

## **RESOLUTION NO. 95-04**

### **A RESOLUTION ADOPTING THE MESA COUNTY, COLORADO PRE-DISASTER 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 Pre-Disaster 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, Pre-Disaster Mitigation Plan which identifies, as best as can be 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 Pre-Disaster Mitigation Plan;

WHEREAS, this Pre-Disaster 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 Pre-Disaster 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 Pre-Disaster 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 Pre-Disaster Mitigation Plan dated September 2004, 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 Pre-Disaster Mitigation Plan.
3. To assist with implementation of the goals of the Pre-Disaster 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 Pres-Disaster Mitigation Plan.
6. The City of Grand Junction urges the other plan participants to adopt and carry out the Mesa County, Colorado Pre-Disaster Mitigation Plan.

PASSED THIS 6<sup>TH</sup> DAY OF OCTOBER, 2004.

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

Attest:

/s/ Stephanie Tuin  
Stephanie Tuin  
City Clerk

MESA COUNTY  
COLORADO  
PRE-DISASTER  
MITIGATION PLAN

PREPARED BY:  
MESA COUNTY EMERGENCY MANAGEMENT  
SEPTEMBER 2004

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## **Purpose of Plan**

The purpose of this plan is to fulfill local Hazard Mitigation Plan requirements. The plan will identify hazards; establish community goals and objectives and select mitigation activities that are appropriate for Mesa County.

The disaster mitigation act of 2000 (DMA 2000), Section 322 (a-d) requires that local governments, as a condition of receiving federal disaster mitigation funds, have a mitigation plan that describes the process for identifying hazards, risks and vulnerabilities, identify and prioritize mitigation actions, encourage the development of local mitigation and provide technical support for those efforts.

The purpose of this plan is to produce a program of activities that will best tackle Mesa County's potential hazards and meet other community needs. Consistent with FEMA planning process guidelines, the purpose of this plan is to accomplish the following objectives:

- Ensure that all possible activities are reviewed and implemented so that disaster related hazards are addressed by the most appropriate and efficient solution;
- Link hazard management policies to specific activities;
- Educate residents about potential hazards that threaten the community, including but not limited to flood, wildfire, drought, extreme weather conditions, and hazardous materials spills;
- Build public and political support for projects that correct existing problems and prevent new problems from known hazards to reduce future losses;
- Fulfill planning requirements for future hazard mitigation project grants; and,
- Facilitate implementation of hazard mitigation management activities through an action plan.

The intent of the Pre-Disaster Mitigation (PDM) Plan is to re-direct a portion of available emergency management resources to preventing potential losses as opposed to recovering from actual losses. Engaging local officials and citizenry in the PDM planning process will focus their attention on and increase their awareness of preventative measures.

## **Planning Process**

The planning process used for the development and updating of the Mesa County Pre-Disaster Mitigation Plan, consists of the following tasks:

### **1. Public Involvement**

The Mesa County Pre-Disaster Mitigation Plan has been posted on the Mesa County Emergency Management web page for public review. It is also available

in hard copy upon request at the Mesa County Emergency Management Department. An open house was held to gather public input on this plan at the Mesa County Courthouse.

2. Coordination with other agencies or organizations

The Mesa County Emergency Management Department was responsible for coordinating with other agencies and organizations in the planning process of this pre-disaster mitigation plan. Several organizations assisted with gathering and submitting information for this plan. These organizations have also participated in reviewing this plan and provided comments to the Mesa County Emergency Management Department. The following municipalities and communities include; DeBeque, Mesa, Molina, Collbran, Palisade, Clifton, Grand Junction, Fruita, Loma, Mack, Orchard Mesa, Glade Park, Whitewater and Gateway and Mesa County. Other entities include; National Weather Service, Mesa County Incident Management Group, Mesa County Local Emergency Planning Committee (LEPC), Excel Energy, Grand Valley Power, Mesa County Interagency Fire Advisory Board, and Grand Valley Municipal Separate Storm Sewer System Permitted entities.

3. Hazard area inventory

With the assistance of the Mesa County GIS Department and the National Weather Service, we have been able to map out the hazard area based on historical information.

4. Hazard identification

Hazard identification and risk assessment determined wildfire, flooding and drought to be the highest hazards for Mesa County based on historical occurrences.

5. Review and analysis of possible mitigation activities

The Mesa County Emergency Management Department completed the review and analysis for possible mitigation activities.

6. Local adoption following a public hearing

Mesa County, City of Grand Junction, Town of DeBeque, Town of Collbran, Town of Palisade, and City of Fruita have adopted this plan as detailed in the attached Resolutions.

7. Periodic review and update

This hazard mitigation plan contains a list of potential projects and a brief rationale or explanation of how each project or group of projects contributes to the overall mitigation strategy outline in this plan.

We identified a number of hazards in Mesa County through historical records and information. This plan summarizes the activities outlined above to assess the effects of flooding, wildfire, drought and other hazards in Mesa County, and recommends mitigation activities.

The Mitigation Plan will be evaluated and updated every five years. In addition, the plan will be updated as appropriate when a disaster occurs that significantly affects Mesa County, whether or not it receives a Presidential Declaration. The update will be completed as soon as possible, but no later than the 12 months following the date the disaster occurs.

Routine maintenance of the plan will include adding projects, as new funding sources become available or taking projects off the list when they are accomplished.

## **Mesa County Profile**

### **Introduction**

Mesa County lies on the Western border of Colorado and covers 3,309 square miles. It consists of the City of Grand Junction (32.72 sq mi), the City of Fruita (6.02 sq mi), and the towns of Palisade (1.04 sq mi), Collbran (.48 sq mi), and DeBeque (.31 sq mi). Mesa County was incorporated on February 11, 1883. The percentage of public lands in Mesa County is 71% and has an estimated 2003 population of 124,086. There are 3268.43 sq miles of unincorporated area throughout the county. Grand Junction is the largest city between Salt Lake City, Utah and Denver, Colorado; therefore, it serves as a regional hub for services, entertainment, shopping, education, and medical technologies.

### **Attractions**

Mesa County has many natural features that make it an attractive place to visit and live; some of which include;

- The Colorado National Monument, a beautiful geological display of towering red sandstone monoliths set against deep, sheer walled canyons which are dotted throughout the over 20 thousand acres of the park.
- The Colorado Canyons National Conservation Area is a collection of wilderness areas consisting of high desert terrain, unique sandstone formations, canyons, river valleys, dinosaur quarries, and other sites of paleontological significance.
- The Grand Mesa National Forest (The Mesa) is one of the world's largest flat top mountains. It is dotted with over 300 alpine lakes and reservoirs providing excellent fishing. With an average elevation of 10,000 feet, the

Grand Mesa affords excellent vistas of the Grand Valley below and the San Juan range to the southeast.

- Mount Garfield, Bookcliffs and Roan Plateau rise 2,000 feet above the valley floor, at an elevation of 6,000 to 7,000 feet. The Bookcliffs stretch 180 miles to Price, Utah; making them the longest east to west mountain range in the United States.
- The Colorado and Gunnison Rivers offer excellent recreational opportunities including fishing, rafting, and kayaking. There is also an extensive riverfront trail system along the Colorado River for use by hikers and bicyclists.

### **Major Highways**

The major highways crossing Mesa County are U.S. Highway 6 & 50, which runs west to east from the Utah state border to the Delta County line. U.S. Highway 139 which runs north to Rio Blanco County, U.S. Highway 141 which runs south through the Gateway-Unaweep Canyon, and Interstate 70 which is a major transportation route running west to east across Mesa County.

### **Airport**

The major airport within the County is Walker Field Airport located in Grand Junction, Colorado. Walker Field hosts a 70,000 square foot terminal. It is also home to a fixed base operation providing fueling and maintenance on numerous aviation aircraft.

### **Population**

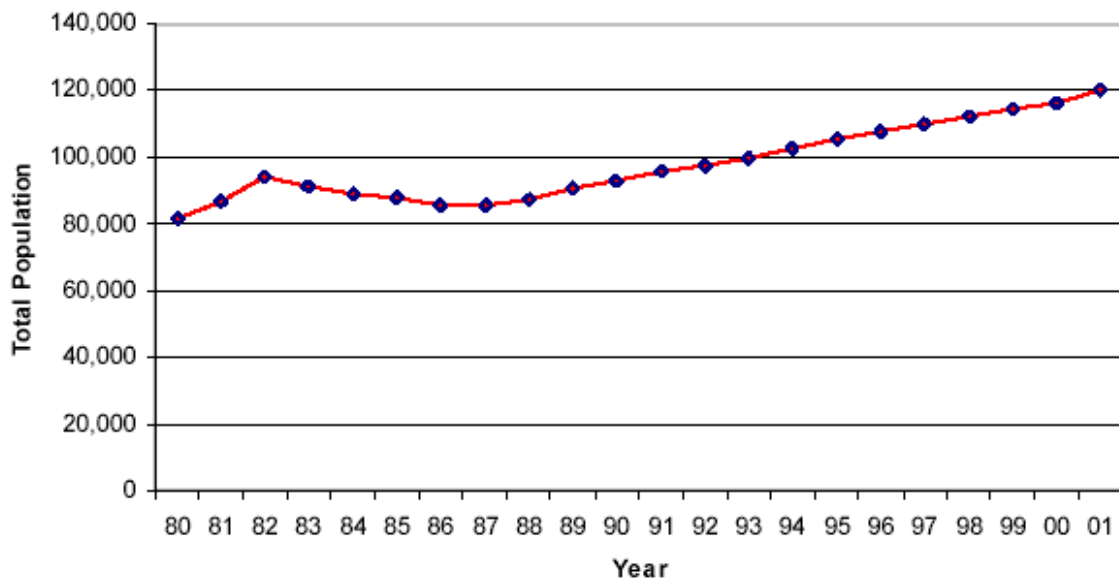
From 1990 to 2000 Mesa County's population grew by 24.8%, putting it in the top 10% of counties nationwide in terms of population change. The Colorado Department of Local Affairs projects that Mesa County's population will grow to 141,176 by 2010 (20.7% growth from 2000) and 194,075 by 2025 (65.9% growth from 2000). Population growth is transforming Mesa County from a rural to an urban community.

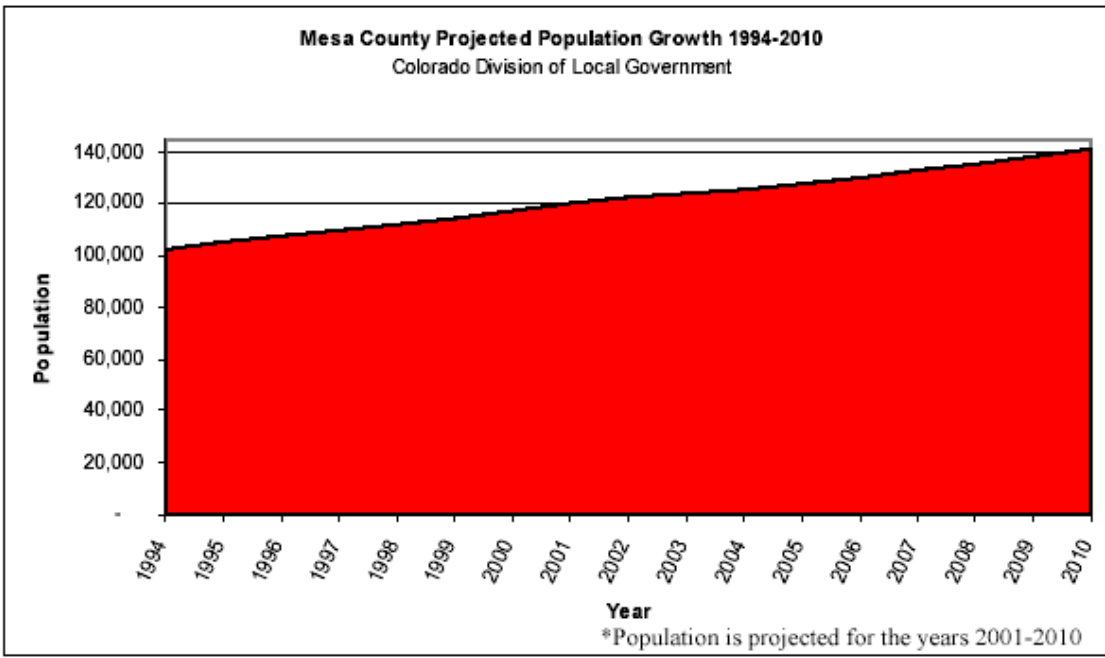


**Mesa County Population Growth by Area (1999-2000)**

County Area	1990 Population	2000 Population	Percent Change
Grand Junction City	29,034	41,986	44.6
Clifton Area	12,671	17,345	36.9
Redlands Area	9,355	8,035	-14.0
Fruitvale Area	5,222	6,936	32.8
Fruita City	4,045	6,478	60.1
Orchard Mesa Area	5,977	6,456	8.01
Palisade Town	1,871	2,579	37.8
De Beque Town	257	451	75.4
Collbran Town	228	388	70.2
Unincorporated Areas	24,485	25,593	4.52
<b>Mesa County</b>	<b>93,145</b>	<b>116,255</b>	<b>24.8</b>

**Mesa County Population Growth 1980-2001**



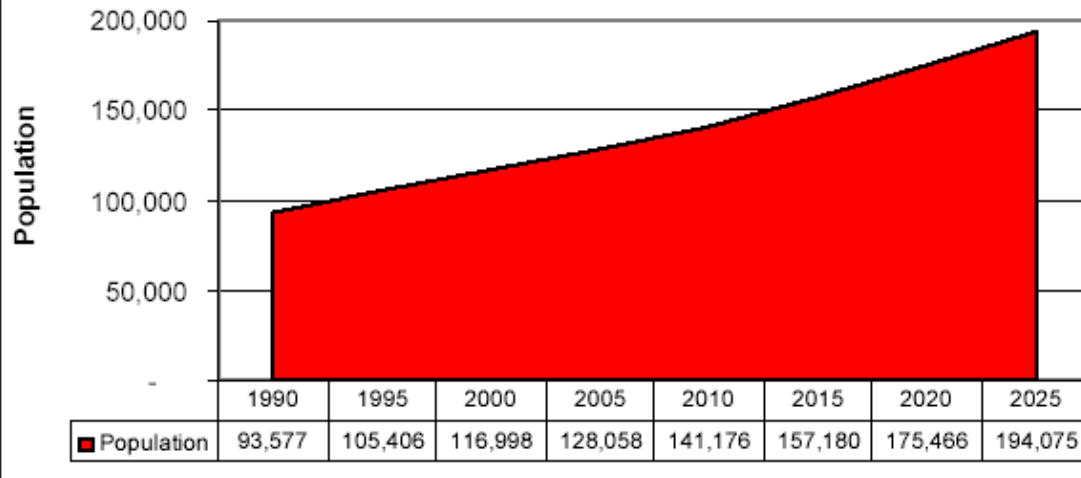


**Mesa County Projected Population Growth**  
(Colorado Department of Local Affairs)

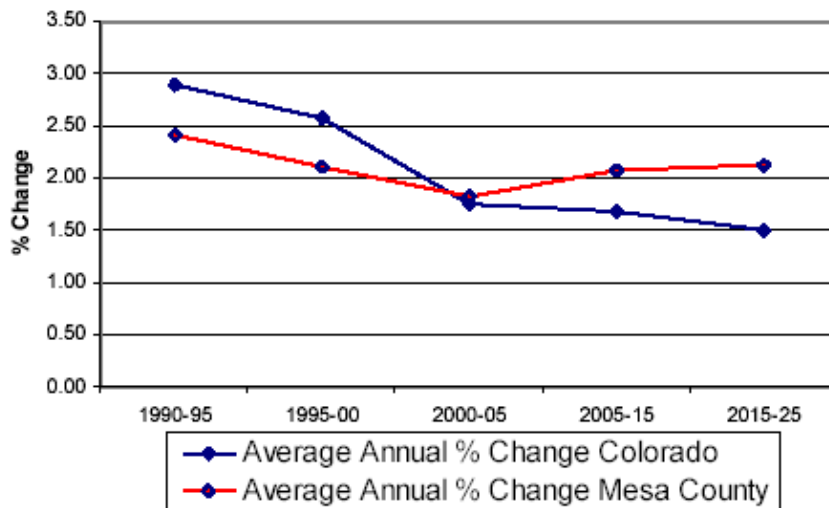
Year	Population	%change	Population Change
1994	102,757		
1995	105,412	2.58%	2,655
1996	107,536	2.01%	2,124
1997	109,762	2.07%	2,226
1998	112,335	2.34%	2,573
1999	114,570	1.99%	2,235
2000	116,992	2.11%	2,422
2001	119,975	2.55%	2,983
2002	122,349	1.98%	2,374
2003	124,086	1.42%	1,737
2004	125,895	1.46%	1,809
2005	128,057	1.72%	2,162
2006	130,378	1.81%	2,321
2007	132,911	1.94%	2,533
2008	135,558	1.99%	2,647
2009	138,311	2.03%	2,753
2010	141,176	2.07%	2,865

