenance are critical to the success of the mitigation plan. While this plan makes many important recommendations, the jurisdictions will need to decide which action(s) to take first. Two factors will help with making that decision; the priority assigned to the recommendations and funding availability. Low or no-cost actions most easily demonstrate progress toward successful implementation of the plan.

An important implementation mechanism that is highly effective and low-cost is incorporation of the hazard mitigation plan recommendations and their underlying principles into other plans such as comprehensive planning, capital improvement budgeting, and regional plans. Mitigation is most successful when it is incorporated in the day to day functions and priorities of government and in land use and development planning.

It is important to maintain a constant monitoring of funding opportunities that can be leveraged to implement some of the more costly recommended actions. Specific funding opportunities that should be monitored include; special pre- and post-disaster funds, state and federal earmarked funds, and other grant programs.

Monitoring, Evaluating, and Updating the Plan

44 CFR Requirement 201.6(c)(4): The plan maintenance process shall include a section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five year cycle.

Hazard Mitigation Planning Committee

With formal adoption of this plan, the HMPC will be tasked with plan monitoring, evaluation, and maintenance. The participating jurisdictions and agencies, led by the Mesa County Emergency Management Department agree to the following:

- Meet biannually and after a significant event to monitor and evaluate the implementation of the plan.
- Act as a forum for hazard mitigation issues.
- Disseminate hazard mitigation ideas and activities to all participants.
- Pursue the implementation of high priority, low- or no-cost recommended actions.
- Maintain active monitoring of multi-objective, cost-share, and other funding opportunities to help the community implement the plan's recommended actions for which no current funding exists.

- Monitor and assist in implementation and update of this plan.
- Keep the concept of mitigation in the forefront of the community decision makers by identifying plan recommendations when other community goals, plans, activities, overlap or influence community vulnerability to hazards.
- Report on plan progress and recommended changes to the Mesa County Board of County Commissioners, City Councils, and other governing bodies of participating jurisdictions.
- Inform and solicit input from the public.

The HMPC's primary duty is to see the plan successfully implemented and to report to the community governing boards and the public on the status of plan implementation and mitigation opportunities.

Plan Maintenance Schedule

The Mesa County Emergency Manager is responsible for initiating plan reviews and scheduling biannually meetings or after a significant event has occurred to monitor progress and update the strategies. This plan will undergo a five-year written update that will be submitted to the Colorado Division of Emergency Management and FEMA Region VIII, unless disaster or other circumstances, i.e., changing regulations require a change to this schedule.

Plan Maintenance Process

Evaluation of progress can be achieved by monitoring changes in vulnerabilities identified in the plan. Changes in vulnerability can be identified by:

- Decreased vulnerability as a result of implementing recommended actions,
- Increased vulnerability as a result of failed or ineffective mitigation actions, and/or
- Increased vulnerability as a result of new development (and/or annexation)

Updates to this plan will:

- Consider changes in vulnerability due to action implementation.
- Document successful mitigation efforts that have been proven effective.
- Document areas where mitigation actions were not effective.
- Identify new hazards that may arise or may have been previously overlooked.
- Identify new data or studies on hazards and risks.
- Incorporate new capabilities or changes in capabilities.
- Incorporate growth and development-related changes to inventories.

Updating of the plan will be by written changes and submissions from the Mesa County Emergency Management Department and as approved by the Mesa County Board of County Commissioners, City Councils, and other governing boards of the other participating jurisdictions.

Incorporation into Existing Planning Mechanisms

44 CFR Requirement §201.6(c)(4)(ii): [The plan shall include a} process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.

When possible, plan participants will use existing plans and/or programs to implement hazard mitigation actions. Based on the capability assessments of the participating jurisdictions, communities in Mesa County continue to plan and implement programs to reduce losses to life and property from hazards. This plan builds upon the momentum developed through previous and related planning efforts and mitigation programs and recommends implementing actions, where possible, through the following plans:

- Mesa County Emergency Operations Plan
- Mesa County Community Wildfire Protection Plan
- General or master plans of participating jurisdictions
- Ordinances of participating jurisdictions
- Capital Improvement plans and budgets
- Other community plans within Mesa County, such as water conservation plans and stormwater management plans.

Continued Public Involvement

44 CFR Requirement §201.6(c)(4)(iii): [The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.

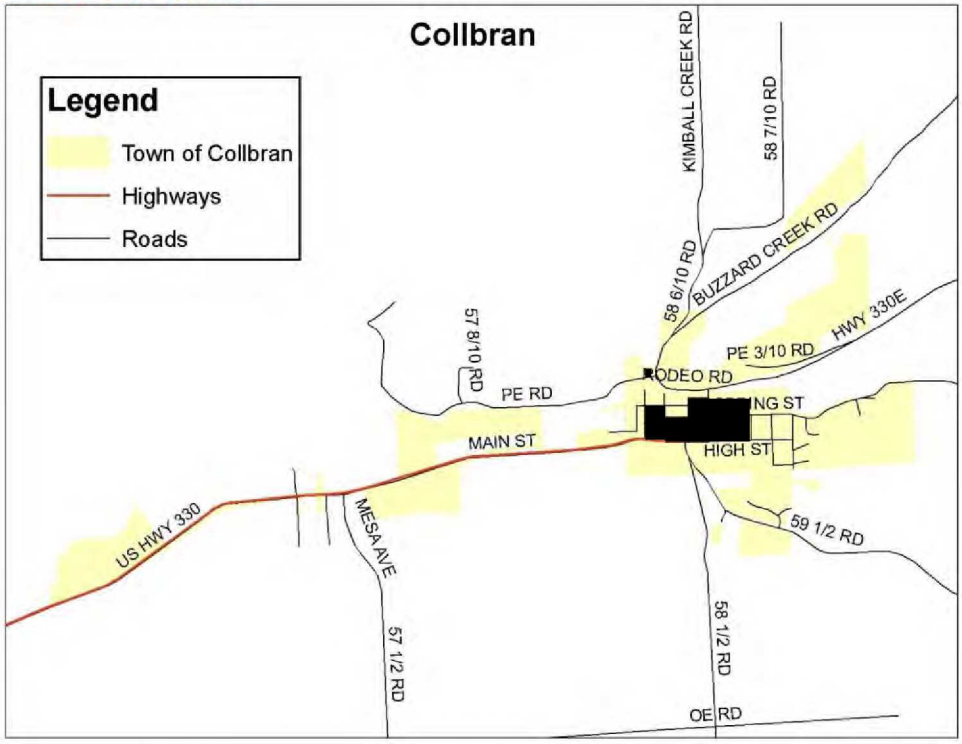
The update process provides an opportunity to document success in mitigating hazards and seek additional public comment. Information will be posted in the local newspapers and on the County website following the annual review of the plan. Community meetings will be scheduled to seek public comment on the plan update. Public notice will be posted and public participation will be invited through available website postings and press releases to the local media outlets.

Community Profiles

Community profiles provide specific information unique to each participating jurisdiction in the hazard mitigation plan. For unincorporated Mesa County, countywide information is addressed previously in the main plan.

Town of Collbran

FIGURE 24 TOWN OF COLLBRAN



Community Profile

The town of Collbran is located in eastern Mesa County, see Figure 24. Collbran is in the Plateau Valley on the western slope of the Rocky Mountains between the 9,000 ft. Battlement Mesa to the north and east and the 11,000 ft. Grand Mesa to the south and west. The town is approximately 35 miles northeast of the City of Grand Junction and is completely bordered by unincorporated Mesa County land.

Cattle ranchers settled in the area which is now Collbran and the town itself was incorporated in 1908. The population of the Town of Collbran is 683 in 2008 based on State Demographer's information. (Demographer) The climate of Collbran is semiarid. The mesa areas surrounding

Collbran are subject to moderately heavy precipitation. Elevation greatly influences the amount of precipitation. The annual precipitation at Collbran averages approximately 13 inches, and the higher elevations of the mesas receive from 20 to 40 inches. Occurrence of precipitation is fairly uniform in the Collbran area, and slightly less than one-half falls as snow from December to April. Most winter precipitation occurs in the higher elevations as snow, and a deep snowpack ordinarily begins in late October and snowmelt in late April. Snowmelt continues through early July. The mean annual temperature at Collbran is 46.4ºF. Cooler temperatures prevail in the higher elevations. (FEMA, Flood Insurance Study, Mesa County Colorado, 2009)

Hazard Identification and Profiles

The HMPC identified the hazards that affect the community and summarized their geographic location, probability of future occurrence, potential magnitude or severity, and planning significance specific to the Town in Table 18.

TABLE 18 COLLBRAN HAZARDS PROFILES

Avalanche	Isolated	Occasional	Critical	M
Drought	Large	Occasional	Limited	M
Earthquake	Medium	Occasional	Limited	M
Expansive Soils	Isolated	Occasional	Negligible	L
Extreme Heat	Large	Occasional	Negligible	M
WildFire	Medium	Highly Likely	Limited	H
Flood	Large	Likely	Limited	H
Hail Storm	Small	Occasional	Negligible	L
Land Subsidence	Isolated	Occasional	Limited	L
Landslide/Rockfall	Small	Likely	Limited	M
Lightning	Medium	Highly Likely	Limited	M
Tornado	Isolated	Unlikely	Negligible	L
Wind Storm	Small	Likely	Limited	M
Winter Storm	Large	Likely	Critical	H
Dam Failure	Large	Occasional	Critical	H
Hazardous Materials	Isolated	Occasional	Limited	L

Vulnerability Assessment

The intent of this section is to assess the Town of Collbran's vulnerability separate from that of the planning area as a whole. The vulnerability assessment analyzes the population, property, and other assets at risk to hazards ranked of moderate or high significance that may vary from other parts of the planning area.

Community Asset Inventory

Table 19 shows the total population, number of structures, and assessed value of improvements to parcels in the Town of Collbran. Land values have been purposely excluded 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 19 TOWN OF COLLBRAN'S ASSET INVENTORY

Jurisdiction:	Town of Collbran								
Type of Structure	Number of Structures			Value of Structures			Number of People		
	#in Comm.	#in Hazard Area	%in Hazard Area	$in Comm.	$in Hazard Area	%in Hazard Area	#in Comm.	#in Hazard Area	%in Hazard Area
Residential	143	143	100%	$ 18,625,780.00	$ 18,625,780.00	100%	468	468	100%
Commercial	18	18	100%	$ 3,059,140.00	$ 3,059,140.00	100%			
Agricultural	7	7	100%	$ 1,706,920.00	$ 1,706,920.00	100%			
Industrial	1	1	100%	$ 43,170.00	$ 43,170.00	100%			

Type of Structure	Number of Structures			Value of Structures			Number of People		
	#in Comm.	#in Hazard Area	%in Hazard Area	$in Comm.	$in Hazard Area	%in Hazard Area	#in Comm.	#in Hazard Area	%in Hazard Area
Residential	143	17	11.89%	$18,625,780.00	$ 2,071,730.00	11.12%	468	67	14.32%
Commercial	18	1	5.56%	$ 3,059,140.00	$ 353,660.00	11.56%			
Agricultural	7	0	0.00%	$ 1,706,920.00	$ -	0.00%			
Industrial	1	0	0.00%	$ 43,170.00	$ -	0.00%			

Jurisdiction:	Town of Collbran								
Type of Structure	Number of Structures			Value of Structures			Number of People		
	#in Comm.	#in Hazard Area	%in Hazard Area	$in Comm.	$in Hazard Area	%in Hazard Area	#in Comm.	#in Hazard Area	%in Hazard Area
Residential	143	0	0.00%	$18,625,780.00	$ -	0.00%	468	0	0.00%
Commercial	18	0	0.00%	$ 3,059,140.00	$ -	0.00%			
Agricultural	7	0	0.00%	$ 1,706,920.00	$ -	0.00%			
Industrial	1	0	0.00%	$ 43,170.00	$ -	0.00%			

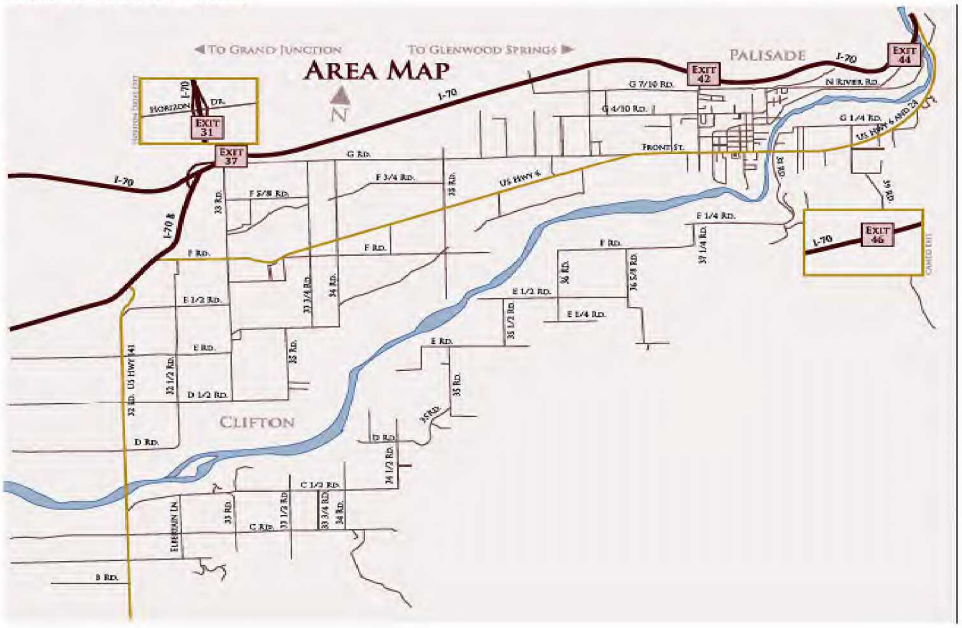
Capabilities Assessment

Comp Plan/General Plan	Yes	
Special Plans	No	
Subdivision Ordinance	Yes	
Zoning Ordinance	Yes	
NFIP/FPM Ordinance	Yes	
Substantial Damage Language	No	
Administrator/Certified Floodplain Mgr.	No	
# of Flood threatened Buildings	Unknown	
# of Flood Insurance Policies	Unknown	
# of Repetitive Losses	Unknown	
Maintain Elevation Certificates	No	
CRS Rating, if applicable	Unknown	
Stormwater Program	Unknown	
Erosion or Sediment Controls	Yes	
Building Code Version	Yes	
Full-Time Building Official	No	
Conduct "as-built" Inspections	No	
BCEGS Rating	Unknown	
Local Emergency Operations Plan	No	Is covered under Mesa County's Plan
Fire Department ISO Rating	Unknown	
Fire Safe Programs	No	
Hazard Mitigation Plans	No	
Warning Systems/Services	No	
Storm Ready Certified	No	
Weather Radio Reception	Yes	
Outdoor Warning Sirens	No	
Emergency Notification (R-911)	Unknown	
Other (e.g., cable over-ride)	Yes	Through GJRCC-EAS System
GIS System	No	
Hazard Data	Unknown	
Building Footprints	No	
Links to Assessor Data	Unknown	
Land-Use Designations	Yes	
Structural Protection Projects	No	
Property Protection Projects	No	
Critical Facilities Protected	No	
Natural/Cultural Resources Inventory	No	
Public Information Program/Outlet	No	
Environmental Education Program	No	

Town of Palisade

Community Profile

FIGURE 25 TOWN OF PALISADE



(Town of Palisade)

The Town of Palisade is located in north-central Mesa County and has a population of 3,105. (Demographer) Palisade is approximately 10 miles east of Grand Junction, and at the eastern end of a portion of Mesa County known as the Grand Valley, see Figure 25. Palisade lies at an elevation of approximately 4,700 feet near the base of the eastern toe of the Bookcliffs. East Orchard Mesa borders Grand Valley on the south in the study area, which is largely devoted to agricultural interests. Some of the first orchards in the valley were planted in the Palisade area because of easily accessible water, rich soil, and suitable climate.

Around 1884, some of the earlier inhabitants of the region constructed the Price Ditch, which is aided in perpetuating interest in and growth of the town and adjacent agricultural areas. Palisade has gained prominence for its excellent fruit products and has continued to present as a major fruit growing center. Completion of the Highline Canal irrigation facility in 1915 assured an adequate water supply to the area and furthered economic stimulation in the region.

The climate of Palisade is arid and yearly precipitation averages approximately 9 inches. Temperatures are often in the 90ºF range in the summer and below freezing in the winter. Occasionally, summertime temperatures may exceed 100ºF and winter temperatures may drop as low as -20ºF. Natural vegetation in valley areas consist of cottonwood and willow, desert shrub, and an understory of hardy grasses. Mesas and lower mountain slopes between 5,000 and 8,000 feet support oak, big sagebrush, Douglas fir, pinon pine, and juniper. (FEMA, Flood Insurance Study, Mesa County Colorado, 2009)

Hazard Identification and Profiles

The HMPC identified the hazards that affect the community and summarized their geographic location, probability of future occurrence, potential magnitude or severity, and planning significance specific to the Town in Table 20.

TABLE 20 TOWN OF PALISADE'S HAZARDS PROFILES

Avalanche	Isolated	Unlikely	Negligible	L
Drought	Large	Occasional	Limited	M
Earthquake	Medium	Occasional	Limited	M
Expansive Soils	Isolated	Occasional	Negligible	L
Extreme Heat	Large	Occasional	Negligible	M
WildFire	Medium	Highly Likely	Limited	H
Flood	Large	Likely	Limited	H
Hail Storm	Small	Occasional	Negligible	L
Land Subsidence	Isolated	Occasional	Limited	L
Landslide/Rockfall	Isolated	Highly Likely	Critical	H
Lightning	Medium	Highly Likely	Limited	M
Tornado	Isolated	Unlikely	Negligible	L
Wind Storm	Small	Likely	Limited	M
Winter Storm	Small	Likely	Limited	L
Dam Failure	Isolated	Occasional	Limited	L
Hazardous Materials	Isolated	Likely	Negligible	L

Vulnerability Assessment

The intent of this section is to assess the Town of Palisade's vulnerability separate from that of the planning area as a whole. The vulnerability assessment analyzes the population, property, and other assets at risk to hazards ranked of moderate or high significance that may vary from other parts of the planning area.

This section analyzes existing structures and other assets at risk to hazards ranked of high significance that vary from the risks facing the entire planning area and estimates potential losses. These hazards include; wildfire, floods, and rockfall.

Community Asset Inventory

Table 21 shows the total population, number of structures, and assessed value of improvements to parcels in the Town of Palisade. Land values have been purposely excluded 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 21 TOWN OF PALISADE'S ASSET INVENTORY

Jurisdiction:	Town of Palisade								
Type of Structure	Number of Structures			Value of Structures			Number of People		
	#in Comm.	#in Hazard Area	%in Hazard Area	$in Comm.	$in Hazard Area	%in Hazard Area	#in Comm	#in Hazard Area	%in Hazard Area
Residential	797	99	12.42%	$ 132,984,480.00	$ 16,175,230.00	12.16%	3111	479	15.40%
Commercial	63	13	20.63%	$ 19,117,930.00	$ 1,794,910.00	9.39%			
Agricultural	12	0	0.00%	$ 4,292,240.00	$ -	0.00%			
Industrial	4	3	75.00%	$ 689,090.00	$ 488,290.00	70.86%			

Jurisdiction:	Town of Palisade								
Type of Structure	Number of Structures			Value of Structures			Number of People		
	#in Comm.	#in Hazard Area	%in Hazard Area	$in Comm.	$in Hazard Area	%in Hazard Area	#in Comm.	#in Hazard Area	%in Hazard Area
Residential	797	5	0.63%	$ 132,984,480.00	$ 757,310.00	5.07%	3111	0	0.00%
Commercial	63	6	9.52%	$ 19,117,930.00	$ 348,350.00	27.09%			
Agricultural	12	0	0.00%	$ 4,292,240.00	$ -	0.00%			
Industrial	4	0	0.00%	$ 689,090.00	$ -	0.00%			

Type of Structure	Number of Structures			Value of Structures			Number of People		
	#in Comm.	#in Hazard Area	%in Hazard Area	$in Comm.	$in Hazard Area	%in Hazard Area	#in Comm.	#in Hazard Area	%in Hazard Area
Residential	797	48	6.02%	$ 132,984,480.00	$ 6,740,140.00	5.07%	3111	0	0.00%
Commercial	63	3	4.76%	$ 19,117,930.00	$ 5,178,400.00	27.09%			
Agricultural	12	3	25.00%	$ 4,292,240.00	$ 1,613,020.00	37.58%			
Industrial	4	0	0.00%	$ 689,090.00	$ -	0.00%			

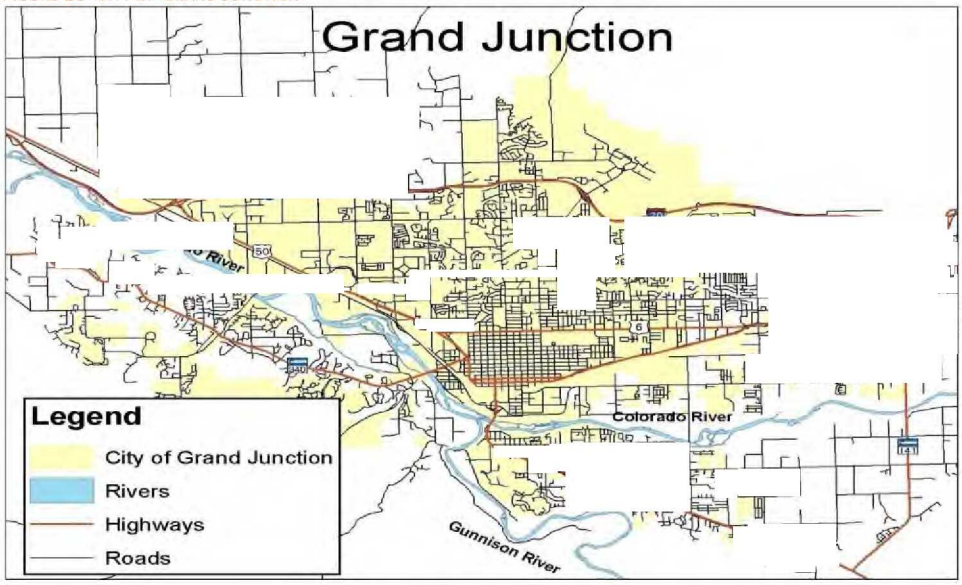
Capabilities Assessment

Comp Plan/General Plan	Yes	
Special Plans	Yes	
Subdivision Ordinance	Yes	
Zoning Ordinance	Yes	
NFIP/FPM Ordinance	Yes	
Substantial Damage Language	No	
Admin/Certified Floodplain Mgr.	No	
# of Flood threatened Buildings	Unknown	
# of Flood Insurance Policies	Unknown	
# of Repetitive Losses	Unknown	
Maintain Elevation Certificates	No	
CRS Rating, if applicable	Unknown	
Stormwater Program	Yes	
Erosion or Sediment Controls	Yes	
Building Code Version	Yes	
Full-Time Building Official	Yes	
Conduct "as-built" Inspections	Yes	
BCEGS Rating	Unknown	
Local Emergency Operations Plan	Yes	
Fire Department ISO Rating	Yes (5)	
Fire Safe Programs	Yes	
Hazard Mitigation Plans	Yes	
Warning Systems/Services	Yes	
Storm Ready Certified	No	
Weather Radio Reception	Yes	
Outdoor Warning Sirens	No	
Emergency Notification (R-911)	Yes	GJRCC
Other (e.g., cable over-ride)	Yes	GJRCC-EAS System
GIS System	Yes	
Hazard Data	No	
Building Footprints	No	
Links to Assessor Data	No	
Land-Use Designations	No	
Structural Protection Projects	No	
Property Protection Projects	No	
Critical Facilities Protected	No	
Natural/Cultural Resources Inv.	No	
Public Information Program/Outlet	No	
Environmental Education Program	No	

City of Grand Junction

Community Profile

FIGURE 26 CITY OF GRAND JUNCTION



Grand Junction is located on the western slope of the Rocky Mountains in central Mesa County in western Colorado. It is surrounded by the unincorporated areas of Mesa County as seen in Figure 26. It is situated approximately halfway between Salt Lake City, Utah and Denver, Colorado, and is a regional center for transportation and trade for an area of over 60,000 square miles.

Grand Junction became the center of an extensive mining industry. It continues to be a transportation center for the farming, orchard growing, and livestock industries in the area, as well as a base for various industrial, commercial, and tourism activities. The current population is estimated to be 55,189. (Demographer) The Colorado River originates high in the Rocky Mountains, on the western slope of the Continental Divide. The headwaters, located in Rocky Mountain National Park, are at approximately 12,000 feet. The river flows southwesterly from its headwaters, approximately 200 miles upstream of Grand Junction. At Grand Junction, the river turns to the northwest and continues in that direction through Colorado. The drainage area at Grand Junction is approximately 17,100 square miles.

Grand Junction lies at an elevation of approximately 4,600 feet in the southern part of the Grand Valley, a wide gently sloping valley defined by high, rock cliffs. To the north, the valley

gradually slopes upward for several miles to the base of the Bookcliffs, which rise abruptly to more than 8,000 feet. To the south, Grand Junction is flanked by the Uncompahgre Plateau.

Indian Wash originates at the foot of the Bookcliffs at an elevation of approximately 5,800 feet and flows approximately 5.5 miles southwesterly to an area just northeast of Grand Junction Regional Airport, where the U.S. Soil Conservation Service IW-1 flood detention structure is located. From there it flows generally southerly through the City of Grand Junction to its confluence with the Colorado River.