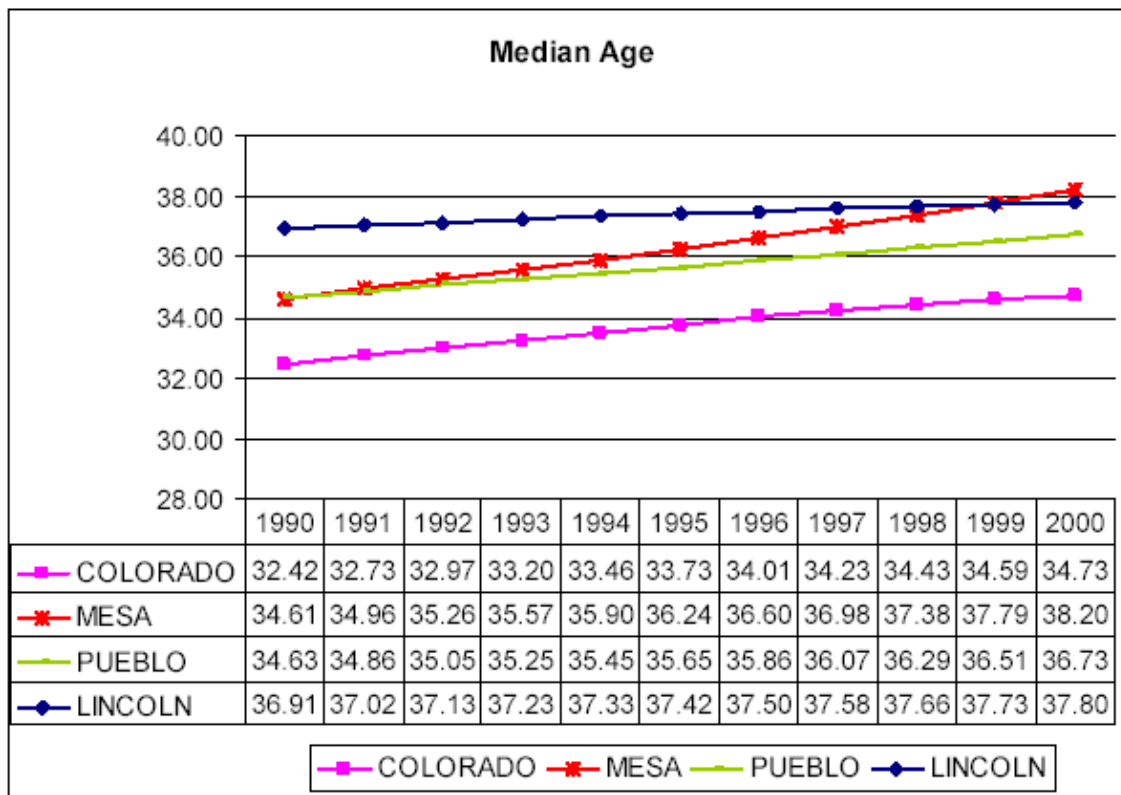
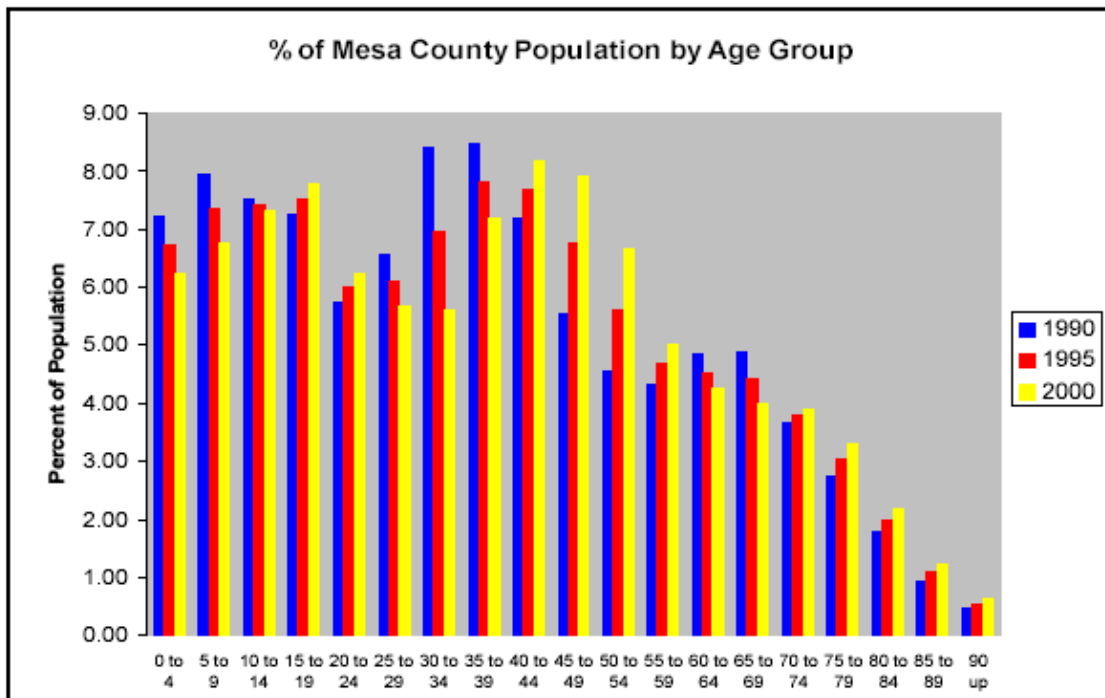
Information from Colorado Department of Local Affairs

**POPULATION PROJECTIONS FOR MESA COUNTY  
1990-2025**  
(Colorado Department of Local Affairs)



**Projected Average Annual % Population Change**





## Economy

**Mesa County Economic Base Analysis (2000)**

<b>Industry</b>	<b>Basic Income (1000)</b>	<b>Percent of Basic</b>	<b>Basic Em- ployment</b>	<b>Percent of Basic</b>
Agribusiness	\$33,132	2.4	3,610	9.0
Mining and Extractive	\$26,043	1.9	533	1.3
Regional Goods Service	\$364,281	26.8	13,767	34.4
Manufacturing	\$135,301	10.0	4,116	10.3
Trans/Comm/Utilities	\$84,474	6.2	2,042	5.1
Tourism	\$101,477	7.5	5,399	13.5
Government	\$71,615	5.3	1,129	2.8
Retirees	\$367,629	27.0	9,391	23.5
Other Income	\$175,703	12.9		
<b>Total Basic</b>	<b>\$1,359,656</b>		<b>39,988</b>	
<b>All Income</b>	<b>\$2,828,223</b>		<b>71,509</b>	

The ability of a regional economy to sustain growth in total product depends in part on the performance of its basic industries. A business firm or industry sector that is totally or partially export driven is one that some or all portions of its output (goods or services) are sold to purchasing units outside the local economy. These activities are considered "basic" to an area's economy because they bring in money from outside.

**Ranking of Percentage Changes in Employment 1990-2000**

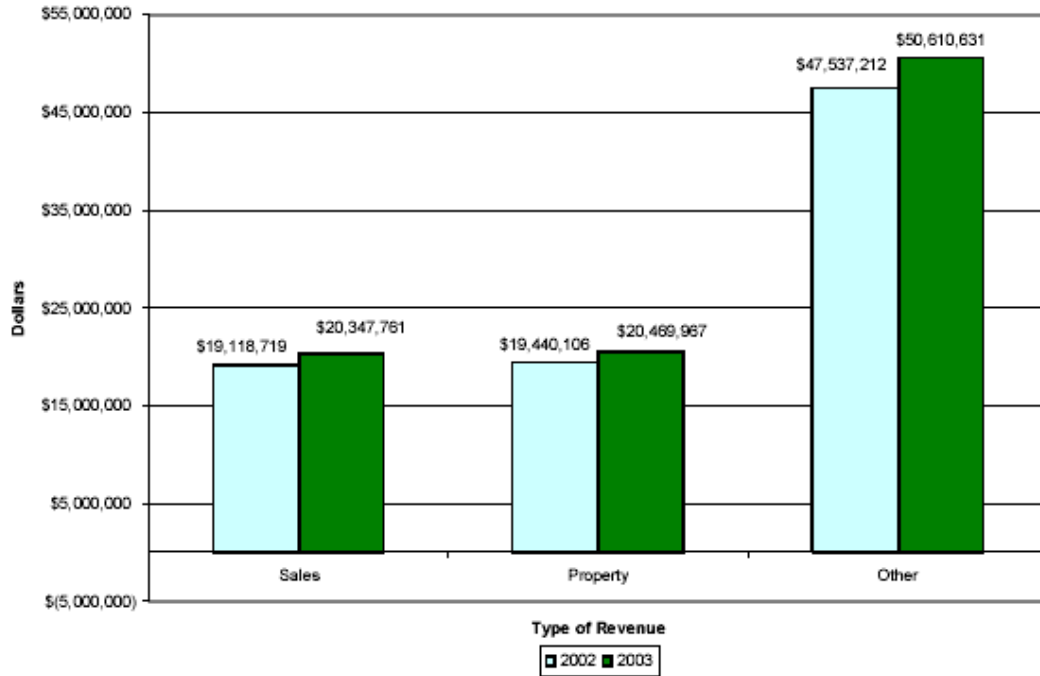
<b>Economic Sector</b>	<b>Percent Change 1991-2000</b>	<b>Annual Percentage Change</b>
Construction	116.3	12.9
Finance-Insurance-Real Estate	56.7	6.3
Services	43.1	4.8
Wholesale and Retail Trade	41.2	4.6
Agriculture	31.4	3.5
Manufacturing	28.7	2.8
Transportation-Communication	25.6	2.8
Government	25.2	2.8
Mining and Extractive	-37.1	-4.1
<b>Total Employment</b>	<b>41.2</b>	<b>4.6</b>

**Housing**

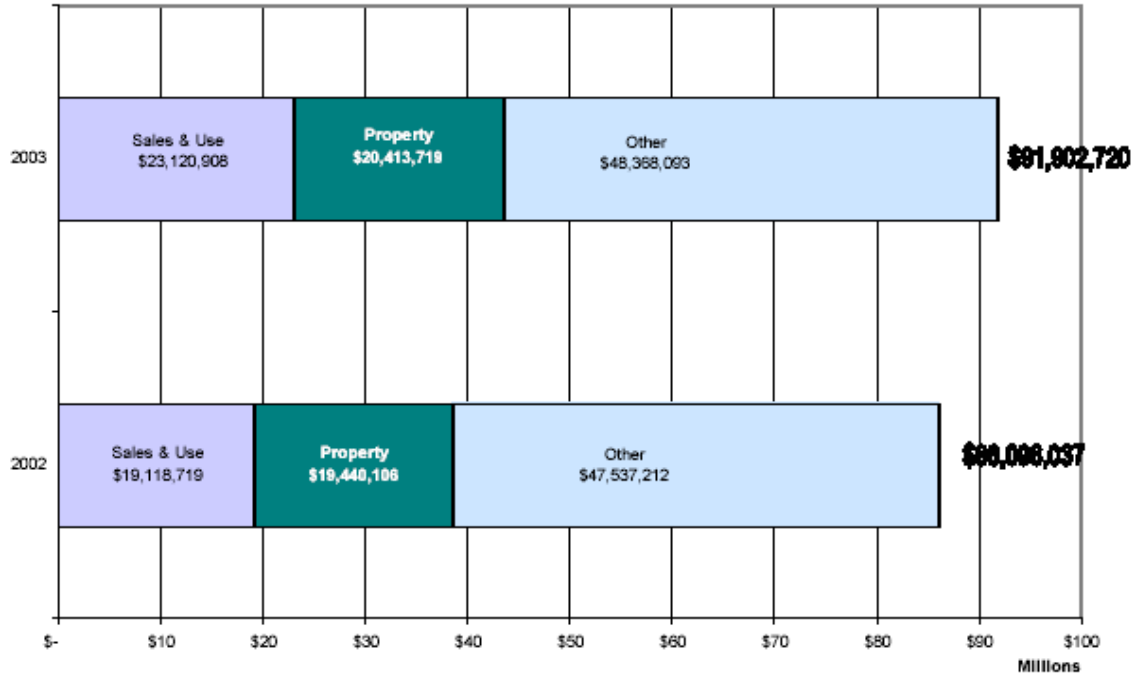
*Estimated Gap in Affordable Housing Resources*

<b>Need and Resources</b>	<b>Very Low Income</b>	<b>Low Income</b>	<b>Totals</b>
<b>Grand Junction</b>			
NEED: Households in Poverty	6,232	1,598	7,830
RESOURCES: Subsidized Housing Units	1,437	78	1,515
<b>GAP: Poverty Households Without Assisted Housing</b>	<b>4,795</b>	<b>1,520</b>	<b>6,315</b>
<b>Mesa County</b>			
NEED: Households In Poverty	2,352	638	2,990
RESOURCES: Subsidized Housing Units	442	0	442
GAP: Poverty Households Without Assisted Housing	1,910	2,158	8,863
<b>GAP: All Mesa County</b>	<b>6,705</b>	<b>2,158</b>	<b>8,863</b>

### Revenue Change from 2002 to 2003



### Revenue Projections from 2002 - 2003



## Hazard Identification

To further refine the list of natural and technical hazards that have occurred within Mesa County, the planning committee considered the results of a risk assessment survey, completed by county emergency management department and county GIS personnel.

The risk assessment survey is an analysis using probability and potential impacts for hazards posing the greatest possible risk to our jurisdiction. Risk assessment is the process of measuring the potential loss of life, personal injury, economic injury, and property damage resulting from hazards (FEMA, 2001). This is done by assessing the likelihood of hazard occurrence and the potential vulnerability of people, buildings, and infrastructure to the natural hazard in question. While there are many different natural hazards that could potentially affect our jurisdiction, some hazards are more likely to cause significant impacts and damages than others.

**Probability** – This parameter addresses the probability that a potential hazard will affect our jurisdiction. Hazard probabilities were classified into one of four distinct categories by estimating the hazard’s average annual frequency, which is the probability of a specific hazard event occurring in your jurisdiction in a given year. (Unlikely=2, Possible=4, Likely=6, Highly likely=8)

**Affected Area** – This parameter is the first of three impact parameters, and addresses the potentially affected geographic area within our jurisdiction should a hazard event occur. (Isolated=.8, Small=1.6, Medium=2.4, Large=3.2)

**Primary Impact** – This second impact parameter addresses the potential direct damages to buildings, facilities, and individuals should a hazard event occur. Primary impacts are classified by estimating the type and amount of casualties and the damage to buildings or facilities from a given hazard. (Minor=.7, Limited=1.4, Critical=2.1, Catastrophic=2.8)

**Secondary Impact** – This third impact parameter addresses the potential secondary impacts on our jurisdiction should a hazard event occur. Note that while primary impacts are a direct result of the hazard, secondary impacts can only arise subsequent to a primary impact. Examples of secondary impacts include loss of building or facility services (functional downtime), power outages, road closures, debris removal, and mass evacuation of residents. (Negligible=.5, Limited=1.0, Moderate=1.5, High=2.0)

In order to quantify these hazard parameters, the following formula was developed to assign a value for probability and impact for each of the hazards considered.

$$\text{Total Score} = \text{Probability} \times \text{Impacts} = P \times (\text{AA} + \text{PI} + \text{SI})$$

$$\text{Where: Probability} = (\text{Probability Score})$$

$$\text{Impacts} = (\text{Affected Area} + \text{Primary Impact} + \text{Secondary Impact})$$



The hazard levels are broken down into four distinct categories that represent the likelihood of a hazard event of that type significantly impacting our jurisdiction: High, Medium-High, Medium, and Low. This is not meant to be a scientific process, but it may serve as a way to prioritize mitigation measures based on the potential frequency and likely extent of damage from hazards known to affect a community.

Hazard Type	Probability (P)	Affected Area Impact (AA)	Primary Impact (PI)	Secondary Impacts (SI)	Total Score	Hazard Level
Winter Storm	6	2.4	0.7	1.5	27.6	M
Drought	6	3.2	2.1	1.5	40.8	H
Earthquake	2	2.4	2.1	1.5	13.6	M
Tornado	2	0.8	0.7	1.5	18.0	M
Wind Storms	6	2.4	0.7	1.0	24.6	M
Flood	6	3.2	1.4	2.0	39.6	H
Fire	6	3.2	1.4	2.0	39.6	H
Landslide/Rock fall	8	0.8	0.7	1.0	20.0	M
Avalanche	8	0.8	0.7	0.5	16.0	M
Lightning	8	0.8	0.7	0.5	16.0	M
Hail Storms	6	2.4	1.4	1.5	31.8	M
Expansive Soils	6	0.8	0.7	0.5	12.0	L
Subsidence	6	0.8	0.7	0.5	12.0	L
Extreme Heat	8	3.2	0.7	1.0	39.2	M

## Identified Hazards

### Floods

Floods present a risk to life and property, including buildings, their contents, and their use. Floods can affect crops and livestock. Floods can also affect lifeline utilities (water, gas, sewer, and power), transportation, jobs, tourism, the environment, and the local and regional economies.

However, floods are also unique, for floods are the only hazard addressed in this plan that are repetitive, not only in their nature, but in their location – floodplains. Floods have an annual probability of occurrence, have a known magnitude, depth and velocity for each event, and in most cases, have a map indication where they will occur. Thus, in many ways, floods are often the most predictable and manageable hazard.

Floods have occurred frequently throughout Mesa County and are considered a high mitigation priority. They have caused enormous damage – often uninsured and un-reimbursed. Floods will continue to occur. As with most hazards, impacts and losses can be anticipated and reduced, but nothing will keep the event from occurring again.

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 principal 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. Major floods on the other creeks, washes, and small streams in the study area, especially those with much of their drainage basin below an elevation of 8,000 feet, are most often caused by cloudburst storms resulting in “flash floods”.

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 hasten 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. Flooding is more severe when antecedent rainfall has resulted in saturated ground conditions or when the ground is frozen and infiltration is minimal. Flash floods characteristically have high peak flows, high velocities, short duration, and small volumes of runoff. **(Flood Insurance Study, Mesa County Colorado Unincorporated Areas, FEMA, Revised July 15, 1992)**  
**Severe Winter Storms and Blizzards**

Severe winter storms are characterized by high winds, heavy snowfall, and freezing or sub-zero temperatures. Winter storms are occasionally severe enough to overwhelm snow removal efforts, transportation, livestock management, and business and commercial activities. Heavy snow can bring a community to a standstill by inhibiting transportation, knocking down utility lines, and by causing structural collapse in buildings not designed to withstand the weight of the snow.

The principal public health and safety problems are power outages, stranded motorists, road closures, and limited capabilities to respond to citizen calls for emergency services. Technically, the National Weather Service defines the following winter storm characteristics as follows:

- **Blizzard:** Winds of 35 mph or more along with considerable falling and/or blowing snow, reducing visibility to less than one-quarter mile for three or more hours. Extremely cold temperatures often are associated with dangerous blizzard conditions, but are not a formal part of the definition. The hazard created by the combination of snow, wind and low visibility significantly increases, however, with temperatures below 20 degrees.
- **Heavy Snow:** Means six inches or more in 24 hours for the valleys in Mesa County. For the Mountains in Mesa County, this means 12 inches or more in 24 hours.
- **Ice Storms:** A damaging accumulation of ice accepted during a freezing rain situation. Significant accumulations of ice are defined as one-quarter inch or greater. This can cause trees and power lines to fall down causing loss of power and communication.

Avalanches are also associated with severe winter storms. In the upper elevations of Mesa County, avalanches are either caused by mother nature or are triggered by outdoor enthusiasts.

Note: Lives and property can be threatened indirectly by winter weather criteria lower than the definitions for blizzards and heavy snow. For example, many vehicle accidents occur on snow packed roads where neither a blizzard is occurring nor heavy snowfall has occurred.

## **Drought**

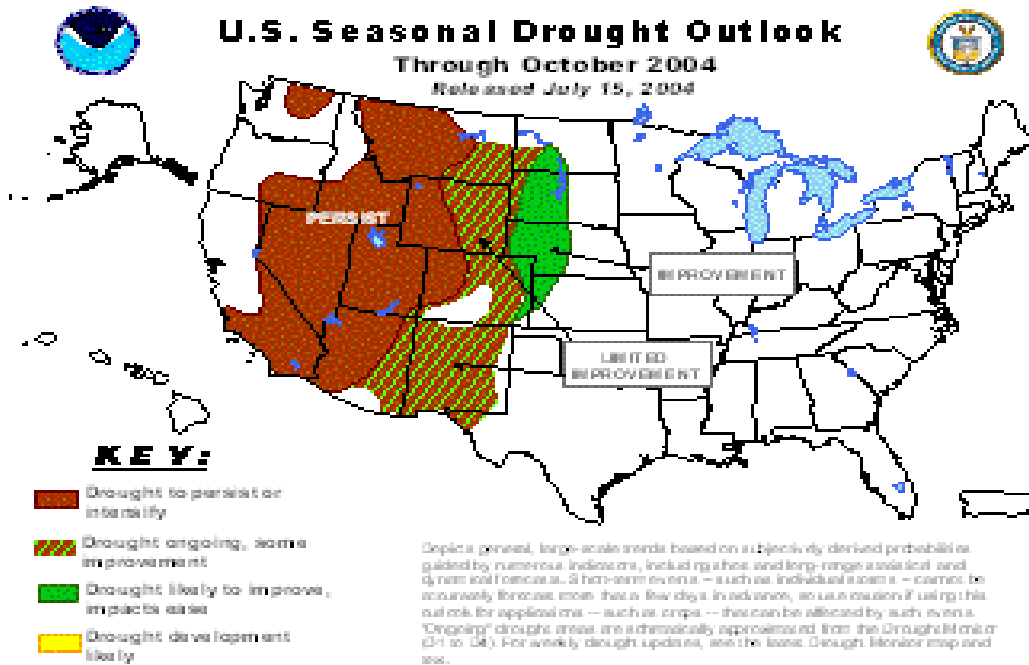
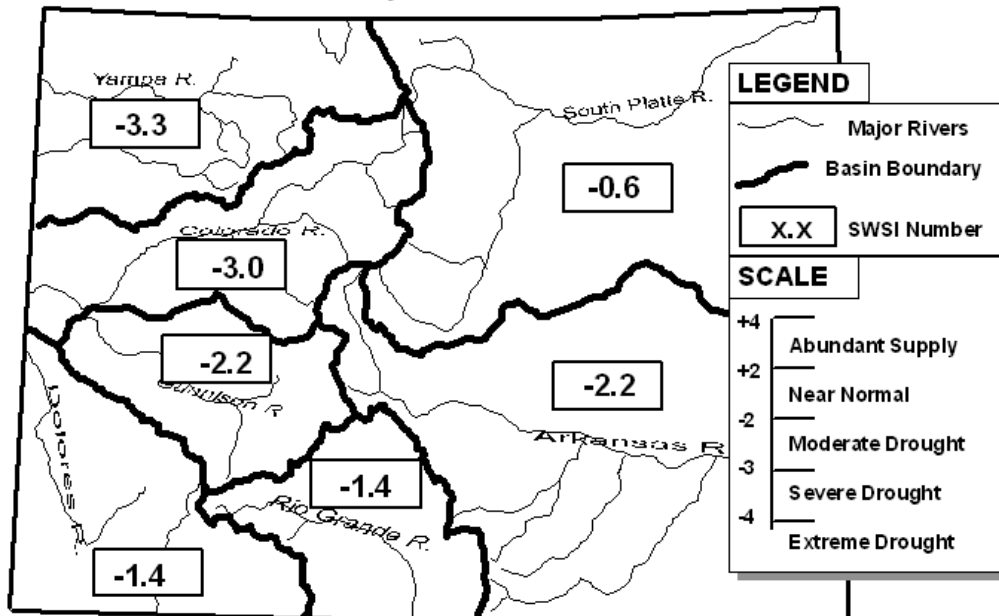
Drought has many definitions, even within the State of Colorado. They include:

- A natural yet unpredictable occurrence in Colorado; an extended period of dry weather, exp. One injurious to crops. (Colorado Drought Mitigation Plan)
- A period of insufficient snow pack and reservoir storage to provide adequate water to urban and rural areas. (Colorado Climate Center @ CSU, from 2003 Drought Impact and Mitigation Report)
- **Meteorological:** Based on degree of dryness; actual precipitation is less than expected average or normal amount. **Hydrologic:** Based on precipitation shortfall effects on stream flows and reservoir, lake and ground water levels.
- A National Weather Service definition of drought is, "a moisture deficit bad enough to have a social, environmental or economic impact".

Mesa County has experienced a multi-year drought since 1999. At the start of 2004, Colorado was beginning its fifth consecutive year of below normal precipitation.

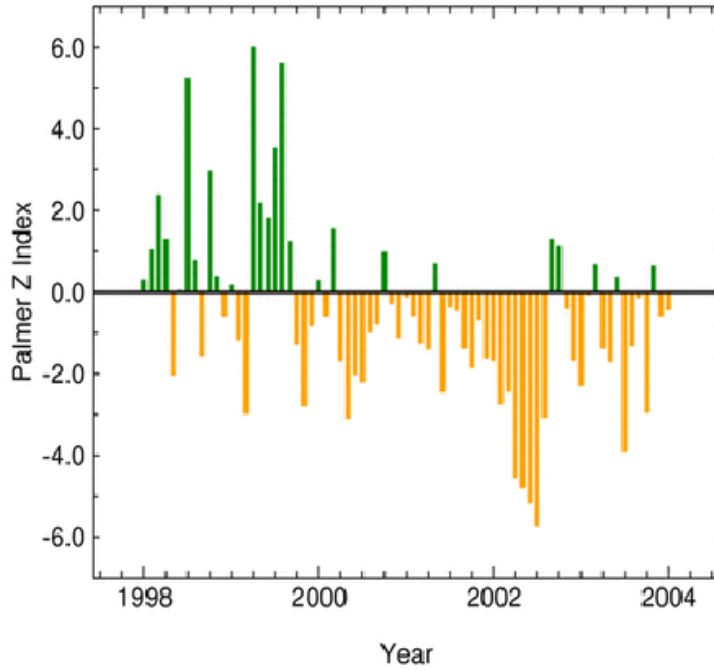
# SURFACE WATER SUPPLY INDEX

July 1, 2004



## Colorado Statewide Z Index\*

January 1998 - January 2004



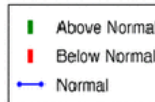
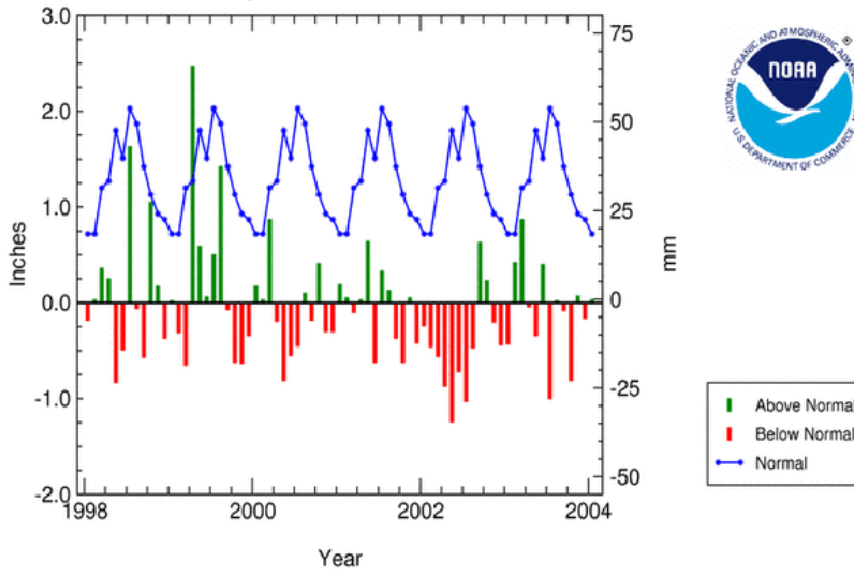
\*Palmer Z Index  
Short-Term Drought



National Climatic Data Center / NESDIS / NOAA

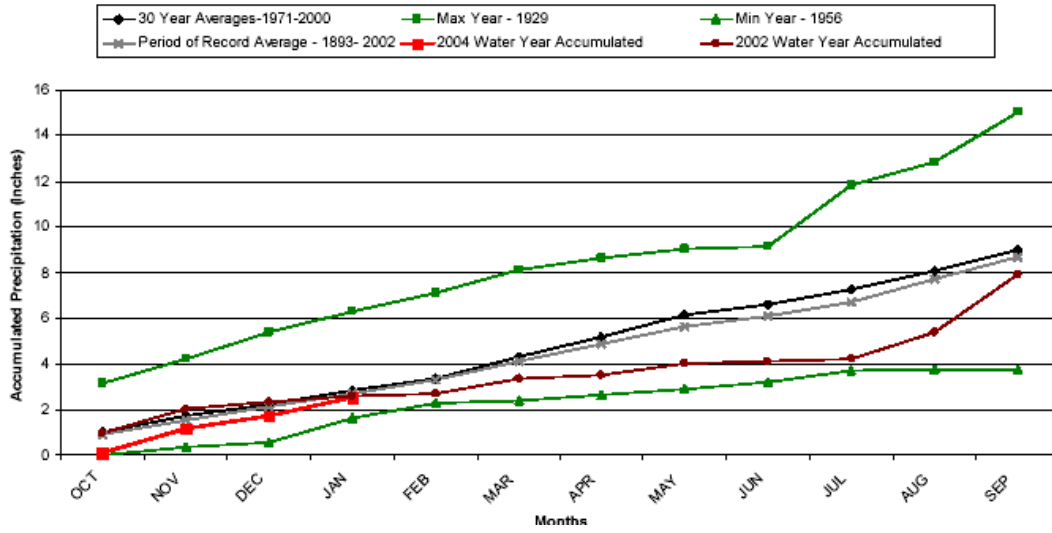
## Colorado Statewide Precipitation

Normal & Departure, Jan 1998 - Jan 2004

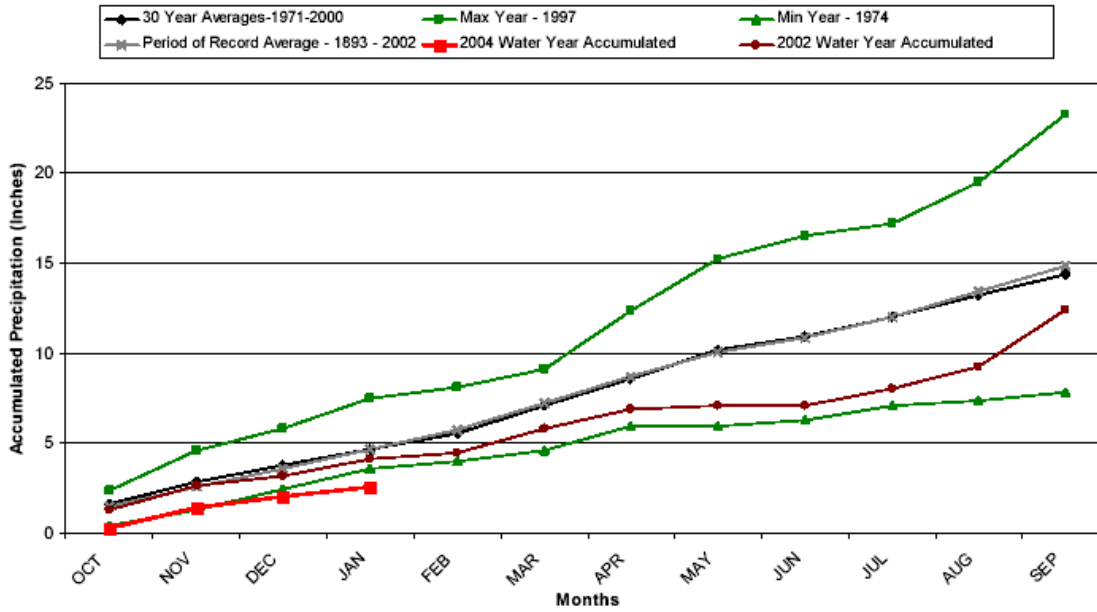


National Climatic Data Center / NESDIS / NOAA

### Grand Junction WSFO 2004 Water Year (through Oct '03 - Jan '04)



### Collbran 2SW 2004 Water Year (through Oct '03 - Jan '04)



## **Tornadoes**

A tornado is a violently rotating column of air extending from within a cloud down to ground level. The strongest tornadoes may sweep houses from their foundations, destroy brick buildings, toss cars and school buses through the air, and even lift railroad cars from their tracks. Tornadoes vary in diameter from ten to twenty feet to nearly a mile, with an average diameter of about 160 ft. Most tornadoes in the northern hemisphere create winds that blow counterclockwise around a center of extremely low atmospheric pressure. Peak wind speeds can range from near 75 mph to almost 300 mph. The forward motion of a tornado can range from a near standstill to almost 70 mph.