The climate of Grand Junction is classified as arid to semiarid. The mountainous regions around Grand Junction are subject to moderately heavy precipitation. Elevation greatly influences precipitation amounts. The annual precipitation of Grand Junction averages approximately 8.4 inches, the higher mesas receive from 10 to 20 inches. Occurrence of precipitation is extremely variable with a large part of the total concentrated in several months. Late summer convection type cloudburst storms of small aerial extent and early fall general rain over large areas normally cause August, September, and October to be the wettest months of the year. Most winter precipitation occurs as snow and, in the higher elevations, a deep snowpack generally accumulates. Average snowfall ranges from approximately 19 inches at Grand Junction to approximately 300 inches in the higher mountainous regions. Snowfall is generally dominated by a few large storms. Snowpack ordinarily begins in late October and snowmelt in late April; snowmelt continues through early July.

The temperature extremes at Grand Junction are shown by mean maximums ranging from approximately 38ºF in January to approximately 94ºF in July, and by mean minimums ranging from approximately 15ºF in January to 62ºF in July. Record low and high temperatures are -34ºF and 64ºF for January and 38ºF and 111ºF for July, respectively.

The Colorado River, Indian Wash, and Horizon Drive Channel floodplains are moderately developed with commercial and residential structures. (FEMA, Flood Insurance Study, Mesa County Colorado, 2009)

Hazard Identification and Profiles

The HMPC identified the hazards that affect the community and summarized their geographic location, probability of future occurrence, potential magnitude or severity, and planning significance specific to the Town as shown in Table 22.

TABLE 22 CITY OF GRAND JUNCTION'S HAZARDS PROFILES

Avalanche	Isolated	Unlikely	Negligible	L
Drought	Large	Occasional	Limited	M
Earthquake	Medium	Occasional	Limited	M
Expansive Soils	Isolated	Occasional	Negligible	L
Extreme Heat	Large	Occasional	Negligible	M
WildFire	Medium	Highly Likely	Limited	H
Flood	Large	Likely	Limited	H
Hail Storm	Small	Occasional	Negligible	L
Land Subsidence	Isolated	Occasional	Limited	L
Landslide/Rockfall	Isolated	Unlikely	Limited	L
Lightning	Medium	Highly Likely	Limited	M
Tornado	Isolated	Unlikely	Negligible	L
Wind Storm	Medium	Likely	Limited	M
Winter Storm	Large	Occasional	Limited	M
Dam Failure	Medium	Occasional	Critical	M
Hazardous Materials	Isolated	Occasional	Limited	L

Vulnerability Assessment

The intent of this section is to assess the City of Grand Junction's vulnerability separate from that of the planning area as a whole. The vulnerability assessment analyzes the population, property, and other assets at risk to hazards ranked as high significance that may vary from other parts of the planning area and estimates potential losses. These hazards include; wildfire, floods, and rockslides.

Community Asset Inventory

Table 23 shows the total population, number of structures, and assessed value of improvements to parcels in the City of Grand Junction. Land values have been purposely excluded 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 23 CITY OF GRAND JUNCTION'S ASSET INVENTORY

Jurisdiction:	City of Grand Junction								
Type of Structure	Number of Structures			Value of Structures			Number of People		
	#in Comm.	#in Hazard Area	%in Hazard Area	$ in Comm.	$ in Hazard Area	%in Hazard Area	#in Comm.	#in Hazard Area	%in Hazard Area
Residential	19911	3349	16.82%	$ 3,721,808,840.00	$ 765,930,110.00	20.58%	56977	8866	15.5%
Commercial	1926	301	15.63%	$ 1,041,798,810.00	$ 121,427,630.00	11.66%			
Agricultural	86	14	16.28%	$ 20,693,890.00	$ 3,150,000.00	15.22%			
Industrial	313	67	21.41%	$ 183,537,290.00	$ 58,877,120.00	32.08%			

[redacted]	[redacted]								
[redacted]	Number of Structures			Value of Structures			Number of People		
	#in Comm.	#in Hazard Area	%in Hazard Area	$in Comm.	$in Hazard Area	%in Hazard Area	#in Comm.	#in Hazard Area	%in Hazard Area
Residential	19911	195	0.80%	$ 3,721,808,840.00	$ 29,669,810.00	0.80%	56977	491	0.86%
Commercial	1926	52	2.53%	$ 1,041,798,810.00	$ 26,336,470.00	2.53%			
Agricultural	86	0	0.00%	$ 20,693,890.00	$ -	0.00%			
Industrial	313	5	1.62%	$ 183,537,290.00	$ 2,967,660.00	1.62%			

Jurisdiction:	City of Grand Junction								
Type of Structure	Number of Structures			Value of Structures			Number of People		
	#in Comm.	#in Hazard Area	%in Hazard Area	$ in Comm.	$ in Hazard Area	%in Hazard Area	#in Comm.	#in Hazard Area	%in Hazard Area
Residential	19911	2453	12.32%	$ 3,721,808,840.00	$ 671,122,270.00	18.03%	56977	5134	9.01%
Commercial	1926	48	2.49%	$ 1,041,798,810.00	$ 24,539,800.00	2.36%			
Agricultural	86	5	5.81%	$ 20,693,890.00	$ 1,769,650.00	8.55%			
Industrial	313	0	0.00%	$ 183,537,290.00	$ -	0.00%			

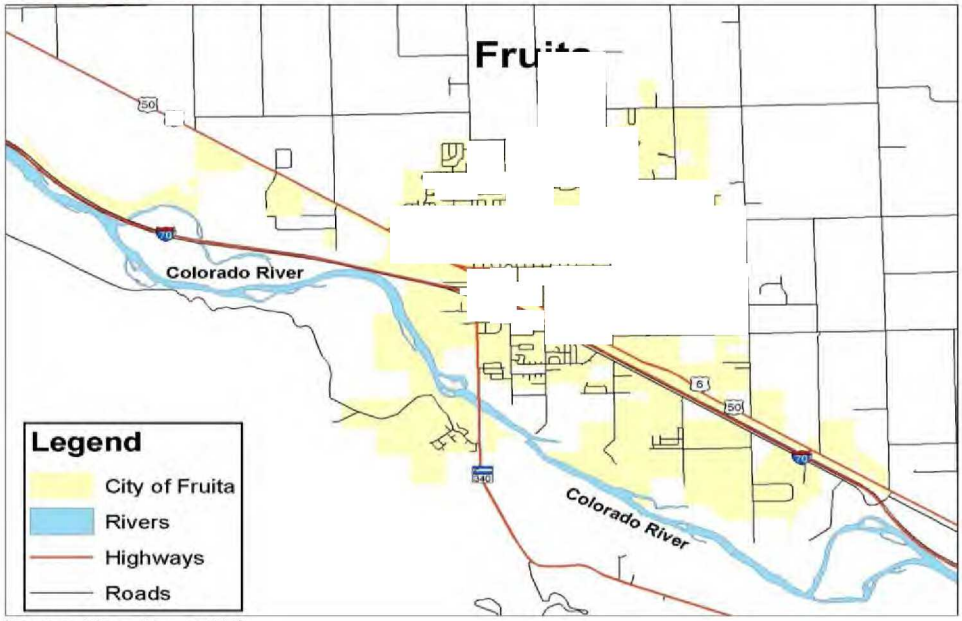
Capabilities Assessment

Comp Plan/General Plan	Yes	Update of Comp Plan underway
Special Plans	Yes	Area plans, transportation plans
Subdivision Ordinance	Yes	
Zoning Ordinance	Yes	
NFIP/FPM Ordinance	Yes	
Substantial Damage Language	Yes	
Admin/Certified Floodplain Mgr.	Yes	
# of Flood threatened Buildings	Unkown	
# of Flood Insurance Policies	Yes	84 active policies
# of Repetitive Losses	No	
Maintain Elevation Certificates	Yes	
CRS Rating, if applicable	n/a	
Stormwater Program	Yes	
Erosion or Sediment Controls	Yes	
Building Code Version	2006 IBC	
Full-Time Building Official	Yes	
Conduct "as-built" Inspections	Yes	
BCEGS Rating	Unknown	
Local Emergency Operations Plan	No	Covered under Mesa County Plan
Fire Department ISO Rating	Yes	
Fire Safe Programs	Yes	
Hazard Mitigation Plans	Yes	Included in the Mesa County Plan
Warning Systems/Services		
Storm Ready Certified	No	
Weather Radio Reception	Yes	
Outdoor Warning Sirens	No	
Emergency Notification (R-911)	Yes	Dam Failure City of GJ Structures
Other (e.g., cable over-ride)	Yes	
GIS System	Yes	Flood plain info. on zoning map
Hazard Data	Yes	
Building Footprints	Yes	Aerial Photos
Links to Assessor Data	Yes	
Land-Use Designations	Yes	
Structural Protection Projects	NA	
Property Protection Projects	Unknown	
Critical Facilities Protected	Yes	
Natural/Cultural Resources Inv.	No	
Public Information Program/Outlet	Yes	
Environmental Education Program	Unknown	

City of Fruita

Community Profile

FIGURE 27 CITY OF FRUITA



(Source: Mesa County GIS)

The City of Fruita is in northwestern Mesa County. Fruita lies approximately 20 miles east of the Colorado-Utah State boundary and approximately 11 miles west of Grand Junction, see Figure 27. Fruita is surrounded by unincorporated areas of Mesa County. The total land area contained within Fruita is approximately 2.25 square miles. The population of Fruita is estimated to be 11,535. (Demographer)

Fruita has been agriculturally oriented and farming has since become more diversified, with such crops as grains for livestock feed and various fruits and vegetables. Cattle and sheep ranching began as large-scale operations and continue as part of the economic base of the community. There are extensive irrigation facilities in the area to support these activities. Both the Little Salt Wash and the Colorado River floodplains are developed in Fruita.

Little Salt Wash originates in the Bookcliffs approximately 11 miles north of town, where its headwaters are at approximately 5,100 feet. It flows through the northern corporate limits of Fruita, then forms the western corporate limits of the town as it flows southwesterly to its

confluence with the Colorado River. Little Salt Wash flows in the Colorado River approximately 0.5 miles downstream of Fruita. The drainage area at Fruita is approximately 33 square miles.

Fruita lies at an elevation of approximately 4,500 feet in the southern part of the Grand Valley. To the north, the valley gradually ascends for several miles to the base of the Bookcliffs. Approximately 2 miles south of town, the steep sandstone and shale formations of the Colorado National Monument (or the Uncompahgre Uplift) begin. Fruita is part of the Canyon lands, a subdivision of a larger physiographic region known as the Colorado Plateaus.

The climate of Fruita is classified as arid to semiarid. The mountainous regions around Fruita are subject to moderately heavy precipitation. Elevation greatly influences the precipitation amounts. Annual precipitation at Fruita averages approximately 9 inches. The higher mesas (headwaters and primary drainage areas of Little Salt Wash) receive from 10 to 20 inches. Convection-type cloudburst storms of small aerial extent and general rainfall over large areas normally make August, September, and October the wettest months of the year. Most wintertime precipitation occurs as snow, and a deep snowpack normally accumulates at the higher elevations. Average snowfall is approximately 19 inches at Fruita.

The temperature extremes at Fruita are evidenced by mean maximums ranging from approximately 38ºF in January to approximately 94ºF in July, and by mean minimums ranging from approximately 15ºF in January to 62ºF in July. Record low and high temperatures are -34ºF and 64ºF for January and 38ºF and 111ºF for July respectively. (FEMA, Flood Insurance Study, Mesa County Colorado, 2009)

Hazard Identification and Profiles

The HMPC identified the hazards that affect the community and summarized their geographic location, probability of future occurrence, potential magnitude or severity, and planning significance specific to the Town as shown in Table 24.

TABLE 24 CITY OF FRUITA'S HAZARDS PROFILES

Avalanche	Isolated	Unlikely	Negligible	L
Drought	Large	Occasional	Limited	M
Earthquake	Medium	Occasional	Limited	M
Expansive Soils	Isolated	Occasional	Negligible	L
Extreme Heat	Large	Occasional	Negligible	M
WildFire	Medium	Highly Likely	Limited	H
Flood	Large	Likely	Limited	H
Hail Storm	Small	Occasional	Negligible	L
Land Subsidence	Isolated	Occasional	Limited	L
Landslide/Rockfall	Isolated	Unlikely	Negligible	L
Lightning	Medium	Highly Likely	Limited	M
Tornado	Isolated	Unlikely	Negligible	L
Wind Storm	Medium	Likely	Limited	M
Winter Storm	Large	Occasional	Limited	M
Dam Failure	Medium	Occasional	Critical	M
Hazardous Materials	Isolated	Occasional	Limited	L

Vulnerability Assessment

The intent of this section is to assess the City of Fruita's vulnerability separate from that of the planning area as a whole. The vulnerability assessment analyzes the population, property, and other assets at risk to hazards ranked of moderate or high significance that may vary from other parts of the planning area.

This section analyzes existing structures and other assets at risk to hazards ranked of high significance that vary from the risks facing the entire planning area and estimates potential losses. These hazards include; wildfire, floods, and rockfalls.