Although tornadoes are relatively rare anywhere in western Colorado, Mesa County is not exempt. Since 1988, there have been five officially documented tornadoes in Mesa County. There is no data about any tornadoes prior to 1988. It is interesting to note that the Grand Junction weather office officially became a forecast office in late 1995. Prior to that time, there was no weather spotter network in western Colorado. Therefore, it is highly likely that there were other tornadoes in Mesa County which were never reported to the National Weather Service.

In addition to the tornadoes, there have been dozens of funnel cloud sightings in Mesa County. The most recent was in early April 2004 when a well defined funnel cloud (possibly a tornado) developed above the Colorado National Monument. Video was shot of that event from a location in the Redlands. However, there is no confirmation that it actually touched down.

### Straight-line Winds from Thunderstorms

Straight-line thunderstorm winds include microbursts and outflow winds, with both types very common in Mesa County. Less common in Mesa County are strong winds generated by an intense line of thunderstorms, commonly referred to as derecho winds.

Straight-line thunderstorm winds can be as strong as F1 intensity (rotational) tornado winds, with speeds to just over 100 mph. These thunderstorm winds often produce damage to property, with estimated property damage well into the thousands of dollars range. The threat to lives from straight-line thunderstorm winds is mainly due to falling trees and wind blown objects.



FUNNEL CLOUD \* August 2, 1988

Over Glade Park



These pictures were provided by the NWS Grand Junction Office. These are pictures of the tornado that occurred on August 2, 1988 at approximately 1130 AM MDT. The above photos are courtesy of Bill LeBaron (top), taken from Fruita and Stan Christmas (bottom), taken from near Whitewater.

**Wind Storms/Other Wind Hazards**



Mesa County is subject to significant winds. Although these high winds may not be life threatening, they can disrupt daily activities, cause damage to buildings and structures and increase the potential of other hazards. Many locations in Mesa County have minimal vegetative ground cover and the high winds can create a large dust storm which becomes a hazard for travelers and a disruption of local services. In 2002 high winds caused a thirty car pile-up on Interstate 70 resulting in multiple injuries to travelers.

### **Hail and Severe Summer Storms**

Hail is formed when water droplets are thrown high into the upper atmosphere by the violent internal forces of thunderstorms. Mesa County can experience severe summer storms with occasional hail. Since 2000, there have been 24 reported storms with large hail in Mesa County, with a maximum diameter of 1 3/4" inches from two of the storms.

### **Earthquake**

Mesa County has historically experienced few earthquakes. The U.S. Geological Survey has rated Mesa County as having a low to moderate earthquake hazard (4%-16% g). No specific seismic risk study has ever been done in Mesa County and its rating by the USGS is part of a larger geographical assessment.

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 are associated with the Uncompahgre Uplift (Mesa, Montrose Counties) and the White River Uplift (Routt, Rio Blanco, and Garfield Counties). A magnitude 6.5 earthquake is capable of creating serious damage to local buildings and infrastructure.

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 risks associated with earthquakes in Mesa County.

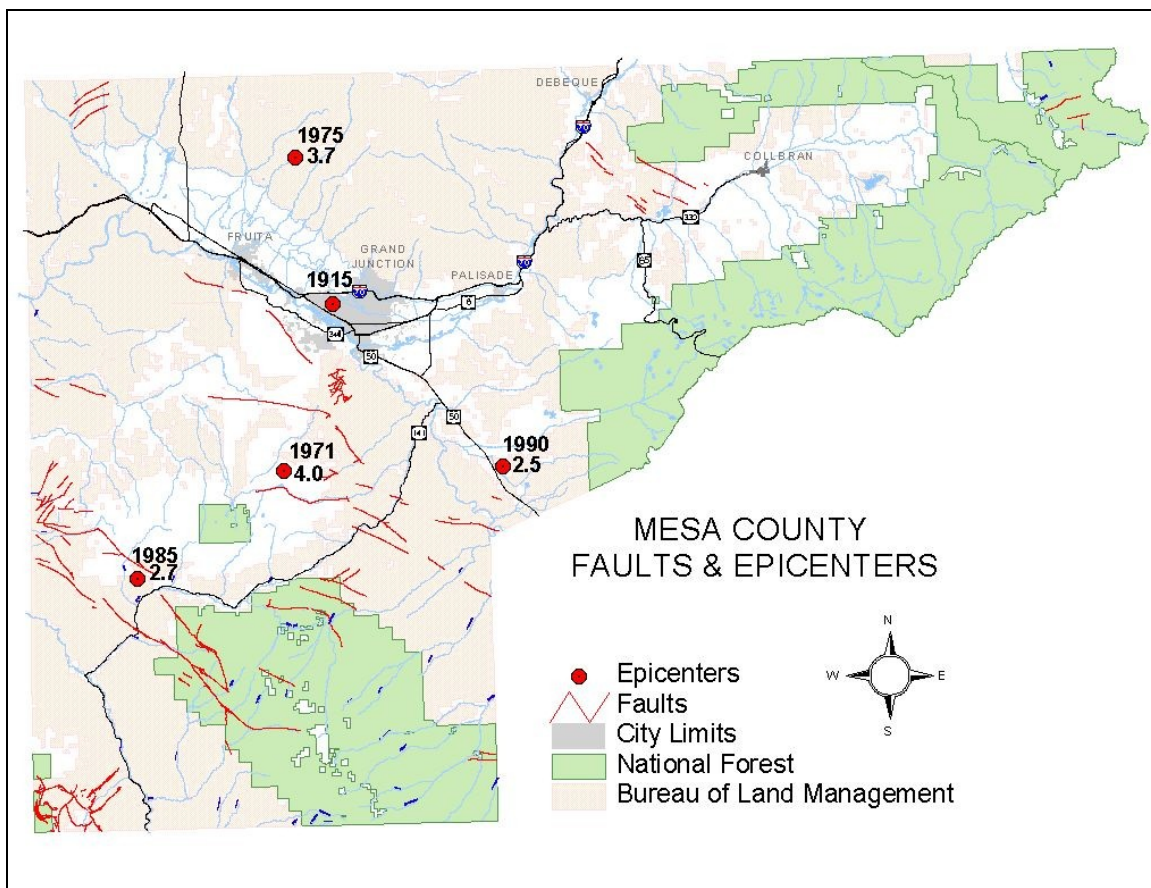
A basic understanding of earthquakes is needed to understand the potential risk of seismic events in Mesa County. Earthquakes are a result of movement along a fault as a result of stress. The subsequent ground motion is a result of a complex series of compressive and shear waves. These waves are responsible for the damage done to structures. The movement of a structure during an earthquake is reliant upon the soils on which it is built, as well as its harmonics. Unconsolidated sediments will have the effect of exaggerating ground motion, while solid rock and consolidated sediments will minimize ground motion.

The location of an earthquake is referred to as its epicenter. The epicenter is that point on the surface which lies directly above the focal point of the earthquake. The

focal point is that point on the fault plane at which the earthquake starts and may have a depth of up to 10 km on Continental interior faults.

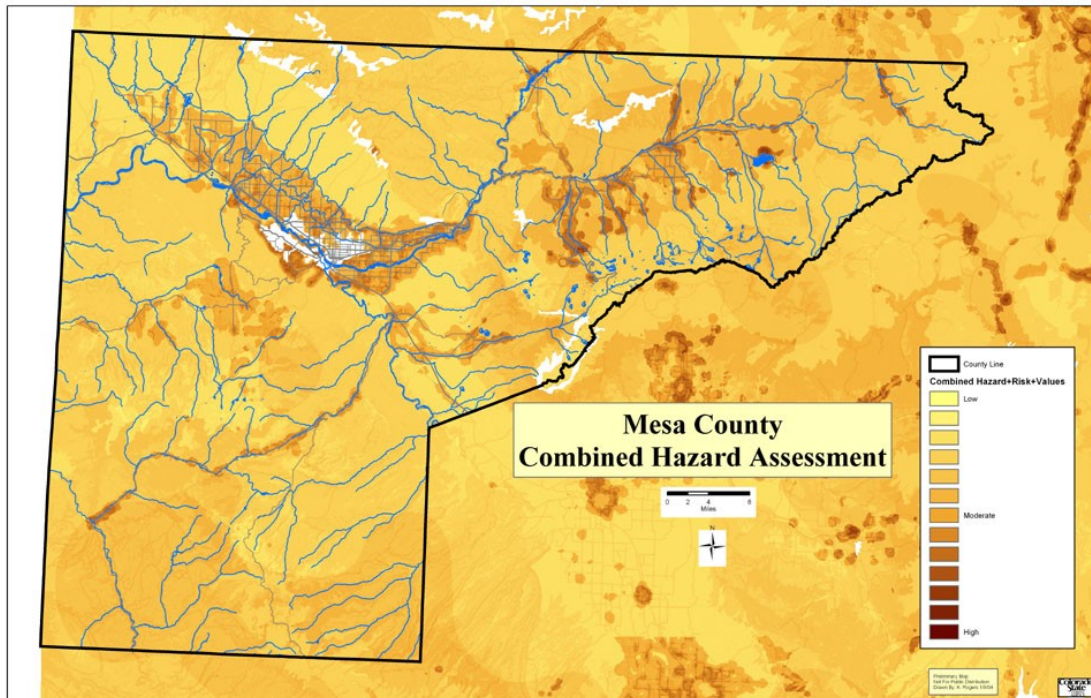
The size of an earthquake, reported as its magnitude, is reliant upon the amount of distance a fault moves during an earthquake. The magnitude is determined on a logarithmic scale. Thus, a magnitude 6.0 is 10 times larger than a 5.0, but 100 times larger than a 4.0. The size of the fault itself limits the maximum size of the earthquake. A maximum magnitude of about 6.5 is expected based on analysis of faults found in Western Colorado (CGS Kirkham and Rodgers, 1981).

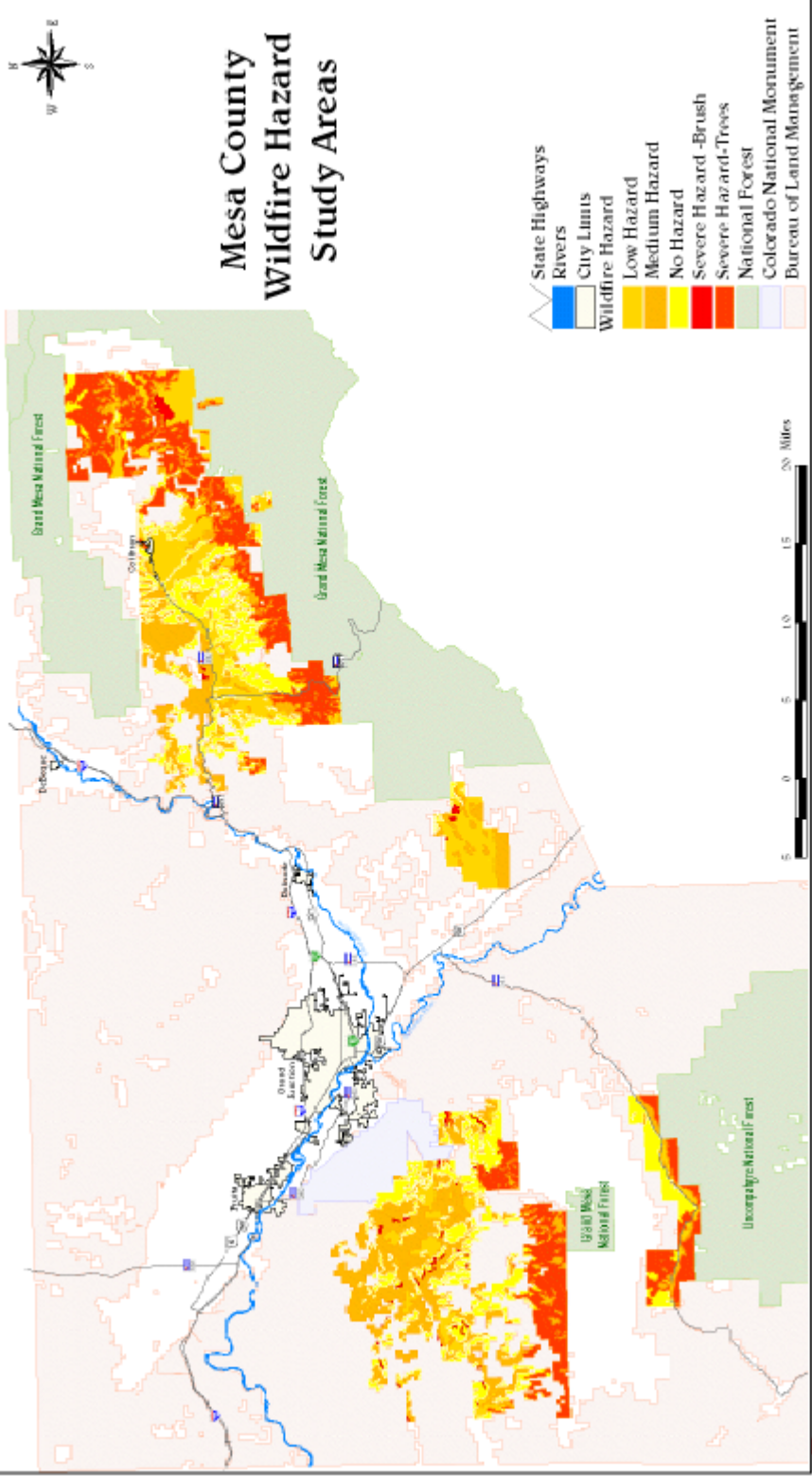
Distance from the epicenter profoundly affects the amount of ground motion to be expected. It would reason that the further from an earthquake's epicenter a city is located, the less damage is expected. There are a few factors however, which do not follow this rule. The most notable is the location of a city on unstable, unconsolidated sediments. These sediments have a tendency to exaggerate wave motion. Examples are Mexico City in 1985 and the Marina District of San Francisco in 1989. Both cities were built on unconsolidated sediments and suffered serious damage as a result of earthquakes having epicenters far from their region. (David G. Wolny, Adjunct Faculty, Mesa State College and Dr. Verner C. Johnson, Professor of Geology, Mesa State College)

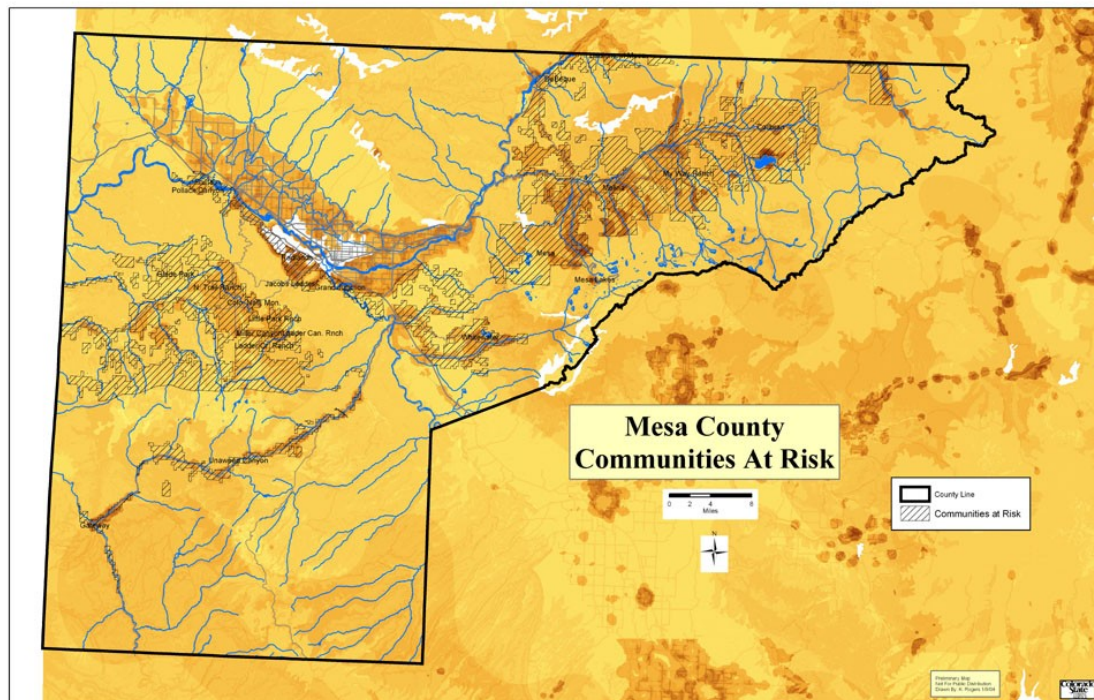
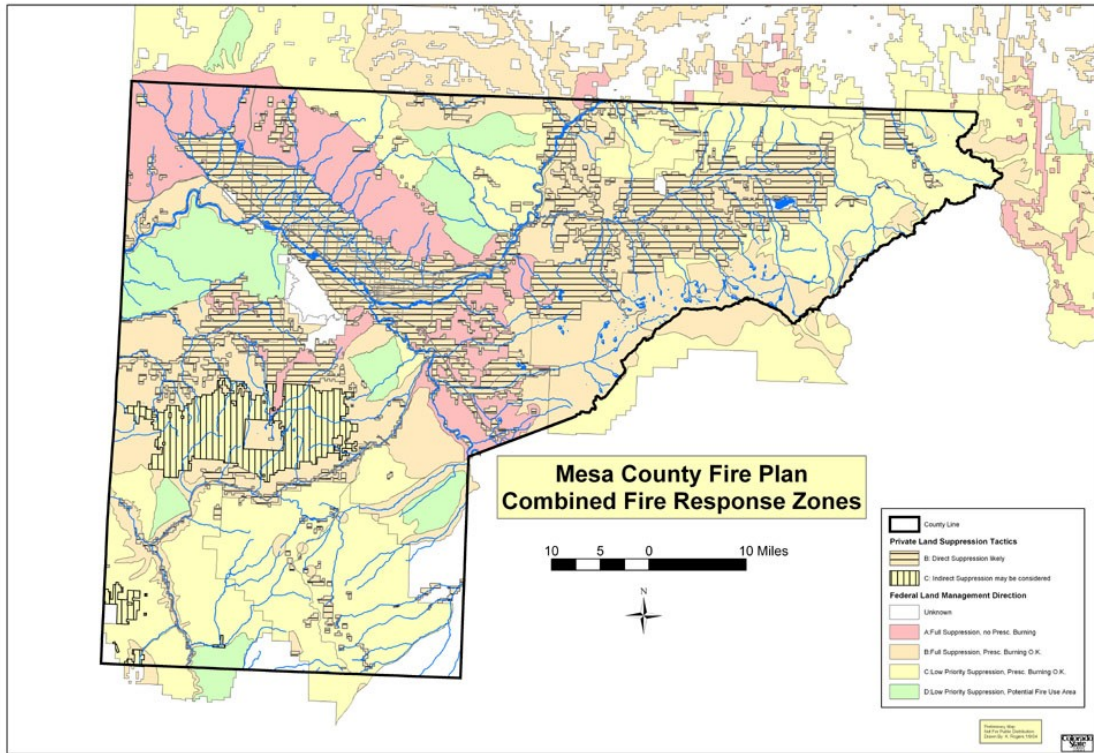


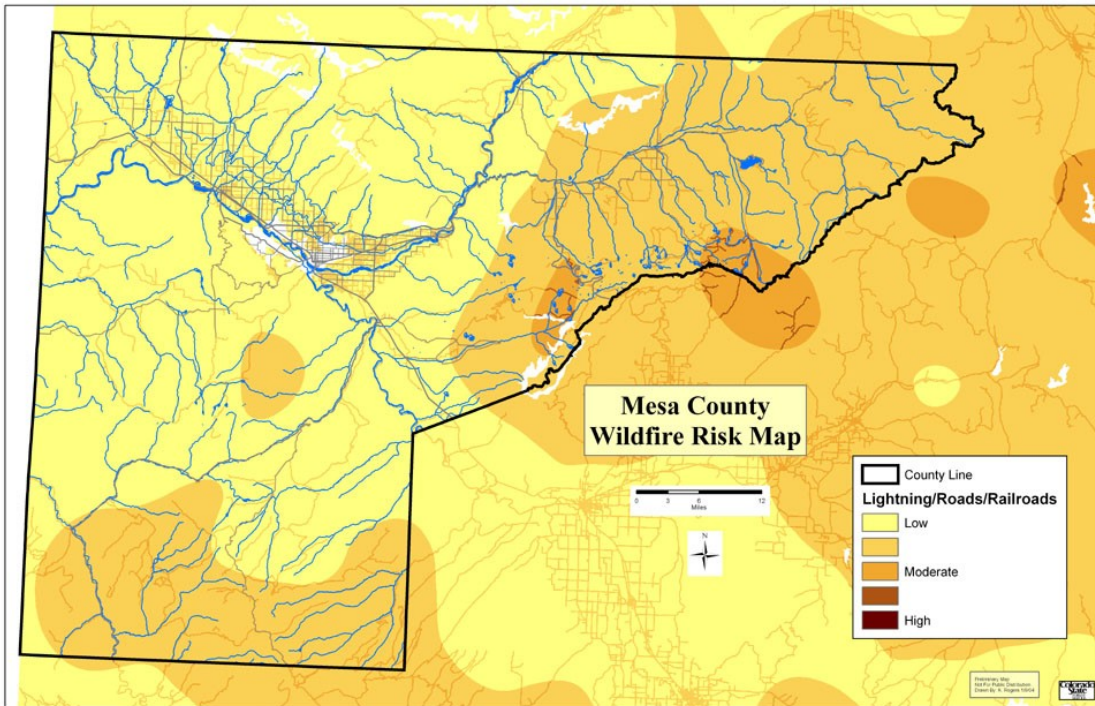
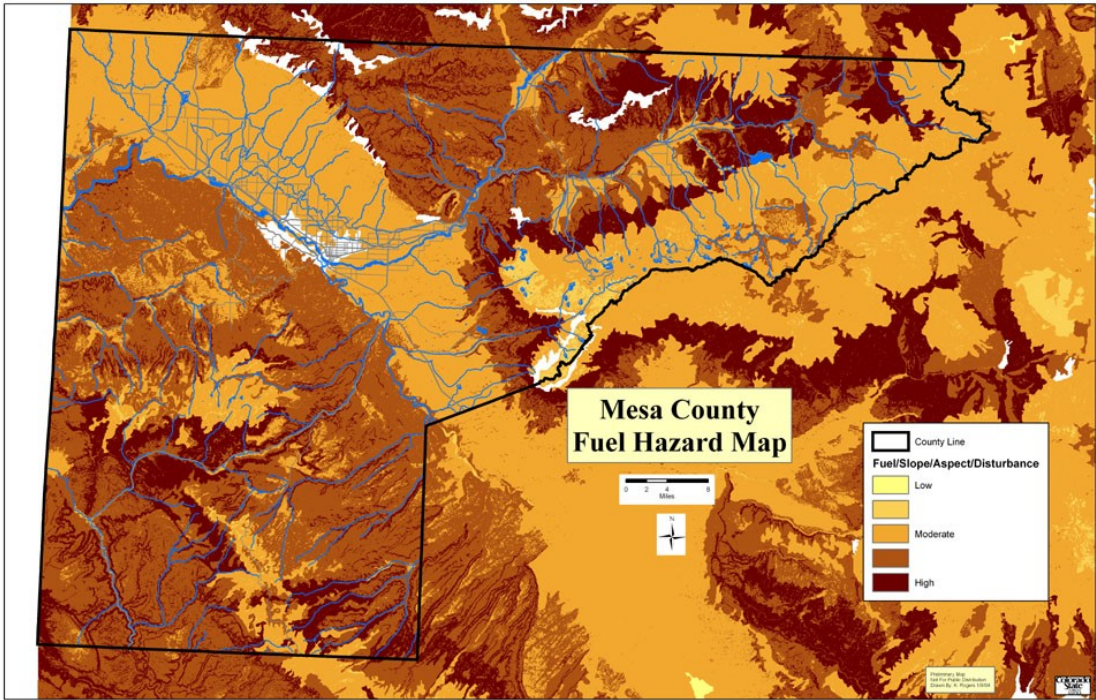
## Wildfire

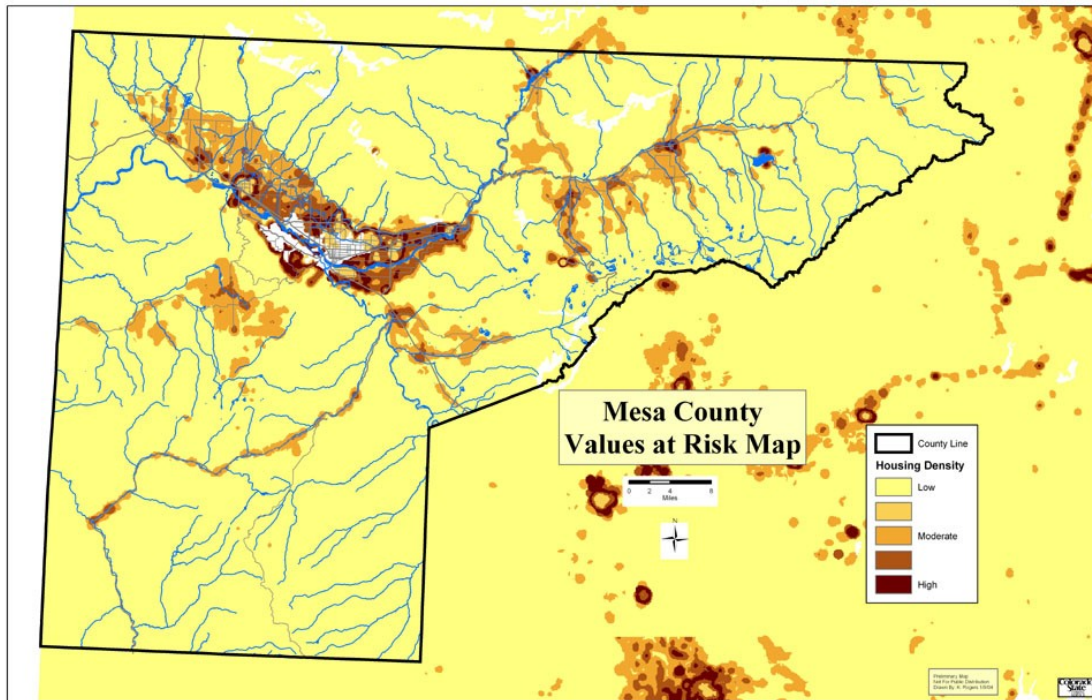
Mesa County has a significant risk of wildfire. One million acres of BLM land covers Mesa County with an additional 600,000 acres in the Grand Mesa and Uncompahgre National Forests. At 4,286 to 7,300 feet in altitude, the vegetation varies from dry and desert like to sparse mountain forests. Pinyon pine, juniper, sage grass and gambel oak brush occupy the lower areas, transitioning to aspen and ponderosa pine. Glade Park, Unaweep Canyon and Plateau Valley are the areas at greatest risk of wildfire in Mesa County. Glade Park is especially hazardous, given the mix of hazardous fuels, development and occurrence of lightning strikes.







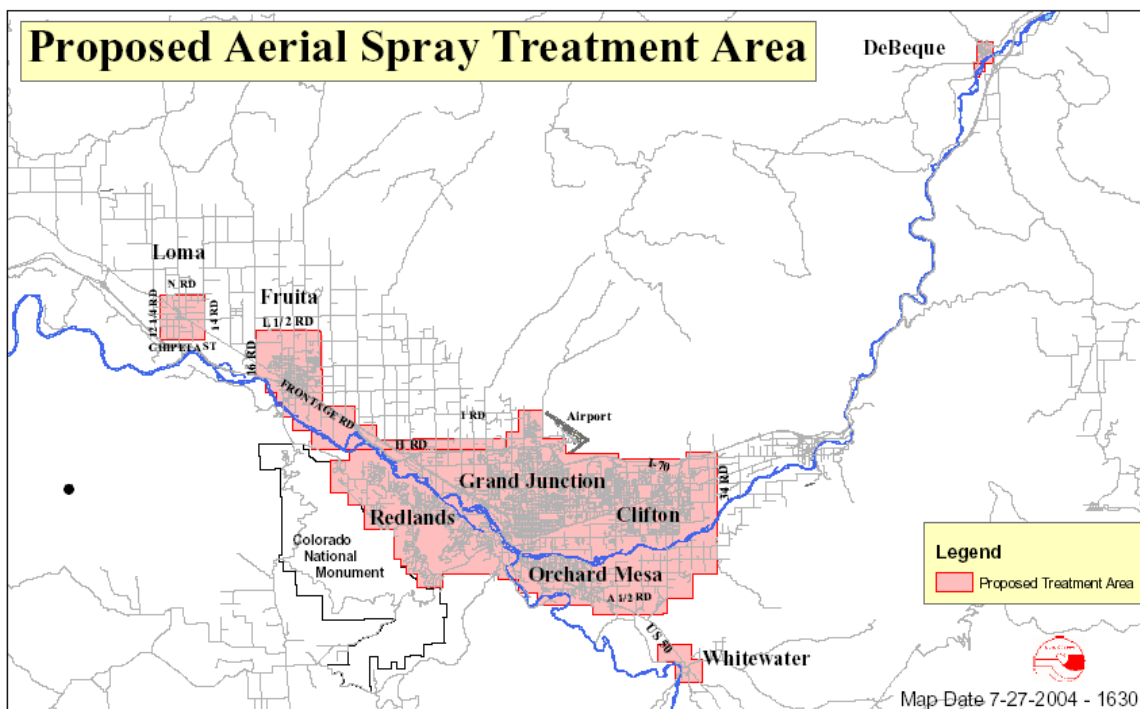




Insects

West Nile virus (WNV) is a potentially serious illness. Experts believe WNV is established as a seasonal epidemic in North America that flares up in the summer and continues into the fall. WNV is spread by the bite of an infected mosquito. Mosquitoes are WNV carriers that become infected when they feed on infected birds. Infected mosquitoes can then spread WNV to humans and other animals when they bite. There are ongoing mitigation efforts being taken by the Mesa County Health Department.

In July of 2004 the Mesa County Health Department Director declared a public health emergency due to the number of mosquitoes carrying the virus and the number of human cases of West Nile virus. To mitigate the number of West Nile cases in Mesa County it was recommended that the County contract for aerial spraying with the chemical Dibrom to kill the adult mosquitoes. Aerial spraying covered the following areas in Mesa County: DeBeque, Grand Junction, Redlands area, Clifton area, Loma, Fruita and Orchard Mesa area. (See aerial spraying map below)



The following insects are identified as causing potential problems to Mesa County crops and plants:

<u>Insects</u>	<u>Target Crop/Plants</u>
Pinyon Ips Beetle	Pinyons



Mountain Pine Beetle	Spruce, Fir
Cedar Bark Beetle	Juniper
Spruce Budworm	Spruce
Spruce Beetle	Spruce
Douglas Fir Bark Beetle	Fir
Oak Borers	Oak
Two Spotted and Banks Grass Mite	Grass and small grain crops
Corn Earworm	Corn
Beet Leafhopper	Tomatoes
Onion Thrips	Onions
Grasshoppers	All Vegetation
Apple Maggot	Apples
Japanese Beetle	All Vegetation
Asian Lady Beetle	Wine Grapes
Phylloxera	Wine Grapes

Areas affected by these insects include Glade Park, Whitewater, Plateau Canyon, Collbran, Mesa, Grand Mesa, Grand Valley, Lower Valley, East Orchard Mesa, Orchard Mesa, Palisade, Clifton and the Redlands.

Currently the Pinyon Ips beetle is destroying pinyons all over Mesa County. Due to the drought, there has been an explosion in population of this insect. Drought has also increased control costs of the Corn Earworm. In 2003, 60% of the tomato production was lost to the Beet Leafhopper. A new virus (Iris Yellow Spot) transmitted by the Onion Thrips is a threat to onion production.