Community Asset Inventory

Table 25 shows the total population, number of structures, and assessed value of improvements to parcels in the City of Fruita. Land values have been purposely excluded 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 25 CITY OF FRUITA'S ASSET INVENTORY

Jurisdiction:	City of Fruita

Type of Structure	Number of Structures			Value of Structures			Number of People		
	#in Comm.	#in Hazard Area	%in Hazard Area	$in Comm.	$in Hazard Area	%in Hazard Area	#in Comm.	#in Hazard Area	%in Hazard Area
Residential	4237	1056	24.92%	$ 760,571,300.00	$ 201,674,330.00	26.52%	7924	922	11.64%
Commercial	164	3	1.83%	$ 65,842,970.00	$ 1,262,220.00	1.92%			
Agricultural	40	21	52.50%	$ 10,129,910.00	$ 5,414,880.00	53.45%			
Industrial	12	5	41.67%	$ 8,526,210.00	$ 6,951,700.00	81.53%			

Type of Structure	Number of Structures			Value of Structures			Number of People		
	#in Comm.	#in Hazard Area	%in Hazard Area	$in Comm.	$in Hazard Area	%in Hazard Area	#in Comm.	#in Hazard Area	%in Hazard Area
Residential	4237	24	0.57%	$ 760,571,300.00	$ 6,859,980.00	0.90%	7924	535	6.75%
Commercial	164	1	0.61%	$ 65,842,970.00	$ 246,180.00	0.37%			
Agricultural	40	0	0.00%	$ 10,129,910.00	$ -	0.00%			
Industrial	12	0	0.00%	$ 8,526,210.00	$ -	0.00%			

Jurisdiction:	City of Fruita

Type of Structure	Number of Structures			Value of Structures			Number of People		
	#in Comm.	#in Hazard Area	%in Hazard Area	$in Comm.	$in Hazard Area	%in Hazard Area	#in Comm.	#in Hazard Area	%in Hazard Area
Residential	4237	0	0.00%	$ 760,571,300.00	$ -	0.00%	7924	0	0.00%
Commercial	164	0	0.00%	$ 65,842,970.00	$ -	0.00%			
Agricultural	40	0	0.00%	$ 10,129,910.00	$ -	0.00%			
Industrial	12	0	0.00%	$ 8,526,210.00	$ -	0.00%			

Capabilities Assessment

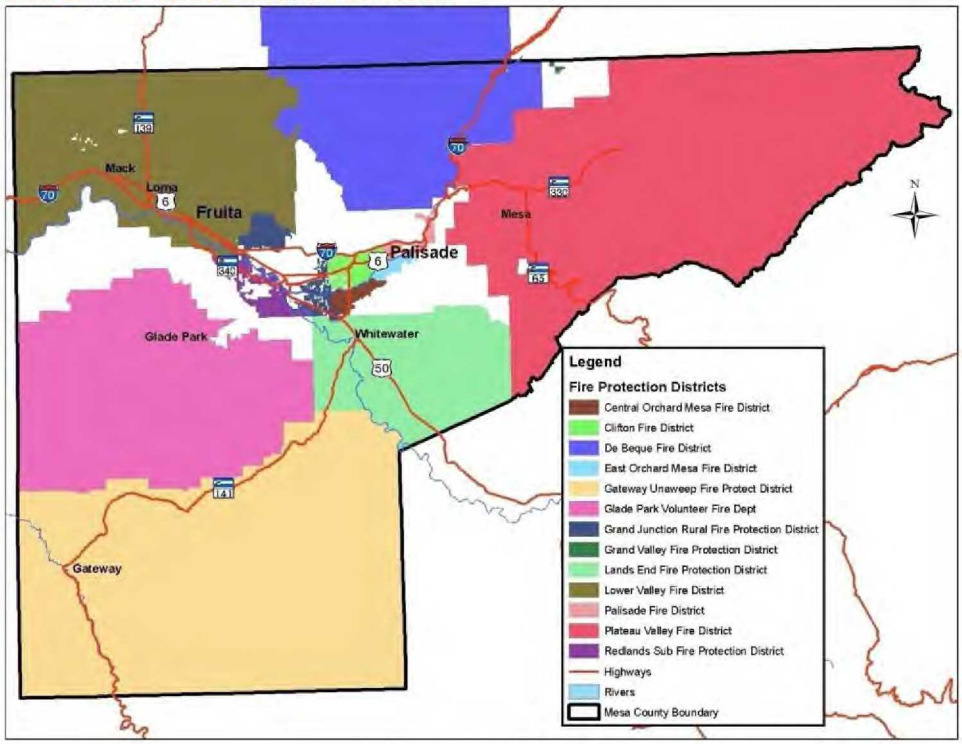
Comp Plan/General Plan	Yes	
Special Plans	Yes	
Subdivision Ordinance	Yes	
Zoning Ordinance	Yes	
NFIP/FPM Ordinance	No	
Substantial Damage Language	Unknown	
Admin./Certified Floodplain Mgr.	Yes	
# of Flood threatened Buildings	Unknown	
# of Flood Insurance Policies	Unknown	
# of Repetitive Losses	Unknown	
Maintain Elevation Certificates	Unknown	
CRS Rating, if applicable	Unknown	
Stormwater Program	Sort of	
Erosion or Sediment Controls	Pro	
Building Code Version	Most current with Mesa County	
Full-Time Building Official	Mesa County	
Conduct "as-built" Inspections	Yes	
BCEGS Rating	Unknown	
Local Emergency Operations Plan	Yes	
Fire Department ISO Rating	Yes	
Fire Safe Programs	Yes	
Hazard Mitigation Plans	Yes	
Warning Systems/Services	Reverse 911	
Storm Ready Certified	Unknown	
Weather Radio Reception	Unknown	
Outdoor Warning Sirens	No	
Emergency Notification (R-911)	Yes	
Other (e.g., cable over-ride)	No	
GIS System	Yes	
Hazard Data	Yes	
Building Footprints	Yes	
Links to Assessor Data	Yes	
Land-Use Designations	Yes	
Structural Protection Projects	Unknown	
Property Protection Projects	Unknown	
Critical Facilities Protected	Some	
Natural/Cultural Resources Inv.	Unknown	
Public Information Program	Nothing Formal	
Environmental Education Pgm.	No	

Fire Protection Districts:

District Profile

The material presented in this section applies to two fire protection districts in Mesa County, which are described below. Each of the districts participated individually in this planning process. Figure 28 shows all fire districts in Mesa County.

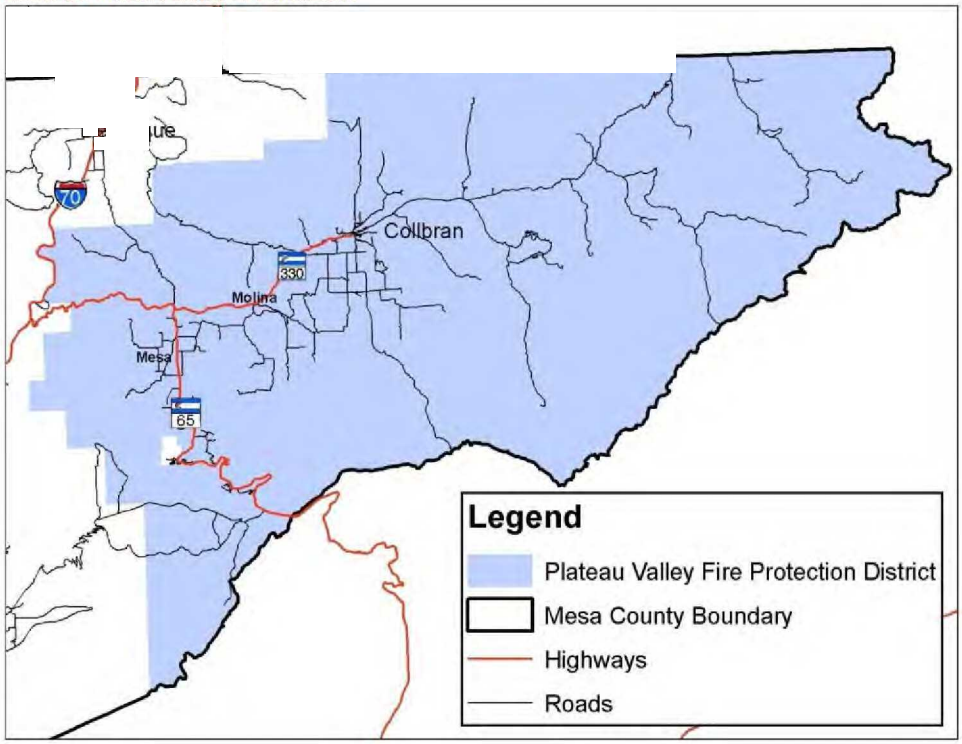
FIGURE 28 FIRE PROTECTION DISTRICTS IN MESA COUNTY



Plateau Valley Fire Protection District

The Plateau Valley Fire Protection District (PVFPD) covers an area of 803 square miles as shown in Figure 29, with a residential population of approximately 4000 people. The district operates out of 3 fire stations with approximately 30 volunteers.

FIGURE 29 PLATEAU VALLEY FPD BOUNDARY



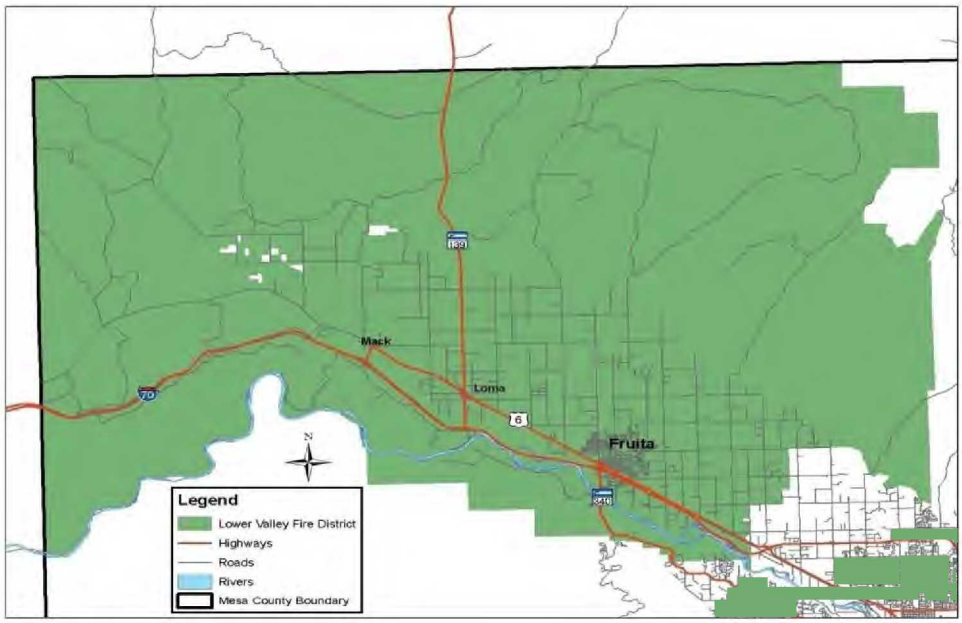
Lower Valley Fire Protection District

The Lower Valley Fire Protection District (LVFPD) and the City of Fruita organized a fire district in 1973. The district split from the City and in 1980 became its own separate district. Both volunteer and paid positions make up the district and provide fire protection as well as emergency medical services.

Population of the district ranges between 8,500 and 12,000 people. LVFPD operates out of two fire stations, Station 31 is located in Fruita and houses 3 ambulances, 2 engines, 2 brush trucks, 1 water tender, 1 river boat and 2 atvs. Station 32 is five miles to the west in Loma and houses 1 water tender, 1 ladder, 1 rescue and the antique fire truck.

Coverage of the district amounts to approximately 225 square miles ranging from the city limits of Grand Junction on the east side and the Utah state border on the west side as shown in Figure 30. This area covers the Colorado National Monument to the south and continuing north to Douglas Pass in Garfield County. The District has a variety of terrain ranging from desert to heavy timber and rural residential to a small downtown commercial district. (Home: Lower Valley Fire Protection District, 2009)

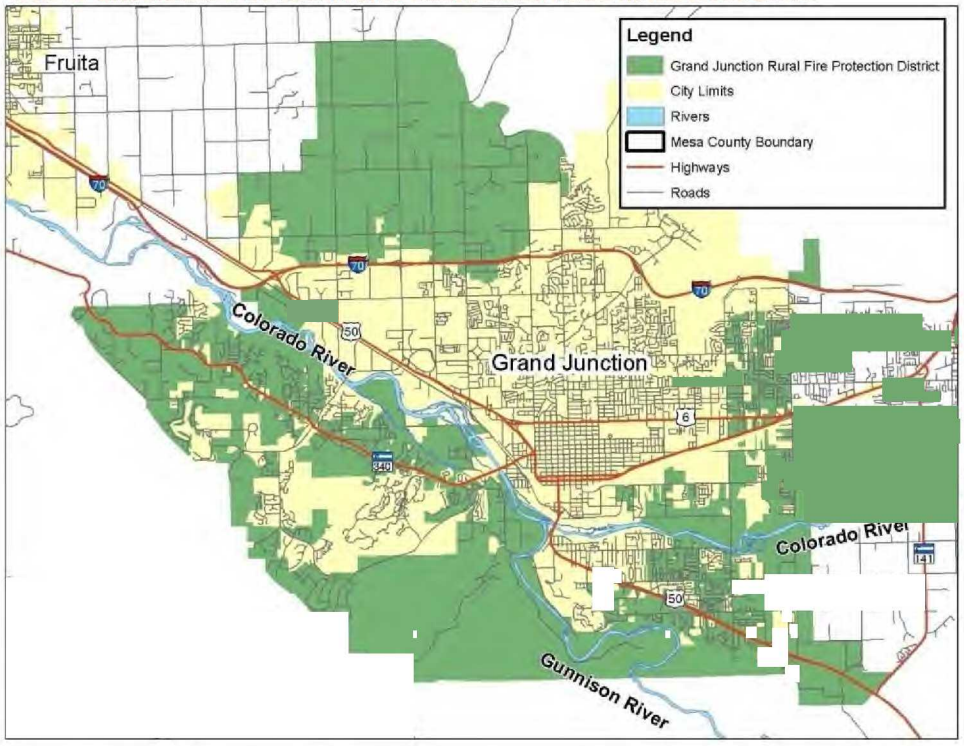
FIGURE 30 LOWER VALLEY FIRE PROTECTION DISTRICT



Grand Junction Fire Department & Grand Junction Rural Fire Protection District

The Grand Junction Fire Department is an emergency organization that provides education, enforcement and emergency services to over 84,000 residents living within the City of Grand Junction and the Grand Junction Rural Fire Protection District. The Grand Junction Rural Fire Protection District is a taxing district surrounding the City Limits which contracts with the City of Grand Junction to provide these services. Grand Junction Fire Department serves a total of 77 square miles with five stations and 120 full-time personnel as shown in Figure 31.