The Apple Maggot has been identified in Mesa County on hawthorne trees; if the apple feeding strain reaches Mesa County, it will cause quarantines, increased use of pesticides, and may end apple production in the County.

The Japanese Beetle control costs in the east run approximately \$500,000 a year. Costs to fruit and grape growers will be devastating. Quarantines already have impacted shipment of nursery stock from Mesa County to California and Utah. The Asian Lady Beetle has been identified in Mesa County and is prolific in the eastern U.S. It threatens wine grapes by imparting a bad taste to the wine.

Phylloxera is an insect native to the eastern U.S. that attacks the roots of grapevines throughout the U.S. It is impacting most grape growing areas in California. Nursery stock imported to Colorado from California should be certified Phylloxera free. If found in Mesa County, it will severely impact grape growers by increasing pest control costs and pesticide use.

#### Noxious Weeds

Noxious weeds have become a threat to the natural resources of Colorado, as thousands of acres of crop, rangeland, and habitat for wildfire and native plant

communities are being destroyed by noxious weeds each year. In Mesa County, large populations of Saltcedar (Tamarisk) have established themselves along the Colorado and Gunnison rivers and their tributaries. Saltcedar's effect on a watershed's water quantity and quality is unarguable.

The following weeds are listed as Noxious Weeds in Mesa County and warrant a particularly serious problem for Mesa County:

### **Weeds**

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Yellow Starthistle	Purple Loosestrife
Leafy Spurge	Dyer's Woad
Diffuse & Spotted Knapweed	Yellow Toadflax
Dalmation Toadflax	Russian Knapweed
Bull Thistle	Canadian Thistle
Hoary Cress/Whitetop	Houndstongue
Musk Thistle	Oxeye Daisy
Plumeless Thistle	Scotch Thistle
Tamarisk/Salt Cedar	

Additional weeds that are not known to occur in Mesa County but have the potential to cause serious in Mesa County:

### **Weeds**

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Camelthorn  
Medusahead Rye  
Rusk Skeletonweed  
Squarrose Knapweed  
Black Henbane  
Perennial Pepperweed

Yellow Starthistle displaces native vegetation and is poisonous to horses. There are two known infestations in Mesa County, and eradication efforts have been ongoing for four years. Pest Management is currently mapping and delineating areas of infestation and working with landowners on control.

Noxious weeds displace native vegetation and invade cropland, and some are even considered poisonous to humans and other animals. They destroy food, shelter and breeding grounds for native species and can be difficult to control. Currently, mapping is being done to delineate areas of infestation, and control measures are being considered.

### **Dam Failure/Flooding**

The Colorado River is a high risk flood area near Grand Junction and along Interstate 70 from Rulison to DeBeque. In DeBeque there is only one bridge that allows access to the Town of DeBeque and it is built over the Colorado River. Flooding of the Colorado River also threatens Fruita, Mack, and Cameo. Flooding of

Plateau Creek and Buzzard Creek threatens Collbran, Plateau City, Molina, and Mesa. There is also the potential for flash flooding on many of the smaller streams located in Mesa County, which includes West Creek, Roan Creek, and Mesa Creek. Those areas potentially impacted are listed above and include Unaweep Canyon, Colorado National Monument area down into the Redlands, John Brown Canyon, No Thoroughfare Canyon and Lamplite Park.

Dams are placed in four different classifications. A Class I dam is considered a high hazard dam, which means sudden failure of the dam would result in loss of life. In the interest of public safety the State Engineer has required written emergency plans for these dams. The plan includes warning and evacuation of persons located in the inundation area.

A Class II dam is considered a moderate hazard dam, which means sudden failure of the dam would not cause loss of life but would result in extensive property damage. A written emergency plan for these dams is also required.

There are a number of dams located in Mesa County: thirty-five Class II dams and fifteen class I dams. A failure of Vega Reservoir (Class I) would inundate ranches from the base of the dam through the town of Collbran. Failure of Granby Dam, located in Grand County, would inundate Interstate 70 and U.S. 6 & 24 from DeBeque to Palisade. Failure of the Dillon Dam, in Summit County, would inundate the same area.

## **Hazardous Materials**

Mesa County is a center of commerce in western Colorado and hazardous materials are commonly transported through the county by truck and rail transport. Designated truck routes are Highways 139, 141, 50 and 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 of 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 139 Tier II reporting fixed site facilities in Mesa County. These facilities either store and/or use hazardous materials.

Natural gas pipelines are also of significant concern in Mesa County and specifically for the Town of DeBeque. Currently, three high pressure gas lines form a triangle around the Town of DeBeque. The concern from the Town of DeBeque is for the

safety of the citizens who live in this area if one of these high pressure lines were to rupture.

Natural gas is transported through the transmission pipeline system, which is composed of large steel pipe ranging from 20 inches to 42 inches in diameter. The pressure ranges from 200 pounds to 1,500 pounds per square inch.

Most major pipelines are looped, which means two or more lines run parallel to each other in the same right of way.

Compressor stations are located every 50 to 60 miles along each pipeline. A compressor is an internal combustion engine or turbine that creates pressure to push the natural gas through the lines.

Along the pipeline route, depleted oil and gas wells, salt caverns and other natural geological formations are used to store natural gas for use during times of peak demand.

When the natural gas reaches a local natural gas utility, it passes through a gate station, where its pressure is reduced to a range between 100 pounds and as low as ¼ pound.

*\*Information for this section was supplied in part by the American Gas Association*

## **Cyber Viruses**

Cyber Viruses have a capability of spreading rapidly by the speed of internet connections. Within minutes, an infected E-Mail can bring an office or the entire county system down, causing costly productivity loss and clean-up expenses. There are more than 50,000 known Cyber Viruses and an average of at least 100 viruses are created every month. It is safe to say that all organizations using computers will deal with Cyber Virus outbreaks from time to time.

## **Power Failure**

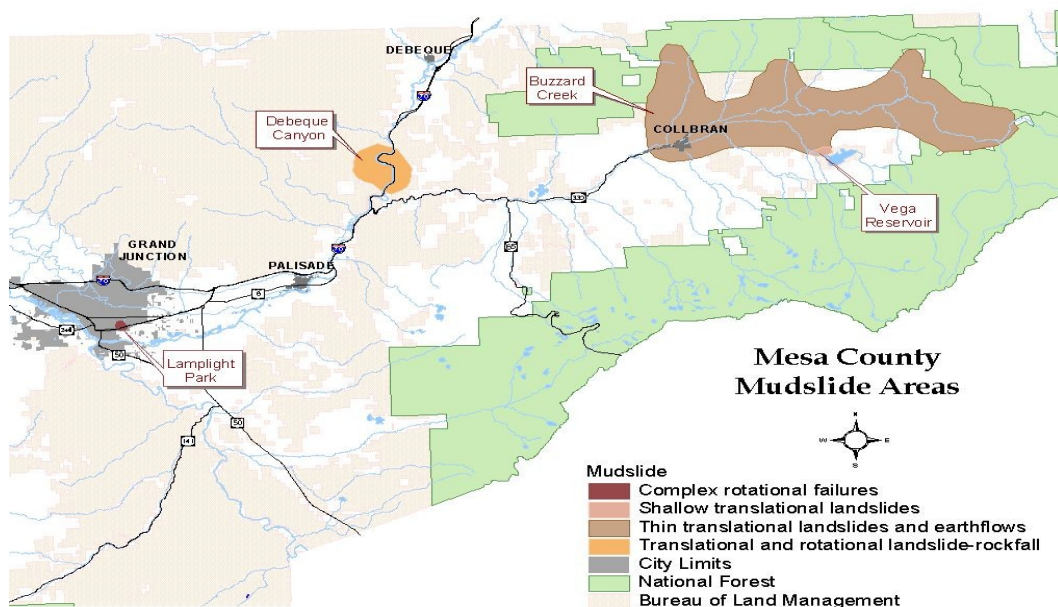
Power companies generate electric power from a mix of fuel sources, and distribute natural gas and electricity over transmission and distribution lines throughout the service area. Mesa County is home to a power plant owned and operated by Excel Energy, located east of Grand Junction, Colorado. The Cameo Station began operating in 1957 when Unit 1 went into service and expanded in 1960 with the operation of Unit 2. The Cameo Station has two operating units that burn low-sulfur coal as their primary fuel and natural gas as their secondary fuel. Power Production Capabilities: 73 megawatts (MW): Unit 1 - 24 MW and Unit 2 - 49 MW. Fuel Source: Low-sulfur coal supplied by the McClane Canyon Mine near Mack, Colorado. (Excel Energy web page. [www.excelenergy.com](http://www.excelenergy.com)) On the electric side of Excel Energy there are 8 substations fed by a two looped transmission system. This is

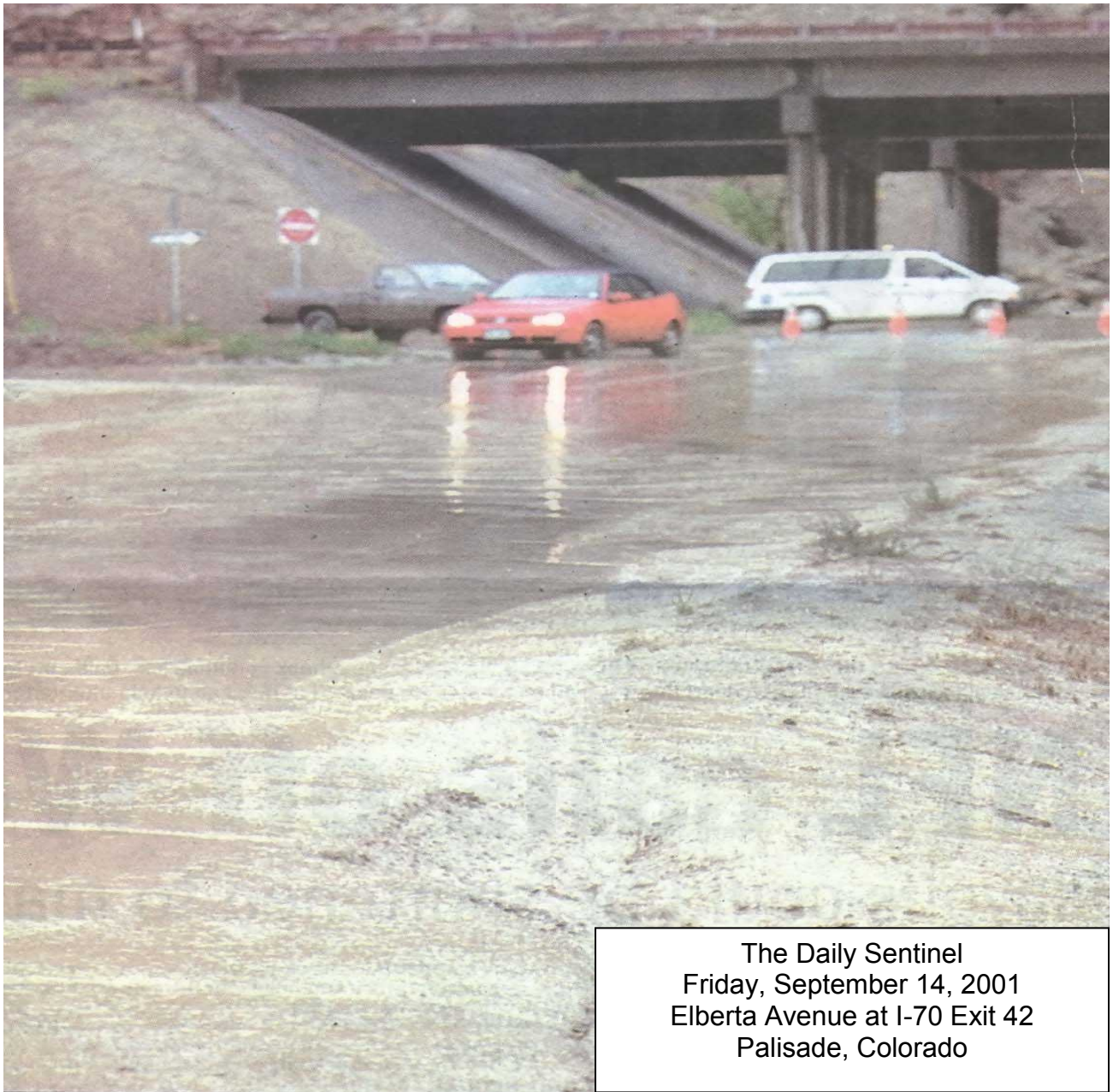
important when power is lost, because power can be looped back through the system to prevent prolonged outages. Excel Energy has 53,000 electric customers in Mesa County with peak demand of 140 megawatts (MW).

Grand Valley Power is an electric coop serving 14,716 meters in Garfield, Mesa and Delta Counties. Their service territory's west boundary is the CO - UT line, Roan Creek north of DeBeque, east to Vega Reservoir and south to Grand Mesa, Escalante Canyon and Gateway. The cities of Grand Junction, Fruita, DeBeque and Palisade are served by Excel. Excel is also the wholesale power supplier to Grand Valley Power Co. and they have no generation capability. Grand Valley has 6 substations and 40 miles of transmission line. The average annual outage per meter for the past 5 years has been less than one hour per year for each meter. In the event of a loss of one of the substations, a mobile unit is available to move on site to restore service. Grand Valley Power is signatory to a Disaster Aid Agreement in which 24 Colorado and Wyoming Rural Electrics will share labor, equipment and materials in the event of a major outage.

## Landslide

In Mesa County there are many unstable mountain sides. Most are traversed by roads and almost all are above streams. Excessive moisture, ground tremors, or even construction activity can cause activation of these slides. There are a number of slide areas around Plateau Creek which could dam the creek and cause flooding in Plateau Canyon. Buzzard Creek poses a risk to pipelines and utilities, and DeBeque Canyon (tunnel landslide) poses a risk to Interstate 70 and D&RGH Railroad. Vega Reservoir poses a risk to residents, roads, and utility lines. The Lamplight Park area poses a risk to residents and city utilities.





The Daily Sentinel  
Friday, September 14, 2001  
Elberta Avenue at I-70 Exit 42  
Palisade, Colorado

**Historical Hazards in Mesa County**

**History of Flooding**

Mesa County has a long history of flooding from summer cloudburst storms and from snowmelt runoff. Cloudburst flood events or flash flooding, however, have gone virtually unrecorded due to the rural nature of floodplain areas affected. From records, limited newspaper coverage, and interviews with local residents and officials, it is known that nine 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 floods in Mesa County result from snowmelt, sometimes augmented by rain fall.

In 1884, snowmelt flooding was widespread in Mesa County. All major streams were overflowing in May, June, and July, and flow on the Colorado River at Fruita reached an estimated 125,000 cubic feet per second (cfs) on July 4. The largest snowmelt flood runoff of record on the Colorado river occurred in June 1921. Heavy rain on June 14 and 15 augmented runoff to produce a peak flow of 81,100 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.

Studies show that the 1984 flood on the Colorado and Gunnison Rivers had a frequency of approximately once in 300 years. With consideration given to upstream regulation, the most recent flood on those streams, in late May, 1984, had a frequency of approximately once in 50 years.

Colorado River floodflows in the Grand Junction area have 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 sections southwest of Grand Junction.

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. Several streets in that area, as well as along Rosevale Road west of the river, have been flooded and traffic has been disrupted.

On farmland and ranges south and southwest of the city, crops have been lost and irrigation facilities have been seriously damaged. Between Grand Junction and the northern county boundary near DeBeque, Colorado River overflow has inundated ranches and farmland; isolated people and cattle, damaged or destroyed irrigation facilities; damaged orchards by uprooting trees, eroding soil, and depositing debris; inundated roads, and disrupted traffic. Potential flooding impacts include the Mesa Mall area as well.

Gunnison River floods have caused damage mainly in the reach just above its mouth, where ranches and farms have been inundated, building and cattle have been isolated, and people have been stranded for varying periods of time. The abutments of the bridge south of Grand Junction and a portion of the south bank upstream from the bridge have been seriously eroded.

Dolores River floods have isolated people and livestock, damaged or destroyed crops, and damaged crop and pastureland with deposits of silt and debris. Flood fighting has been required to prevent traffic disruption.

Flooding is known to have occurred on many of the lesser streams in the county, but data on contributing precipitation, peak flows, and damage are not available. Historical and descriptive data on floods and flooding in Mesa County were based on Floodplain Information and Flood Hazard Information reports prepared by the Core of Engineers in 1973 and 1976.