FIGURE 31 GRAND JUNCTION FIRE DEPARTMENT & GRAND JUNCTION RURAL FIRE PROTECTION DISTRICT



Hazard Identification and Profiles

As population continues to grow in Mesa County, development continues in the wildland urban interface areas, increasing the risk to wildfires. Continued assessments and mitigation efforts are needed throughout the county to reduce the risk and impacts to communities. More detailed analysis has been done for the specific communities and can be found in those sections.

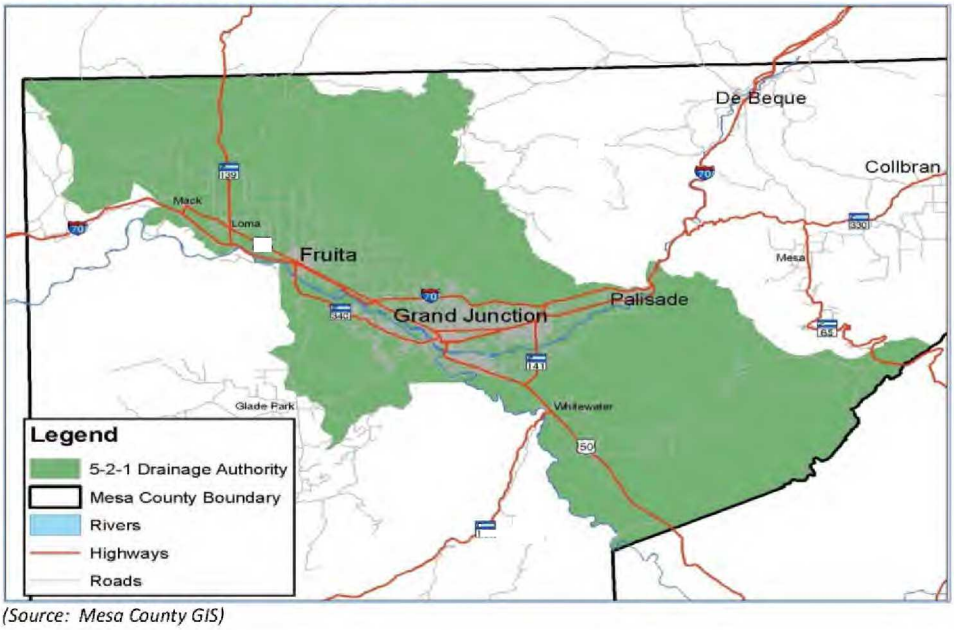
5-2-1 Drainage Authority

Authority Profile

The 5-2-1 Drainage Authority was formed in June of 2004 through an Intergovernmental Agreement (IGA) between the City of Grand Junction, the City of Fruita, the Town of Palisade, Mesa County, and the Grand Valley Drainage District (formally the Grand Junction Drainage District). The Authority was formed in order to protect people and property from flooding, to comply with federal environmental regulations regarding water quality, and to provide a funding mechanism so that stormwater services can be performed.

Figure 32 illustrates the service area that includes all of the City of Grand Junction, the City of Fruita, the Town of Palisade, the Grand Valley Drainage District, and that part of Mesa County south of the rim of the Bookcliffs to the northerly line of Mesa County. The boundary line then follows the westerly boundary of West Salt Creek to the Colorado River where it crosses the river and hugs the southerly bank of the river to a point where 16 Road would intersect and goes south to follow the drainage basin boundaries that encompasses lands all the way to No Thoroughfare Canyon where the boundary follows the channel to the A Road line, thence easterly to the Gunnison River. The line follows the point where it intersects the northerly boundary of Rapid Creek. All of Rapid Creek to the Colorado River is in the service area. (Home: 5-2-1 Drainage Authority)

FIGURE 32 5-2-1 DRAINAGE AUTHORITY BOUNDARY



(Source: Mesa County GIS)

Hazard Identification and Profiles

The 5-2-1 Drainage Authority is primarily responsible for stormwater management. As precipitation falls, some is absorbed into the ground, and some makes its way into streams and rivers, and eventually oceans. In a natural environment, stormwater will soak into soils and soft surfaces and some water will run into area streams. Due to the environment of the Grand Valley, the clay soils don't absorb moisture very well, causing stormwater to flow into storm drains, creeks and rivers. Stormwater does not go into a treatment plant so any pollutants like oil, grease, pesticides, fertilizers, detergents, lawn clippings, etc. are carried into the stormwater and discharged into waterways and back into the environment.

Vulnerability Assessment

Stormwater management is the process of public education coupled with understanding, analyzing, planning for, and controlling stormwater. Stormwater management plays a critical role in controlling flooding, enhancing safety, protecting the environment, and meeting requirements of federal environmental regulations. Many existing facilities are aging, rusting or in need of repair and maintenance. The 5-2-1 Drainage Authority also needs to construct new facilities to adequately address stormwater management in not only developing areas, but in all areas of the valley, including agricultural. Work on stormwater facilities is needed in all areas of the Grand Valley to varying degrees. Some facilities have reached their service life; and a maintenance effort is not enough, replacement is necessary. Other facilities have become overgrown or eroded to a point where maintenance is needed. Lastly, facilities are not adequate or even in existence and in some cases major capital construction is needed to correct deficiencies. (Home: 5-2-1 Drainage Authority)

Community Asset Inventory

The intent of this section is to assess the 5-2-1 Drainage Authority vulnerability separate from that of the planning area as a whole. One area prone to flooding in the Grand Valley is Bosley Wash between the unincorporated Clifton area and the Town of Palisade. Floodwaters have made highway 6 between Clifton and Palisade impassable in the recent past and has flooded homes and farmlands. Studies have been performed on this area for the purpose of alleviating these problems.

Vulnerability by Hazard

The 5-2-1 Drainage Authority is currently studying other washes in the Grand Valley to determine what measures need to be taken to mitigate flooding of homes and farmlands. There are proposals to build detention facilities and to correct other structures, such as bridges and culverts. There are 28 major washes in the Grand Valley to be studied with corrective action to be taken. (Home: 5-2-1 Drainage Authority)

Appendix A: Plan Adoption Resolutions

RESOLUTION NO. MCM 2009-225

A RESOLUTION ADOPTING THE REVISED MESA COUNTY, COLORADO

MULTI-JURISDICTION HAZARD MITIGATION PLAN

WHEREAS, natural hazards in Mesa County have the potential for loss of life and significant property damage; and

WHEREAS, the County of Mesa recognizes the importance of reducing or eliminating vulnerability of disasters caused by natural hazards for the overall good and welfare of the community; and

WHEREAS, the County of Mesa, Emergency Management Department has revised the comprehensive, multi-jurisdictional, Hazard Mitigation Plan to identify both natural and manmade hazards and developed strategies to mitigate these hazards; and

WHEREAS, the Federal Disaster Mitigation Act of 2000 requires jurisdictions to prepare and adopt a Hazard Mitigation Plan to be eligible for future pre-disaster and post disaster federal funding for mitigation purposes; and

WHEREAS, the County of Mesa has identified and justified a number of proposed projects and programs needed to mitigate the vulnerabilities of the County to the impacts of future disasters to be included in this revised Hazard Mitigation Plan.

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF COUNTY COMMISSIONERS OF MESA COUNTY, COLORADO:

Section 1: The County of Mesa hereby proposes to accept and approve the revised Mesa County Multi-Jurisdiction Hazard Mitigation Plan.

Section 2: The plan participants are requested and instructed to pursue available funding opportunities for implementation of the proposals designated therein, and

Section 3: The plan participants will, upon receipt of such funding or other necessary resources, seek to implement the proposals contained in its section of the mitigation strategy, and

Section 4: The plan participants will continue to participate in the updating and revision of the Mesa County Multi-Jurisdiction Hazard Mitigation Plan with a plan review and revision to occur within a five-year cycle, and designated staff will provide annual progress reports on the status of implementation of the plan to the Board of County Commissioners, and

Section 5: The plan participants will further seek to encourage the businesses, community groups, organizations and other stakeholders within the County of Mesa, to also participate in the updating and revision of this plan.

DULY MOVED, SECONDED, AND PASSED THIS 21st day of December, 2009.

MESA COUNTY BOARD OF
COUNTY COMMISSIONERS

By: _____
Steven Acquafresca, Chairman

ATTEST:

_____
Mesa County Clerk & Recorder

Appendix B: Kick-off Meeting Invitation List

Towns/Cities

Town of Collbran
1010 High
Collbran, CO 81624

City of Fruita
325 E. Aspen Ave.
Fruita, CO 81521

City of Grand Junction
250 North 5th Street
Grand Junction, CO 81501

Town of DeBeque
381 Minter
DeBeque, CO 81630

Town of Palisade
175 E. 3rd Street
Palisade, CO 81526

Fire Protection Districts/Departments

Central Orchard Mesa Fire Protection District
3253 B ½ Road
Grand Junction, CO 81503

DeBeque Fire Protection District
380 Curtis Avenue
DeBeque, CO 81630

Glade Park Volunteer Fire Department
16400 DS Road
Glade Park, CO 81523

Grand Junction Rural Fire Protection District
P.O. Box 4450
Grand Junction, CO 81502

Lower Valley Fire Protection District
168 N. Mesa
Fruita, CO 81521

Palisade Rural Fire Protection District
3836 G. Road
Palisade, CO 81526

Gateway-Unaweep Fire Protection District
P.O. Box 126
Gateway, CO 81522

Clifton Fire Protection District
3254 ½ F Rd.
Clifton, CO 81520

East Orchard Mesa Fire Protection District
455 35 Road
Palisade, CO 81526

Grand Junction Fire Department
330 S. 6th Street
Grand Junction, CO 81501

Lands End Fire Protection District
34980 Pronghorn Drive
Whitewater, CO 81527

Palisade Fire Department
175 E. 3rd Street
Palisade, CO 81526

Plateau Valley Fire Protection District
49084 KE-1/2 Rd.
Mesa, CO 81643

Grand Junction Fire Department
222 South 6th Street
Grand Junction, CO 81501

Other Districts

Grand Mesa Metropolitan District #2

Grand Valley Drainage District

Powderhorn Metropolitan District No. 1

Redlands Mesa Metropolitan District

Ridges Metropolitan District #1

Upper Grand Valley Pest Control District

Southwest Mesa County Rural Services Public Improvement District
544 Rood Ave.
Grand Junction, CO 81501

Whitewater Public Improvement District
544 Rood Ave.
Grand Junction, CO 81501

Mesa County Lower Valley Public Improvement District
544 Rood Ave.
Grand Junction, CO 81501

Mesa County Whitewater Urban Services Public Improvement District
544 Rood Ave.
Grand Junction, CO 81501

Sanitation Districts

Mesa Water & Sanitation District

Central Grand Valley Sanitation District
541 Hoover Dr.
Grand Junction, CO 81504

Clifton Sanitation District
3217 D. Road
Clifton, CO 81520

Persigo Wastewater Treatment Plant/Service Area
2145 River Road
Grand Junction, CO 81505

Water Districts

Clifton Water District
510 34 Road
Clifton, CO 81520

Colorado River District
P.O. Box 1120
Glenwood Springs, CO 81602

Ute Water Conservancy District
560 25 Road
Grand Junction, CO 81506

Colorado Division of Water Resources
Attn: Garrett Jackson
2754 Compass Drive, #175
Grand Junction, CO 81506

West Divide Water Conservancy District
P.O. Box 1478
Rifle, CO 81650

Law Enforcement Agencies

Colorado State Patrol
554 Jurassic Ct.
Fruita, CO 81521

Collbran Town Marshall
1010 High St.
Collbran, CO 81624

Fruita Police Department
101 W. McCune Ave.
Fruita, CO 81521

Mesa County Sheriff's Office
215 Rice St.
Grand Junction, CO 81501

Grand Junction Police Department
625 Ute Ave.
Grand Junction, CO 81501

DeBeque Town Marshall
381 Minter Ave.
DeBeque, CO 81630

Palisade Police Department
175 E. 3rd Street
Palisade, CO 81526

Federal Bureau of Investigation
402 Rood Ave., Suite 225/P.O. Box 1905
Grand Junction, CO 81502

Other Agencies

NOAA National Weather Service
792 Eagle Dr.
Grand Junction, CO 81506

Grand Valley Power
2727 Grand Ave.
Grand Junction, CO

Bureau of Land Management
2815 H. Road
Grand Junction, CO 81506

Bureau of Reclamation
2764 Compass Drive, Suite 106
Grand Junction, CO 81506

Mesa County Floodplain Manager
750 Main Street
Grand Junction, CO 81501

Colorado State Forest Service

Xcel Energy
Grand Junction, CO 81501

Redlands Water & Power Co.
2216 S. Broadway
Grand Junction, CO 81503

Bureau of Land Management
Attn: Mr. Doug Paul
2815 H. Road
Grand Junction, CO 81506

Colorado State Forest Service
Attn: Mr. Kelly Rogers
222 South 6th Street, Room 416
Grand Junction, CO 81501

Attn: Tim Foley
222 South 6th Street, Room 416
Grand Junction, CO 81501

State of Colorado, Division of Emergency Management
Attn: Mr. Steve Denney
222 South 6th Street, Room 409
Grand Junction, CO 81501

State of Colorado-Department of Agriculture
700 Kipling Street, Suite 4000
Lakewood, CO 80215-8000

State of Colorado
Department of Transportation
222 South 6th Street
Grand Junction, CO 81501

Grand Junction Regional Communications Center
Attn: Mrs. Paula Creasy
625 Ute Ave.
Grand Junction, CO 81501

Grand Junction Public Works
Attn: Mr. Tim Moore
2553 River Road
Grand Junction, CO 81505

Mesa County LEPC
P.O. Box 2242
Grand Junction, CO 81502-2242

Mesa County Information Technology Department
Att: Rick Corsi
544 Rood Ave.
Grand Junction, CO 81501

Mesa County Engineering Department
750 Main Street
Grand Junction, CO 81501

Mesa County Public Works Department
750 Main Street
Grand Junction, CO 81501

Mesa County Planning Department
750 Main Street
Grand Junction, CO 81501

Mesa County Health Department
Community Services Building
510 - 29½ Road
Grand Junction, Colorado 81504

Colorado Water Conservation Board
1313 Sherman St., Room 721
Denver, CO 80203

Colorado Geological Survey
1313 Sherman Street, Room 721
Denver, CO 80203

Colorado National Monument
Fruita, CO 81521-0001

U.S. Forest Service
2250 Highway 50
Delta, CO 81416

Mesa County Fleet Services
Mr. Dave Wolney
1000 South 9th Street
Grand Junction, CO 81501

City of Grand Junction Water Department
Attn: Rick Brinkman
333 West Ave., Bldg. A
Grand Junction, CO 81501

FEMA Region VIII- Mitigation Office
Building 170, Denver Federal Center
P.O. Box 25267
Denver, CO 80225-0267

5-2-1 Drainage Authority
Attn: Eric Mende
P.O. Box 3389
Grand Junction, CO 81502

Appendix C: Invitation Letter to Kick-Off Meeting

Kimberly Bullen
544 Rood Avenue
Grand Junction, Co. 81501
Kimberly.bullen@mesacounty.us

July 23, 2009

RE: Mesa County Multi-Hazard Mitigation Plan

To Whom It May Concern:

As you may be aware, the Disaster Mitigation Act of 2000 requires all local governments to assess their risks to natural hazards and identify actions that can be taken in advance to reduce future losses. The law requires all local governments and districts to have an approved local hazard mitigation plan after November 1, 2004, to be eligible for certain federal disaster assistance and mitigation funding programs.

Mesa County completed the original plan in October, 2004 and is required by the State of Colorado, Division of Emergency Management (CDEM) and the Federal Emergency Management Agency (FEMA), to submit an updated Pre-Disaster Mitigation Plan every five years. The purpose of this plan is to reduce or eliminate long-term risk to the people and property of Mesa County from the effects of natural hazard events

Mesa County Emergency Management has taken the lead in developing this plan which was adopted in 2004 by all municipal/Town governments and Mesa County. During the revision process we hope to expand this plan to also include special districts. Mesa County Emergency Management will facilitate the planning process, collect the necessary data, and perform other technical services, including preparing the risk assessment and plan document. However, we need your help to successfully complete this project.

The Pre-Disaster Mitigation planning process is heavily dependent on the participation of representatives from local government agencies and departments, the public, and other stakeholder groups. A Hazard Mitigation Planning Committee will be formed to support this project and will include representatives from the County, Cities/Towns, special districts, and other local, state, and federal agencies in or that serve Mesa County.

Your organization's participation on the committee is requested due to the information, technical knowledge, or other valuable experience you have about your community or agency. Please designate a representative to serve on the committee and attend the kickoff meeting. If you have more than one department or individuals that you would like to attend this meeting, please feel free to invite them.

Mesa County Multi-Hazard Mitigation Plan Kick-off Meeting
August 11, 2009 (10:00 a.m. -12:00 p.m.)
Mesa County Courthouse-Multi-Purpose Room
544 Rood Ave., Grand Junction, Co. 81501

Please respond to Kimberly Bullen at (970)244-1649 or kimberly.bullen@mesacounty.us as to whether or not you or your representative will be able to attend. Thank you for your attention to this important project.

Sincerely,

Kimberly K. Bullen
Sr. Management Analyst/
Interim Emergency Manager

Appendix D: HMPC Meeting Agendas, Sign-In Sheets, and Sample Worksheets

AGENDA

Mesa County Multi-Hazard Mitigation Plan Kick-off Meeting

August 11, 2009

10:00 a.m. – 12:00 p.m.

Mesa County Courthouse: Multi-Purpose Room

10:00 a.m. – 10:15 a.m.	Opening Remarks Introductions
10:15 a.m. – 10:30 a.m.	Local Hazard Mitigation Plan Purpose & Requirements
10:30 a.m. – 10:45 a.m.	Identification of Multi-Jurisdictional Participation & Hazard Mitigation Planning Committee Planning for Public Involvement
10:45 a.m. – 12:00 p.m.	Hazard Identification and Data Collection Needs Worksheets 1-3 Next Steps

MESA COUNTY

Sign-In Sheet
Mesa County Multi-Hazard Mitigation Plan
Kick-off Meeting
August 11, 2009

MARTY MEDINA	CDOT	222 S. 6th Rm 317 GRAND JUNCTION 81501	970 683 6211	marty.medina@dot.state.co.us
Dave Wolny	Mesa State College	1100 North Ave Grand Jct 81501	970-245-7141	dwolny@mesastate.edu
VIC STUIZKI	Town of Collbran.	1010 High St. Collbran 81624	970-487-3120	Publicworks@TOWNOFCOLLBRAN.US
AARON LAING	COLO STATE PATROL	554 JURASSIC COURT FRUITA, CO 81521	970 858-2650	
Adam Applehans	Collbran Marshall's Office	1010 HIGH ST P.O. Box 387 81624	970-487-3088	Collbran.marshal@HOTMAIL.com
DAVE GITCHELL	CENTRAL ORCHARD MESA FPD	3253 B½ rd. G.J. 81503	970-640-0434	FIREDIVER_54@HOTMAIL.COM
DAVID SMITH	CITY OF GRAND JCT. (PERSICO)	2145 RIVER ROAD	970-256-4163	davids@gjcity.org
Bud Thompson	MCDOT	1000 So. 9th St	970-216-1323	bud.thompson@mesacounty.us
Andi Staley	Mesa Cnty - Engineering	750 main	970-244-1686	andi.staley@mesacounty.us
chuck vale	CDEM		970 256 3914	chuck.vale@state.co.us
Garrett Jackson	CO DWR	2254 Compass Dr. #175 Grand Jct. 81506	970/248-8355	
Kelly Rogers	CSFS	222 S. 6th St. #416 GJ, CO 81501	970 248 7325	kelly.rogers@colostate.edu
Mark Haynes	Co DWR Dam Safety	1313 Sherman St Rm 818 Denver, Co 80203	303/866-3581 x 8220	mark.haynes@state.co.us
Jim Pringle	NATL. WX SVC.	792 EAGLE DR GRAND JUNCTION, CO 81506	970-243-7007 X726	james.pringle@noaa.gov

MESA COUNTY

Sign-In Sheet
Mesa County Multi-Hazard Mitigation Plan
Kick-off Meeting
August 11, 2009

	epartment	Address	Phone	E-
Andy Smith	Palisade P.D.	Box 128 Palisade	464-5601	ASmith@Townof Palisade
Richard Rupp	Palisade Fire	P.O. Box 128 Palisade	270-4753	rrupp@Townof Palisade
Jane Quimby	FBI	400 Rood Ave GJ	242 8360	Jane.quimby@ic.fbi.gov
mike Harvey	Plateau Valley Fire	Box 456, Collbran, CO	487-5283	mharvey155@msn.com
Eric Mende	5-2-1 Drainage Auth	573 w. Crete Cr. GJ.	263-7401	eric.mende@mesacounty
Bob Nelson	GJ PD	625 Ute Ave	244-3727	Bobn@gjcity.org
DREW REEKIE	GJFD HAZMAT	330 S. 6TH	244 1400	Dwarr@gjcity.org
Corey Lovern	" "	" "	" "	coreyl@gjcity.org
Bill Rom	GJFD	330 S 6th	244-1476	billr@gjcity.org
Richard Proctor	Grand Valley Water Users	Assoc. 1147 24 Rd	242-5065	GVWUA1147@AOL.com
Barry Odrich	BLM GJ	2815 H Road	970-589-9658	Barry_Odrich@blm.gov
FRANK CAVALIERE	LOWER VALLEY FD	168 N. MESA ST	888-3133	fcavaliere@fruita.org
BOBBY GUNNELL	CITY OF GJ.	250 N 5th ST.	244-1510	BOBBYG@GJCITY.ORG
Frank Hayde	Colorado Natn'l Monument	Fruita, Co	858-3617	frank_hayde@nps.gov
KEN WATKINS	GJ FIRE	330 S. 6TH ST GJ	244-1415	KENW@GJCITY.ORG

MESA COUNTY

Sign-In Sheet
Mesa County Multi-Hazard Mitigation Plan
Kick-off Meeting
August 11, 2009

		Add			
Steve Grant	GJ Rural FD	P.O. Box		3039474477	spgrant@1 hotmail.com
KENT HOLSAN	CLIFTON FD	BOX 398	81520	434-5448	KHOLSAN@
Brandi Marruppella	GJFD	330 S 6th St	81501	244-1402	

AGENDA

Mesa County Multi-Hazard Mitigation Plan – 2nd Meeting

September 3, 2009

10:00 a.m. – 12:00 p.m.

Mesa County Courthouse: Multi-Purpose Room

10:00 a.m. – 10:15 a.m.	Opening Remarks Introductions
10:15 a.m. – 10:45 a.m.	Review Historical Hazard Data, Vulnerability Assessment and Capabilities Matrix
10:45 a.m. – 11:30 a.m.	Discuss Mitigation Actions (Worksheet #4)
11:30 a.m. – 12:00 p.m.	Discuss Mitigation Project Descriptions (Worksheet #5) Next Steps

MESA COUNTY

Sign-In Sheet
Mesa County Multi-Hazard Mitigation Plan
Mitigation Strategy Meeting
September 3, 2009

Chuck Vole	CDEM			chuck.Vole@state.co.us
Bill Roth	G.J.F.D.			billr@gjcity.org
DREW REEKIE	GJFD			Drewr@gjcity.org
Jim Fobb	MCSO			Jim.Fobb@mesacounty.us
Jim Pringle	NWS			james.pringle@noaa.gov
Richard Rupp	Palisade Fire			rrupp@townofpalisade.org
Eric Mende	Grand Drainage Authority			eric.mende@mesacounty.us.
Mike Harvey	Plateau Valley Fire			mharvey155@q.com
Wade Nafziger	FEMA Region VIII	Denver		wade.nafziger@dhs.gov
Garrett Jackson	Colo DNR			garrett.jackson@state.co.us
Brent Gurney	City of G.J.			BRENTG@gjcity.org
Andi Staley	Mesa County Public Works			andi.staley@mesacounty.us
Bud Thompson	MCDOT			bud.thompson@mesacounty.us
FRANK CAVALIERE	LVFD			fcavaliere@fruita.org

MESA COUNTY

Sign-In Sheet
Mesa County Multi-Hazard Mitigation Plan
Mitigation Strategy Meeting
September 3, 2009

Mark Angelo	FPD	101 W. McCune Ave Fruita, CO	858-3308	MARK.Angelo@MESACOUNTY.US
Marilyn Gally	CDEM	15220 S. Golden Rd, Golden	303-273-1712	marilyn.gally@state.co.us
Brandi Marrapello	GJFD	330 S 6th St	970-250-9766	brandim@gjcity.org

AGENDA

Mesa County Multi-Hazard Mitigation Plan – 3rd Meeting

September 17, 2009

10:00 a.m. – 12:00 p.m.