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 floodflows. 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.

Major flooding along Roan Creek is caused by rapid melting of the mountain snowpack during late May to early July, as well as summer rainstorms. There is also the potential for flooding as a result of rainfall occurring on melting snow. The most recent damaging flood on Roan Creek occurred at the end of May 1983. It resulted from the melting of an unusually deep snowpack. (Flood Insurance Study, Mesa County Colorado Unincorporated Areas, FEMA, Revised: July 15, 1992)

Cunningham Court Flooding July 2001





# Flood slams home



No Thoroughfare 1978



FRUITA - 18 1/4 and K Rd August 12, 1997



**Repeated August 9, 2001**



**LOMA - 12 1/2 and M Rd  
August 2003**



25 Road August 5, 1997



## Kayaking North Avenue (Cloudburst)



## Bosely Wash



## **History of Blizzards and Severe Winter Storms**

This category includes those unusually heavy snowfall events and represents about one fifth of all significant snowfall events. According to the National Weather Service, Mesa County has had approximately 70 of these winter storms since 1996. There has been no reported damage to property or crops, and no directly related fatalities or injuries in Mesa County. Indirectly, there have been numerous accidents and injuries as a result of strong winter storms that have impacted Mesa County.

There have been 3 reported avalanches in Mesa County since 1999. In 1999 nine snowmobiles were traversing the north side of the Grand Mesa at the 10,600 foot level. One of the snowmobiles triggered a small hard slab avalanche which buried him under 5 feet of snow. Resuscitation efforts were unsuccessful. In 2002 another avalanche was triggered by snowmobiles near Flat Top Mountain in the northeast part of Mesa County, again this avalanche proved fatal. The third reported avalanche occurred in 2004 when it swept across Hwy. 65 at mile marker 36 on the Grand Mesa. One vehicle was buried; estimated property damage was \$5000.00.

## **History of Drought and Soil Erosion**

Drought has been a significant issue in Mesa County as well as the entire state for the last 5 years. It is the one hazard that we really cannot control, yet it has devastating effects. Those effects can last for years. Geographically, drought can occur locally, regionally, or statewide.

The impacts from drought are non-structural and generally affect the economy and environment the most. A drought event can be short term or it can be a multi-year event much like the current drought Colorado is experiencing.

Soil erosion and blowing dust have been a problem in Mesa County over the past few years. More recently we had a thirty car pile up on Interstate 70 due to blowing dust adjacent to the interstate.

## **History of Tornadoes**

Since 1988, there have five officially documented tornadoes in Mesa County, for a total of six tornadoes in Mesa County. There is no official data about any tornadoes prior to 1988. Property damage loss due has been limited to about \$1,000 dollars since all documented tornadoes have occurred in unincorporated and rural areas of the county.

## **History of Gradient Winds**

This category of high winds is not associated with thunderstorms, but rather with the surface pressure gradient. These winds are most common in fall, winter and spring, though it has occurred as late as June in Mesa County. Damage to

property/and or crops since 1996 is estimated to be \$139,000. There have been no fatalities or injuries.

### **History of Hail and Severe Summer Storms**

Large hail by National Weather Service definition is measured at ¾ inch diameter or greater. Hail storms typically occur from May through September. There have been 24 significant hail storms since 1996. Damage to property and crops is estimated to be \$350,000. There have been no fatalities or injuries.

### **History of Wildland Fires**

Historically, wildfires of limited extent have occurred each spring and summer during lightning season, spring burning of irrigation ditches and in the fall when crop residue is burnt. Drought conditions and winds significantly enhance the potential for wildfires.

On June 9, 2002, the Dierich Creek Fire broke out southwest of Glade Park, Mesa County, CO. A Fire Management Assistance Grant was requested on June 10. The request was approved on June 10, 2002. A total of 3,951 acres burned in the Miracle Complex fire, which included the Dierich Creek Fire.

Based on the development taking place in the county, areas that are at highest risk include the Plateau Valley, Gateway and Glade Park areas.

### **History of Hazardous Materials Events**

The Grand Junction Fire Department (GJFD) is the Designated Emergency Response Authority (D.E.R.A.) for Mesa County. In 2000 the GJFD as the D.E.R.A. responded to 24 hazardous materials incidents and 17 hazardous device incidents. In 2001 the GJFD as the D.E.R.A. responded to 30 incidents involving the release of hazardous materials above the reportable quantity and 18 hazardous device incidents. In 2002 there were 24 hazardous materials incidents and in 2003 there were 28 incidents.

### **History of Earthquakes in Mesa County**

Historically, Mesa County has had little seismic activity. There are 7 earthquakes on record for the time period 1971 to 2004. The largest earthquakes recorded, having an epicenter in Mesa County, were a Richter magnitude 4.4 NNE of Fruita in 1975 (this was attributed to an unknown fault) and a 4.5 near Glade Park in 1971, attributed to the Glade Park fault.

Since earthquakes have a broad range of damage beyond their epicenters, earthquakes having epicenters outside of Mesa County should also be examined. There have been 132 earthquakes within a 150 km radius of Grand Junction in the same time period listed above. The largest of these was a magnitude 4.6. The largest recorded within the same distance, but outside the time range was a

magnitude 5.4 in 1960. This earthquake occurred south of Montrose and caused widespread minor damage.

Of particular note is an earthquake that occurred in February of 1994. The magnitude 5.9 earthquake struck an area near Afton, Wyoming, almost 500 km from Grand Junction. Despite the distance to the epicenter, it was widely felt across the Grand Valley, and for many hours a local radio station reported the epicenter was near Grand Junction. It is believed that the unconsolidated sediments underlying the Grand Valley contributed to an increase in ground motion, above that which would be expected for an earthquake of that size and at that distance.

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. It must be understood that surface expression of a fault does not represent the entire fault. The fault has depth, tilt, and length which cannot always be seen at the surface. These characteristics contribute to the type of ground motion that will be felt at the surface.

In Mesa County, all of 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 240m of displacement and can be seen most vividly in the Colorado National Monument. Slip rates on the Redlands fault complex are presumed to be 0.2mm/year (USGS). An unidentified fault located SE of Grand Junction and along the NE flank of the uplift produced a magnitude 2.5 earthquake in 1990 and a 2.7 earthquake in 1995.

The southwest flank of the Uncompahgre Plateau near Gateway includes the Ryan Creek fault zone; the Granite Creek fault zone, and other unnamed faults. Risks associated with earthquakes include rock fall, landslides, liquefaction, and building failure.

Rock fall hazards and landslides are most typically associated with canyons. Of specific note for rock fall hazards would be I-70 in DeBeque Canyon, Colo. Highway 65 in Plateau Canyon, Colo. Highway 141 in Unaweep Canyon, and the area encompassing the Colorado National Monument. Landslide areas would most likely be associated with the north and west slope of the Grand Mesa.

Liquefaction related hazards in the Grand Valley have never been studied. Liquefaction will most likely occur in an area bordered by the Grand Valley Canal on the north, the Colorado River on the south, 33 road on the east and 13 road on the



west. This area contains unconsolidated sediments derived from the Bookcliffs area and the Colorado River. These sediments consist mainly of silts, clays, and sands, with an underlying cobble layer. Depths of the sediments range to 65-75 feet. The area is irrigated, bringing ground water tables to near the surface. It is unknown if these water logged sediments will remain stable during strong ground movement. Liquefaction could cause the failure of water, sewer, and gas lines. It may also cause problems with heavy structures that do not have a substantial foundation.

Ground movement as a result of an earthquake will also have an adverse affect on older buildings in downtown Grand Junction, Fruita, and Palisade, many of which have false fronts above the roof line. These older buildings have a brick masonry front which is not reinforced. The failure of these fronts will present serious hazards to pedestrians on the sidewalks below these fronts during an earthquake.

(David G. Wolny, Adjunct Faculty, Mesa State College and Dr. Verner C. Johnson, Professor of Geology, Mesa State College)

### **History of Power Failure**

Small and short duration power failures have occurred throughout Mesa County. Excel Energy experiences approximately 500 outages per year but these outages are considered extremely minor and affect 2 customers or less when they occur. Since January of 1999 Excel Energy has experienced 2526 outages.

### **History of Insects and Noxious Weeds**

Weeds have a long history in Mesa County, beginning with settlement of the area by Europeans. In the past, weeds were often not identified until the infestations became large enough to affect agriculture production. Awareness if new introductions is much higher now, and new infestations are being rapidly identified and treated. Although the exact dates of infestations cannot be definitively determined for all weeds, we do know the approximate introduction of some species.

Tamarisk has likely been in Mesa County for nearly 80 years. Russian knapweed has been here for at least 60 years. Diffuse and spotted knapweed are recent additions to the landscape, appearing in the last 10-15 years. Leafy spurge is a relative newcomer, entering the County in about 1983. Yellow starthistle was introduced in 1993, but was not identified by the County Pest Inspector until 1999, after it had spread to approximately 100 acres. Purple loosestrife has been on the Redlands since at least 1983, and possibly earlier. White top has probably been here for 30-40 years. Canada, musk, Scotch and bull thistles and houndstongue have been in Mesa County for at least 30-40 years. Dalmation toadflax is not widespread and has probably been in the area for about 10-20 years. Goatshead has been here for at least 25 years. Perennial pepperweed has probably been in the County for 5-10 years. A single plant of Dyer's woad was identified in Grand Junction in 2004.

Camelthorn, medusahead rye, rush skeletonweed, black henbane and squarrose knapweed have not been found as of yet in Mesa County but are at our borders.

## Insects

The forest insects; pinyon ips, mountain pine beetle, cedar bark beetle, spruce beetle, douglas fir bark beetle, and oak borers are all native insects. Their populations explode and they kill large tracts of forest that are under stress. The recent drought has triggered "outbreaks", which are killing many trees.

Spruce budworm is a native insect which occasionally reaches epidemic numbers. There are several sites in western Colorado, including Mesa County with increasing numbers of this defoliator of fir and spruce.

Two spotted Spider and Banks Grass mite are also native mites. Banks Grass Mite is a serious pest of field and sweet corn and small grains. Two Spotted Spider Mite attacks most broadleaf plants, both agricultural and ornamental. They thrive in hot dry conditions, and our climate makes Mesa County especially vulnerable. Farmers spend considerable money to control these pests, and controls are limited. Acquired resistance to insecticides is a very real concern.

Corn Earworm is a native insect and is the number one insect pest in sweet corn. Acquired resistance to insecticides has made it more difficult to control in recent years. Onion Thrips, another native insect that threatens local onion crops. Iris Yellow Spot virus is a new Onion Thrips transmitted disease of onions which appeared in western Colorado in 2003. Insecticide resistance has made Onion Thrips difficult to control.

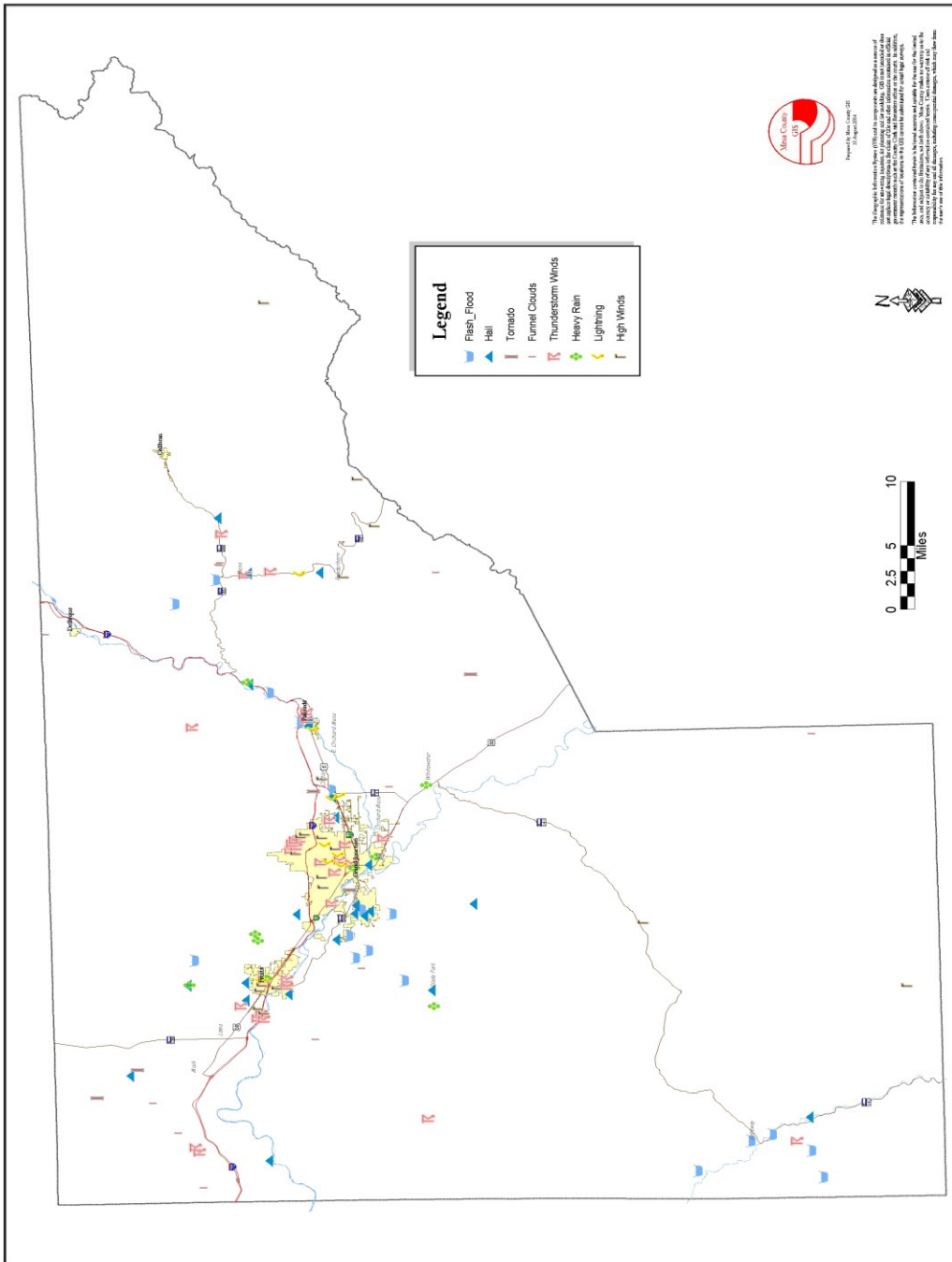
Many species of native grasshoppers are a threat to agriculture in outbreaks. There are current problems with grasshoppers in the Collbran and Unaweep Canyon areas.

There are arguments whether Apple Maggots are native or introduced in the late 1970's or early 1980's. It's a regulatory concern regarding the export of apples from infested areas to several states that is of major concern. Apple Maggots are rarely found in apples, but is not uncommon in native hawthornes.

The Japanese Beetle is established in Palisade. It was first discovered in 2002, but has probably been present since 1998. There is an eradication program in effect. Japanese Beetles are a real threat to broadleaf plants directly, and as a regulatory concern for shipments of nursery stock to several western states.

The Asian Lady Beetle is an exotic lady beetle first confirmed in Mesa County in 2003. It is a serious nuisance to homeowners in infested areas, and a threat to grape production when it contaminates grape clusters.

# Historical Weather Events since 1996



## **Hazards in Mesa County**

The goal of mitigation is to reduce the future impacts of a hazard, including property damage, disruption to local and regional economies, and the amount of public and private funds spent to assist with recovery. However, mitigation should be based on risk assessment.

A risk assessment is measuring the potential loss from a hazard event by assessing the vulnerability of buildings, infrastructure and people. It identifies the characteristics and potential consequences of hazards, how much of the community could be affected by a hazard, and the impact on community assets.

A risk assessment consists of three components hazard identification, vulnerability analysis, and risk analysis. Technically, these are three different items, but the terms are sometimes used interchangeably.

The following annexes describe hazards that may occur in Mesa County. The hazards are broken down into sections, which when appropriate, describe the hazard assessment by hazard identification, vulnerability assessment, risk assessment, mitigation goals and potential projects. Some of the annexes are for hazards that do not present a significant risk to Mesa County, and are only presented in this plan as a hazard assessment.

In development of this plan, it was important to carry out specific steps. These steps included; mapping the hazards, completed by Mesa County GIS Department, and identification of critical facilities, taken from the Homeland Security Assessment completed in 2002 and 2003.