Mesa County Courthouse: Multi-Purpose Room

10:00 a.m. – 10:15 a.m.	Opening Remarks Introductions
10:15 a.m. – 10:45 a.m.	Review Vulnerability Assessment, Capabilities Matrix
10:45 a.m. – 11:15 a.m.	Review Hazard Maps (Floods, wildfires, rockfalls, Tier II facilities, dams, earthquakes, critical facilities, historical events)
11:15 a.m. – 12:00 p.m.	Refine Strategies & Projects Schedule one additional HMPC meeting to review and finalize plan Schedule Community Meetings

MESA COUNTY

Sign-In Sheet
Mesa County Multi-Hazard Mitigation Plan
Kick-off Meeting
September 17, 2009

Name	Jurisdiction/Department	Address	Phone	E-Mail
Marty Medina	CDOT	222 S. 6th G.J.	683-6211	marty.medina@dot.state.co.us
Richard Rupp	Palisade Fire	175 E 2nd P.O. Box 128	270-9753	rrupp@townofpalisade.org
Doug Paul	UCR Fire	2815 H&R GJ	244-3106	douglas.paul@stm.gov
Brad Mangopella	GJFD	330 S 6th - GJ	244-1400	
Mike Harvey	Plateau Valley	Bx 456, Collbran	268-5283	mharvey155@q.com
Jim Pringle	NWS			james.pringle@noaa.gov

AGENDA

Mesa County Multi-Hazard Mitigation Meeting – Final Planning Meeting

December 9, 2009

9:00 a.m. – 10:30 p.m.

Mesa County Courthouse: Multi-Purpose Room

9:00 a.m. – 9:30 a.m.	Planning Committee Agreement on Project Priorities
9:30 a.m. – 10:00 a.m.	Final Changes to Plan
10:00 a.m.-10:30 a.m.	Review Community Open House Schedule and Formal Adoption Process

MESA COUNTY

Sign-In Sheet
Mesa County Multi-Hazard Mitigation Plan
Final Planning Meeting
December 9, 2009

Andrew Markoff	Mesa County / OEM	544 Rood Ave Grand Jct.	970-241-1063	andrew.markoff@mesacounty.us
Kimberly Bullen	Mesa County / OEM; Admin.	544 Rood Ave., Grand Jct.	(970) 244-1649	kimberly.bullen@mesacounty.us
Bret Guillory	City of G.J.	250 N 5th St.	970-244-1590	bretg@gjcity.org
Frank Cavaliere	Lower Valley FD	168 N Mesa St	858-3133	fcavaliere@fruita.co.us
Monica Mullin	Comm Center	625 Ute Ave GJ	244-3663	monicam@gjcity.org
Dave Wolny	Mesa State College	12th & North Ave	255-7128	dwolny@mesastate.edu
Richard Rupp	Palisade Fire	175 E 3rd St	270-4253	rrupp@townofpalisade.org
Greg Hanover	MCHD	510 29 1/2 Rd	778-5393	Greg.Hanover@mesacounty.us

Appendix E: Data Collection Worksheets

Historic Hazard Event Data Collection Sheet
Worksheet #1

Instructions: Please fill out one sheet for each event with as much detail as possible. Attach supporting documentation, photocopies of newspaper articles or other original sources.

Type of natural hazard event:	
Date of event:	
Description of the nature and magnitude of the event:	
Location (community or description with map):	
Injuries:	
Deaths:	
Property damage:	
Infrastructure damage:	
Business/Economic impact:	
Road/School/Other closures:	
Other damage:	
Total damages:	
Insured losses:	
Fed/State Disaster relief funding ($):	
Opinion on likelihood of occurring again:	
Source of information:	
Comments:	

Contact Information	
Name of Jurisdiction:	
Submitted By:	
Address:	
Phone:	

Vulnerability Assessment
Worksheet #2

Instructions: Please complete to the extent possible the vulnerable buildings, populations, critical facilities and infrastructure for each hazard that affects your jurisdiction. This information will be used to estimate disaster losses, which can then be used to gauge potential benefits of mitigation measures. Attach supporting documentation, photocopies of engineering reports or other sources.

Hazard:

Location and Description of Potential Impact:

Building Inventory:

Residential	**Count**	**Estimated Value**
Comments		
Commercial	**Count**	**Estimated Value**
Comments		

Industrial	**Count**	**Estimated Value**
Comments		
Agricultural	**Count**	**Estimated Value**
Comments		

Other (Define, e.g., gov.)	**Count**	**Estimated Value**
Comments		

Capabilities Matrix
Capabilities Worksheet #3

Comp Plan/General Plan		
Special Plans		
Subdivision Ordinance		
Zoning Ordinance		
NFIP/FPM Ordinance		
Substantial Damage Language		
Admin./Certified Floodplain Manager		
# of Flood threatened Buildings		
# of Flood Insurance Policies		
# of Repetitive Losses		
Maintain Elevation Certificates		
CRS Rating, if applicable		
Stormwater Program		
Erosion or Sediment Controls		
Building Code Version		
Full-Time Building Official		
Conduct "as-built" Inspections		
BCEGS Rating		
Local Emergency Operations Plan		
Fire Department ISO Rating		
Fire Safe Programs		
Hazard Mitigation Plans		
Warning Systems/Services		
Storm Ready Certified		
Weather Radio Reception		
Outdoor Warning Sirens		
Emergency Notification (R-911)		
GIS System		
Hazard Data		
Building Footprints		
Links to Assessor Data		
Land-Use Designations		
Structural Protection Projects		
Property Protection Projects		
Critical Facilities Protected		
Natural/Cultural Resources Inventory		
Public Information Program/Outlet		
Environmental Education Program		

Mitigation Strategy - Identify Mitigation Actions
Worksheet #4

Instructions: For each type of loss identified on previous worksheets, determine possible actions. Record information below.

Hazard:

Contact Information:

Name of Jurisdiction:

Submitted By:

Address:

Phone:

Mitigation Project Description Worksheet
Worksheet #5

Instructions: Use this guide to record potential mitigation projects (1 or more pages per project) identified during the planning process. Provide as much detail as possible and use additional pages as necessary. These will be collected following HMPC meetings on mitigation goals and measures and included in the plan.

Jurisdiction:

Mitigation Project:

Issue/Background:

Other alternatives:

Responsible Agency:

Priority (High-Medium-Low):

Cost Estimate:

Benefits (Avoided Losses):

Potential Funding:

Schedule:

Worksheet Submitted By:

Name & Title:

Phone:

Address:

Appendix F: Mesa County Hazard Mitigation Planning Committee Members

Marty Medina	Colorado Department of Transportation
Dave Wolny	Mesa State College
Vic Sturm	Town of Collbran
Aaron Laing	Colorado State Patrol
Adam Appelhanz	Town of Collbran (Marshal's Office)
Dave Gitchell	Central Orchard Mesa FPD
David Smith	City of Grand Junction (Persigo)
Bud Thompson	Mesa County Public Works
Andi Staley	Mesa County Engineering
Chuck Vale	Colorado Division of Emergency Management
Garrett Jackson	Colorado Division of Water Resources
Kelly Rogers	Colorado State Forest Service
Jim Pringle	National Weather Service (Grand Junction Office)
Andy Scott	Town of Palisade (Police Department)
Richard Rupp	Town of Palisade (Fire Department)
Jane Quimby	Federal Bureau of Investigations
Mike Harvey	Plateau Valley FPD
Eric Mende	5-2-1 Drainage Authority
Bob Russell	City of Grand Junction (Police Department)
Drew Reekie	City of Grand Junction (Fire Department - D.E.R.A.)
Corey Lovern	City of Grand Junction (Fire Department - D.E.R.A.)
Bill Roth	City of Grand Junction (Fire Department)
Richard Proctor	Grand Valley Water Users Association
Barry Oelrich	Bureau of Land Management
Doug Paul	Bureau of Land Management
Frank Cavaliere	Lower Valley Fire Protection District
Bret Guillory	City of Grand Junction
Ken Watkins	City of Grand Junction (Fire Department)
Frank Hayde	Colorado National Monument
Jim Fogg	Mesa County Sheriff's Office
Brandi Manuppela	City of Grand Junction (Fire Department - D.E.R.A.)
Kent Holsan	Clifton Fire Protection District
Steve Grant	Grand Junction Rural Fire Protection District
Mark Angelo	City of Fruita (Police Department)
Tristan Nelson	Mesa County GIS
Andrew Martsolf	Mesa County Emergency Management
Kimberly Bullen	Mesa County Administration

Appendix G: Community Open House Press Release

MESA COUNTY
COMMUNITY ADVISORY

Date: December 3, 2009

Contact: Andy Martsolf
Emergency Manager
(970) 244-1763
andrew.martsolf@mesacounty.us

Keeping You Safe From Natural Disasters

Plan recommends actions to reduce risks to our communities from flooding, wildfires, rockfalls and landslides.

What steps should Mesa County and its communities take to protect people and property from natural hazards? A new draft plan analyses local threats and proposes ways to minimize risks.

The draft Mesa County Hazard Mitigation Plan assesses the risk of several different types of natural hazards within Mesa County and its communities. The goals of the plan are to:

- Reduce or eliminate the risk to people, property and the environment.
- Minimize potential economic losses.
- Move forward with action steps that will mitigate damage by working with local partners.

The public is invited to find out more about what hazards we face in Mesa County, and what's being planned to reduce our risks. Please come review the draft plan at one of our open houses:

DROP IN ANYTIME!

Thursday, December 10th • 6:00 to 8:00 p.m.	**Fruita**—Lower Valley Fire Station (168 N. Mesa Avenue)
Friday, December 11th • 3:00 to 5:00 p.m.	**Grand Junction**—Old County Courthouse (544 Rood Avenue, first floor multipurpose room)
Monday, December 14th • 6:00 to 8:00 p.m.	**Palisade**—Veterans' Memorial Community Center (121 W. 8th Street)

People who can't attend one of the open houses can review the draft plan online at:
www.mesacounty.us/emergencymanagement
(Just click on "Draft Hazard Mitigation Plan")

The draft plan is also available for review at the following locations during regular business hours:

- Old County Courthouse (544 Rood Avenue)—reception area inside revolving doors on 6th Street.
- Mesa County Sheriff's Office (215 Rice Street)
- Mesa County Department of Planning and Economic Development (750 Main Street)

"Mesa County—Creating a community of opportunities for all residents with a focus on the future."

IN BRIEF SENTINEL STAFF

Holiday party will be Thursday for children of foster care

MOMS Club of Grand Junction East will have a holiday party for all children from Ariel Foster Care from 5:30 p.m. to 8:30 p.m. Thursday at Canyon View Vineyard Church. Food, games and a visit from Santa Claus are on the party agenda.

Anyone wishing to help purchase presents for the children can drop off or mail donations to Ariel Foster Care, 2938 North Ave., Suite G.

County will present draft plan for managing natural hazards

Open houses have been scheduled for the draft Mesa County Hazard Mitigation Plan, which proposes ways to minimize risks from flooding, wildfires, rockfalls and landslides and other threats.

The schedule is:

- Thursday, 6-8 p.m., Lower Valley Fire Station, 168 N. Mesa Ave., in Fruita
- Friday, 3-5 p.m., Mesa County Courthouse, 544 Rood Ave., first floor multipurpose room
- Dec. 14, 6-8 p.m., Veteran's Memorial Community Center, 121 W. Eighth St. in Palisade

The draft plan can also be viewed online at www.mesacounty.us/emergencymanagment by clicking on Draft Hazard Mitigation Plan; in the Mesa County Courthouse reception area, which is inside revolving doors on Sixth Street; at the Mesa County Sheriff's Department, 215 Rice St.; and at Mesa County Department of Planning and Economic Development, 750 Main St.

Letter carriers need bowlers for fundraising event Dec. 13

The National Association of Letter Carriers, Local Branch 913 is seeking bowlers to participate in the 2009 Bowl-A-Thon from 9 a.m. to noon Dec. 13 at Orchard Mesa Lanes.

The event will include a pizza lunch and will help raise awareness and money for the Muscular Dystrophy Association. Each player needs to donate or raise $60 to join a team of five players. Call 241-2181 for information.

Partners offers gift wrapping at mall through Dec. 24

Through Dec. 24, shoppers at Mesa Mall can have gifts wrapped by Partners at cafe Court. Donations will be used for Partners' programs, which provide enrichment activities and provide a safe environment for at-risk youth in the programs.

Call Mary D'Amico at 245-5555, extension 12, for information.

MESA COUNTY

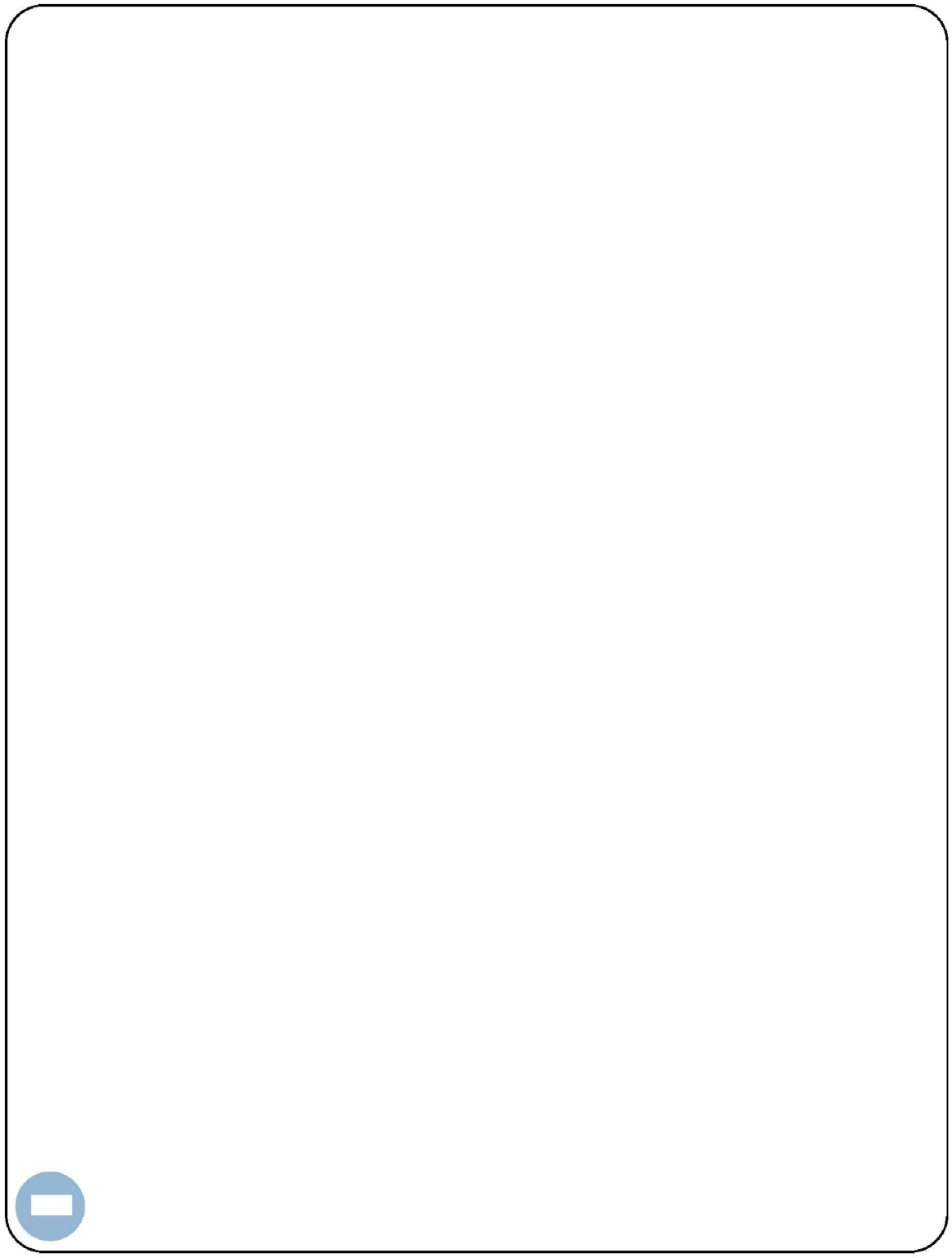
Sign-In Sheet
Mesa County Multi-Hazard Mitigation Plan
Community Meeting
12/10/2009 @ Lower Valley Fire Station

[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	165 [redacted]	858-3133	fcavalier@fruita.org
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Andy [redacted]	Mesa County OEM	544 Road Ave	[redacted]	[redacted]

MESA COUNTY

Sign-In Sheet
Mesa County Multi-Hazard Mitigation Plan
Community Meeting
12/11/2009 @ Mesa County Court House

JOHN LINKO	—	POB 2751 GJ, CO 81502	256-9541	johnlinko@bresnan.net
Brett Gunnoe	City of Grand Jct.	250 N 5th St. G.J. CO. 81501	970 244-1590	—
Andy Mertsock	Mesa County/OEM	544 Rood Ave GJ. CO 81501	970-244-1763	
Jim Pringle	NWS	792 Eagle Dr. GJ, CO 81506	970-248-4376	jim.pringle@noaa.gov



Appendix I: Table of Figures

FIGURE 1 HAZARD MITIGATION PLANNING AREA 14
FIGURE 2 ESTIMATED COUNTY POPULATION 16
FIGURE 3 JURISDICTION'S POPULATION 16
FIGURE 4 AGE DISTRIBUTION IN MESA COUNTY 17
FIGURE 5 MESA COUNTY LABOR FORCE AND UNEMPLOYMENT 19
FIGURE 6 MAP OF DAMS IN MESA COUNTY 35
FIGURE 7 FAULTS IN MESA COUNTY 40
FIGURE 8 RIVERS AND TRIBUTARIES 45
FIGURE 9 MESA COUNTY LANDSLIDE MAP 49
FIGURE 10 DEBEQUE CANYON SLIDE AREA 49
FIGURE 11 PHOTO OF DEBEQUE CANYON SLIDE AREA- INTERSTATE 70 50
FIGURE 12 PHOTO OF DEBEQUE CANYON SLIDE AREA- INTERSTATE 70 50
FIGURE 13 ROCKFALL WEST OF PALISADE ALONG INTERSTATE 70 51
FIGURE 14 ROCKFALL EVENT IN DEBEQUE CANYON AT BEAVER TAIL TUNNEL ON INTERSTATE 70 51
FIGURE 15 ROCKFALL EVENT IN DEBEQUE CANYON AT BEAVER TAIL TUNNEL ON INTERSTATE 70 52
FIGURE 16 MESA COUNTY WILDFIRE RISK ASSESSMENT 59
FIGURE 17 MESA COUNTY WETLANDS AREAS 66
FIGURE 18 MESA COUNTY HABITATS FOR THREATENED AND ENDANGERED SPECIES 67
FIGURE 19 POTENTIAL CONSERVATION AREAS 70
FIGURE 20 MESA COUNTY ECOLOGICALLY SENSITIVE AREAS 71
HIGURE 21 HAZUS EARTHQUAKE SCENARIO 78
FIGURE 22 BRIDGEPORT EARTHQUAKE GROUND MOTION 78
FIGURE 23 BRIDGEPORT EARTHQUAKE SCENARIO, DISPLACED HOMES 79
FIGURE 24 TOWN OF COLLBRAN 112
FIGURE 25 TOWN OF PALISADE 116
FIGURE 26 CITY OF GRAND JUNCTION 121
FIGURE 27 CITY OF FRUITA 126
FIGURE 28 FIRE PROTECTION DISTRICTS IN MESA COUNTY 131
FIGURE 29 PLATEAU VALLEY FPD BOUNDARY 132
FIGURE 30 LOWER VALLEY FIRE PROTECTION DISTRICT 133
FIGURE 31 GRAND JUNCTION FIRE DEPARTMENT & GRAND JUNCTION RURAL FIRE PROTECTION DISTRICT 134
FIGURE 32 5-2-1 DRAINAGE AUTHORITY BOUNDARY 135

Works Cited

About Us: Colorado Natural Heritage Program. (2009). Retrieved October 21, 2009, from Colorado Natural Heritage Program: http:///www.cnhp.colostate.edu

County, M. (2009, July 28). *Mesa County Planning and Economic Development.* Retrieved November 12, 2009, from Mesa County: http://www.mesacounty.us

County, M. (2009, March 24). *Mesa County Public Works, Stormwater Management*. Retrieved November 12, 2009, from Mesa County: http://www.mesacounty.us

Data & Demographics: Grand Junction Economic Partnership. (2009). Retrieved October 26, 2009, from Grand Junction Economic Partnership: http://www.gjep.org/

Demographer, S. (n.d.). *State Demography Office*. Retrieved November 2, 2009, from Colorado Division of Local Government: http://dola.colorado.gov

Department of Geography, U. o. (2009, August 26). *Hazards & Vulnerability Research Institute*. Retrieved September 14, 2009, from SHELDUS: http://webra.cas.sc.edu

EHP Web Team. (2009, September 14). *Welcome to the U.S. Geological Survey Earthquake Hazards Program*. Retrieved September 14, 2009, from USGS: http://earthquake.usgs.gov/

FEMA. (2009). *Flood Insurance Study, Mesa County Colorado.* FEMA.

FEMA. (2009, July 9). *Getting Started: Building SUpport for Mitigation Planning FEMA 386-1.* Retrieved October 28, 2009, from Federal Emergency Management Agency: http://www.fema.gov

FEMA. (2007, October 31). *Hazard Mitigation Planning and Hazard Mitigation Grant Program. Final Rule.* Retrieved October 28, 2009, from Federal Emergency Management Agency: http://www.fema.gov

FEMA. (2009, November 13). HAZUS-MH.

FEMA. (2006). *Introduction to Hazard Mitigation. FEMA IS-393.* Retrieved October 28, 2009, from Federal Emergency Management Agency: http://www.fema.gov

FEMA. (2009). *Multi-Hazard Idenfitication and Risk Assessment.* Retrieved October 28, 2009, from Federal Emergency Management Agency: http://www.fema.gov/library/viewRecord.do

FEMA. (2009, July 9). *Multi-Hazard Mitigation Planning. FEMA 386-8.* Retrieved October 28, 2009, from Federal Emergency Management Agency: http://www.fema.gov

FEMA. (2001, September). *Understanding Your Risks: Identify Hazards and Estimating Losses. FEMA 386-2.* Retrieved October 28, 2009, from Federal Emergency Management Agency: http://www.fema.gov

FEMA. (2001). *Understanding Your Risks: Identifying Hazards and Estimating Losses. FEMA 386-2.* Retrieved October 28, 2009, from Federal Emergency Management Agency: http://www.fema.gov

Hampton, R. (2009, October 28). Division of Wildlife, Public Information Officer, Northwest Region. Grand Junction, CO, USA.

Hinson, S. (2009, September 25). *National Climatic Data Center*. Retrieved September 25, 2009, from Storm Events: http://www.ncdc.noaa.gov

Hinson, S. (2009, September 14). *NCDC Storm Events*. Retrieved September 14, 2009, from National Climatic Data Center: http://www4.ncdc.noaa.gov

Home: 5-2-1 Drainage Authority. (n.d.). Retrieved November 5, 2009, from 5-2-1 Drainage Authority: http://www.521drainageauthority.org/index.html

Home: Lower Valley Fire Protection District. (2009). Retrieved October 28, 2009, from Lower Valley Fire Protection District: http://lowervalleyfire.com

J. Truby, L. B. (January 2001). *The Colorado Drought Mitigation and Response Plan.*

Jackson, G. (2009). Colorado Division of Water Resources Dam Safety Branch. Grand Junction, CO, USA.

Martsolf, A. (2009, October 27). Vulnerability Assessment. Grand Junction, CO.

National and State Registers. (n.d.). Retrieved October 21, 2009, from Colorado Historical Society Office of Archeaology & Historic Preservation: http://www.coloradohistory.org

National Register of Historic Places. (2009, October 21). Retrieved October 21, 2009, from National Park Service: http://nrhp.focus.nps.gov

Nelson, T. (2009, October 29). Mesa County Endangered Species Habitat Map. Grand Junction, CO, USA.

NWS. (2008, October 16). *National Weather Service, Lightning Safety*. Retrieved September 25, 2009, from National Weather Service: http://www.lightningsafety.noaa.gov

Paul, D. (2009, November 4). Fire Mitigation Specilist, Bureau of Land Management. Grand Junction, CO, USA.

Reekie, D. (2009, September 15). Grand Junction Fire Department. Grand Junction, Co, USA.

Subcommittee, E. (1999, November 15). *Colorado Earthquake Information*. Retrieved September 14, 2009, from Colorado Geological Survey: http://geosurvey.state.co.us

Summit County, A. (2008). *Summit County Multi-Hazard Mitigation Plan.* Summit County.

Survey, C. G. (2004, November 24). *DeBeque Canyon Landslide*. Retrieved September 14, 2009, from Colorado Geological Survey: http://geosurvey.state.co.us

Sylves, R. T. (2008, March 31). *Public Entity Risk Institute Presidential Disaster Declaration*. Retrieved September 14, 2009, from PERI Presidential Diaster Declaration Site: http://www.peripresdecusa.org/mainframe.htm

Tuffin, S. (2009). Mesa County Workforce Director. Grand Junction, CO, USA.

U.S. Census Bureau . (n.d.). Retrieved October 9, 2009, from U.S. Census Bureau: http://www.census.gov

University of Nebraska Lincoln. (2009). *About National Drought Mitigation Center*. Retrieved September 14, 2009, from National Drought Mitigation Center: http://drought.unl.edu/index.htm

Welcome, Town of Palisade. (n.d.). Retrieved October 29, 2009, from Town of Palisade: http://www.townofpalisade.org

THIS PAGE LEFT BLANK INTENTIONALLY