After collection of critical infrastructure, Mesa County Emergency Management Department and plan participants identified existing mitigation strategies relative to flood, wildfire and drought hazards. Our next step was to identify gaps in existing mitigation strategies as well as potential future strategies. The Mesa County Emergency Management Department was then responsible for prioritizing and developing the Pre-Disaster Mitigation Plan and seeking formal adoption by all of the communities within Mesa County.

### **FLOOD ANNEX**

#### **A. Hazard Assessment**

Floods have occurred repeatedly throughout Mesa County. Floods will continue to occur. As with most hazards, impacts and losses can be anticipated and reduced, but nothing will keep the event from occurring again. We have not mapped out our critical infrastructure that would be impacted by a flood event.

## B. Vulnerability Assessment and Impacts

Through historical information identifying actual occurrences several communities within Mesa County are at risk of large rain events. These communities include Palisade, Collbran, Clifton, Gateway, Grand Junction, and other parts of unincorporated Mesa County. These storms could cause loss of life and property as well as river bank erosion problems.

## C. Mitigation Measures

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 flood plain. 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.

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

Goal 3: Protect individual properties from flooding.

Property protection focuses resources on activities involving individual property owners. The goal emphasizes measures that landowners can take to protect their homes, structures, or property from storm surges. Property protection activities primarily protect structures in flood hazard areas. Property owners usually undertake them on a building-by-building or parcel basis. These may include:

### Insurance

Insurance is a mechanism for spreading the cost of losses both over time and over a relatively large number of similarly exposed risks. Until 1969, insurance against flood losses were generally unavailable. Under the National Flood Insurance Program initiated in 1968 and significantly expanded in 1973, the federal government made flood insurance available for existing property in flood hazard areas in return for enactment and enforcement of floodplain management regulations designed to reduce future flood losses. Mesa County joined the NFIP in 1978.

### Potential Projects:

1. City of Grand Junction, "Big Pipe" project. This project includes construction of four detention basins. A two stage detention basin in the Ranchmen's Ditch drainage will be located along the east side of the airport. Within the Leach Creek drainage, one basin will be located on airport property west of the runway and the other on BLM lands northwest of the airport. The City of Grand Junction is designing a new conveyance system that will safely convey the remaining storm flows through the lower portions of the drainage basins and ultimately to the outfall at Leach Creek. This project would

consist of improving the existing open ditch and piped portions of the Ranchmen's Ditch conveyance system. It will be re-graded and stabilized, with new large-capacity crossings put in along its length. Three 78" pipes will be installed immediately adjacent to the existing 54" pipe. All four pipes will ultimately discharge to Leach Creek either near the southwest corner of the Mall property, or south of I-70B, depending on combined peaks in Ranchman's Ditch and Leach Creek.

2. The City of Fruita has four natural drainages that travel through the City, all of which have flood potential. Big Salt Wash, Little Salt Wash, Adobe Creek and the Colorado River have all flooded private property in recent history and continue to have that potential. The City of Fruita's primary mitigation tool along these areas is land use regulations preventing particular uses. In addition to this, the City will be undertaking a number of project to clear non-native brush and debris from these areas in order to add capacity to these natural drainages, allowing flood waters to flow through them.

3. Update current Flood Insurance Rate Maps.

4. Information on how to obtain insurance from the NFIP should be provided to private property owners.

### Flood Warning

Adequate and timely notification to residents of impending flood danger is extremely important. The National Weather Service (NWS) provides flood (including flash flood) forecasts and warnings utilized by the Grand Junction Regional Communications Center and the Mesa County Emergency Management Department.

### Flood Response

Taking action to minimize damage during a flood event is perhaps the final flood damage prevention measure. An updated and comprehensive emergency response plan is one way to achieve this. An emergency response plan identifies responsibilities in the event of a flood and provides a template for various parties to organize relief efforts, flood fighting, and additional damage prevention. Local police, fire, public works, public health and emergency management officials typically carry out flood response. Emergency activities prior, during and immediately after a flood may include removing people and property from areas about to be flooded; sandbagging around individual structures and constructing emergency dikes to direct water away from vulnerable areas; search and rescue; and any additional steps to protect the health and safety of residents.

### Goal 4: Increase public awareness

The risk of flooding can be reduced indirectly through increased public awareness. If residents and property owners are knowledgeable about mitigation opportunities, floodplain functions, emergency service procedures, and potential hazards, there will

be more support for risk reduction efforts. Public information activities advise people of the hazards, ways to protect themselves, and the natural and beneficial functions of local floodplains. Public information activities include:

1. Public Education campaigns to bring awareness to the hazards we face throughout the year.
2. Create a brochure containing information on Mesa County hazards and protective measures that can be taken by citizens.
3. Updated Flood Insurance Rate Maps (FIRMs)
4. National Flood Insurance Program information
5. National Floodplain Insurance Program workshops offered in Mesa County.

### Risk Analysis

Mesa County is home to sophisticated Geographic Information System (GIS) technology that is making it increasingly easier to analyze the risk of flood events. This analysis is dependent on availability of data relating to building location, value and flood recurrence.

### Potential Project:

1. Incorporate GIS into risk analysis.
2. Participate in special outreach/awareness activities, such as Colorado's Severe Weather Awareness Week which includes information on river floods and flash floods.

## **Blizzards and Severe Winter Storms**

### A. Hazard Assessment

Heavy snow can bring a community to a standstill by inhibiting transportation, knocking down utility lines, and causing structural collapse in buildings not designed to withstand the weight of the snow. Ice buildup can collapse utility lines and communication towers, as well as cause transportation difficulties.

Extreme cold can lead to hypothermia and frostbite, which are considered serious medical conditions. Cold causes fuel to congeal in storage tanks and supply lines, stopping electric generators. Without electricity, heaters do not work, causing water and sewer pipes to freeze and rupture. Extreme cold can interfere with transportation if the ambient temperature is below a vehicle's minimum operating temperature. If the ground's frost level changes, it can create problems for underground infrastructure.

### B. Vulnerability Assessment

Mesa County is at a relatively low risk for blizzards and severe winter storms. However, in the event a storm would hit Mesa County, the impacts would be large. Roads could become blocked, hindering transportation of goods and services.

Emergency response would be difficult and power may be lost. Because of the low risk, snow removal equipment has not been a priority, and therefore, the ability to clear transportation routes may be hindered.

### C. Mitigation Measures

Goal 1: Mitigate the effects of extreme weather by instituting programs that provide early warning and preparation.

Potential Project: Participate in the National Weather Service's, "Storm Ready" program.

Storm Ready is a nationwide community preparedness program that uses a grassroots approach to help communities develop plans to handle all types of severe weather. The program encourages communities to take a proactive approach by providing emergency managers with clear-cut guidelines on how to improve their hazardous weather operations.

Goal 2: Educate people about extreme weather conditions and how they can prepare individually or as a family.

Potential Project:

1. Participate in special outreach/awareness activities, such as Winter Weather Awareness Week.
2. Expand public awareness about NOAA Weather Radio for monitoring weather conditions.

## **Drought**

### A. Hazard Assessment

As an isolated hazard, drought may not have a major effect on the life and health of the citizens of Mesa County, though it can be a catalyst to other hazards.

### B. Vulnerability Assessment and Impacts

The economy in Mesa County is closely tied to Agri-business. Drought has a devastating impact on that economy and can create additional risks to wildfire and insect disasters.

### C. Mitigation Measures

Goal 1: Improve water conservation practices.

Goal 2: Education of citizens on importance of water conservation.



## **Tornadoes**

A. Tornadoes are considered a minimum hazard based on the fact that we have not experienced many tornadoes in the past. We do know that tornadoes can create winds in excess of 300 mph.

### **B. Vulnerability Assessment and Impacts**

The risk of tornadoes is the same across the county. The area that is struck by a tornado is random and the potential impact of a tornado is random due to the amount of open space throughout the county. However, if a tornado were to touch down in any of the populated areas of Mesa County, there would be devastating effects. Buildings and infrastructure could be destroyed within seconds. Tornadoes can create significant debris removal problems and overwhelm building departments. Because of the random occurrence of tornado damage, loss, and determination of who and what is at risk is not possible.

### **C. Mitigation Measures**

Goal 1: Improve early detection and warning systems in response to tornadoes.

Goal 2: Increase public awareness and education about NOAA Weather Radio for monitoring National Weather Service broadcasts and Emergency Alert System activations.

## **Hail and Straight-line winds from Severe Summer Thunderstorms**

A. Hail is associated with thunderstorms, and thunderstorms are a common occurrence throughout Mesa County between early spring and late fall. Due to the frequency and widespread distribution, the risk of hail and severe summer storms is present throughout the county.

### **B. Vulnerability Assessment and Impacts**

Hail in Mesa County primarily causes crop damage. However, hailstorms in populated areas can cause significant damage to roofs, automobiles, and windows. Strong Straight-line thunderstorm winds are the leading cause of wind damage to property in Mesa County.

### **C. Mitigation Measures**

Goal 1: Expand public awareness about NOAA Weather Radio for continuous weather broadcasts and Emergency Alert System activations.

Goal 2: Increase public awareness and education on how to protect themselves and their property from impacts of severe thunderstorms.

Goal 3: Promote crop insurance information in partnership with insurance agencies.

Potential Project:

1. Participate in special outreach/awareness activities, such as Severe Weather Awareness Week in Colorado.

## **Earthquakes**

### A. Hazard Assessment

The risk of earthquakes in Mesa County is moderate. Although Mesa County has historically experienced few earthquakes, the potential for a large magnitude earthquake is possible.

### B. Vulnerability Assessment and Impacts

In the event of a large magnitude earthquake, loss of life and property damage would be significant. Buildings and infrastructure would sustain heavy damage if the earthquake were to occur in the incorporated areas of the county.

### C. Mitigation Measures

Goal 1: Increase public awareness about earthquakes.

Goal 2: Provide public campaign to educate citizens of the earthquakes and how they can prepare for and respond to earthquakes.

Goal 3: Update GIS maps to show major fault lines running through Mesa County.

Goal 4: Conduct a specific study on the liquefaction hazards found within the Grand Valley.

## **Wildfires**

### A. Hazard Assessment

Wildfires occur frequently in Mesa County and are considered a high hazard.

### B. Vulnerability Assessment and Impacts

Wildfire frequency increases with drought, high temperatures and lightning. Dense vegetation growth also renders areas of the county vulnerable to intense fires. Impacts to the county include economic loss to private property, agriculture and watersheds. Areas at risk of wildfire include, Collbran, Mesa, Molina, Gateway, Redlands, and Glade Park due to close proximity to the wildland urban interface.

### C. Mitigation Measures

- Goal 1: Continue with efforts of implementing the “Firewise” Program.
- Goal 2: Seek opportunities to partner with Federal and State agencies on prescribed burning projects or other fuel reduction projects.
- Goal 3: Continue to educate the citizens on the danger of wildfire throughout Mesa County.

## **Insects**

### A. Hazard Assessment

Insects primarily cause crop damage and are considered a moderate hazard in Mesa County. The current natural hazard caused by insects in Mesa County is the West Nile Virus. West Nile Virus is carried by certain types of mosquitoes. Most people will not become ill, but people over the age of 50 and small children seem to be especially vulnerable to severe forms of the disease.

### B. Vulnerability Assessment and Impacts

There are numerous natural mosquito breeding areas in Mesa County. However, there are several strategies being utilized in combating West Nile Virus. These strategies include spraying areas where mosquitoes breed, inoculating horses, providing larvicide to areas where standing water exists and public education.

### C. Mitigation Measures

- Goal 1: Continue educating the public about the dangers of West Nile Virus and how they can protect themselves.
- Goal 2: Continue Public Health surveillance activities to detect the presence and intensity of West Nile Virus in Mesa County.
- Goal 3: Continue mosquito control measures to reduce the threat of West Nile Virus in areas where the virus is most likely to re-emerge.

## **Hazardous Materials Events**

### A. Hazard Assessment

Mesa County has over 130 fixed site facilities that store or produce hazardous chemicals for agricultural and industrial use. These facilities are located throughout the county. Additionally, various households, lawn care companies, aerial spraying services and those responsible for grounds care of golf courses, parks, and school districts may have chemicals stored on site. Daily, residents are vulnerable to the adverse affects of accidental exposure to these chemicals. Mesa County also has several designated truck routes and Union Pacific Railroad has lines for hazardous materials transported through the county. Additionally, several high pressure gas lines run through Mesa County and are in close proximity to populated communities.

## B. Vulnerability Assessment and Impacts

Mesa County is very vulnerable to hazardous materials spills along the roads, railroads or fixed facilities within the county. Hazardous materials are also transported in close proximity to the Gunnison and Colorado Rivers. A hazardous materials accident, would not only result in injury or death, it could also have devastating effects on the environment.

## C. Mitigation Measures

Goal 1: Continue site inspections and pre-planning with facilities to determine what chemicals are on site and to review site emergency response plans.

Goal 2: Map the high pressure gas lines throughout Mesa County.

## **Terrorism**

### A. Hazard Assessment

We will not know whether a disease outbreak is intentional or natural until long after the fact. In the past few years, the U.S. addressed diseases previously unknown to this country, such as SARS, Monkeypox, and West Nile. Disease outbreaks that are intended may follow the same paths of exposure and infection as natural diseases. Terrorism in general can happen in a variety of ways, and we may not know what terrorists are targeting.

## Vulnerability Assessment and Impacts

Public Health (including environmental, water sanitation, hospital and laboratory) practices in Hong Kong affect our health in rural Colorado. Travel, globalization and trade of animals, food and other substances can expose the world to a disease (such as SARS) in a matter of weeks. Disease does not stop at borders, only reside in metro areas, or remain detained by authorities. With mass production and distribution of food products (consider McDonalds for a moment) worldwide food-borne illness is a possibility. Intentional disruption of drinking water, bottled water, and ground water cannot be dismissed.

First responders to public health emergencies (emergency medical services, public health staff, hospital staff, laboratory staff, and coroners) may be affected prior to proper identification of disease and safety measures that are appropriate. Therefore, our public health infrastructure is at risk without proper personal protective equipment, training in zoonotic and other emerging diseases, and practice of appropriate safety measures. A way to mitigate this area of concern is for regularly scheduled meetings in our communities to address preparation, communication and education.

We tend to think of terrorism in terms of explosions. However, in a bio-terrorist event, the explosion cannot be seen unless the focus is under a microscope, focusing on epi curves, reporting and investigation of disease outbreaks, vigilant environmental practices and open communication among all sectors of public health.

### C. Mitigation Measures

Goal 1: Continuing education on terrorism.

Goal 2: Continued planning with public health officials identifying their roles and responsibilities in a terrorism event.

Goal 3: Conduct exercises to test written plans.

### **Power Failure**

#### A. Hazard Assessment

Almost all infra-structure relies to some extent on a dependable source of power. When these sources become incapacitated for an extended period of time, numerous and potentially life threatening situations can arise.

#### B. Vulnerability Assessment and Impacts

Although Mesa County has not experienced wide spread long term power failures, the potential still exists whether it is caused by natural hazards or technical failure. The majority, but not all critical buildings or sites, possess back up power generation capabilities. The greatest impact would be to individuals, both rural and urban, with special needs such as those who rely on home medical equipment.

### C. Mitigation Measures

Goal 1: Identify populations at risk for loss of power.

Goal 2: Identify critical facilities that don't currently have back up capabilities.

Goal 3: Identify private companies who can provide back up power generation.

### **Dam Failure**

#### A. Hazard Assessment

Mesa County could suffer effects from high hazard and moderate hazard dams. If failure of these dams were to occur, loss of life and property would be inevitable. Mesa County has 15 Class I dams and 35 Class II dams located throughout Mesa County. These dams are required to have emergency operations plans in place.

#### B. Vulnerability Assessment and Impacts

At this time, we do not have GIS maps that show the inundation area if there was a failure at any of these dams.

## C. Mitigation Measures

Goal 1: Identify and map with Mesa County GIS Department the inundation area of the class I and II dams in Mesa County.

Goal 2: Early notifications to citizens in the inundation areas of the dam failure.

## Noxious Weeds

### A. Hazard Assessment

Because certain undesirable plants, primarily aggressive non-native invaders, constitute a threat to the “continuous economic and environmental value of the lands of the state”, these species must be managed on private and public lands, using integrated management techniques which is least damaging to the environment and which are practical and economically reasonable. (Mesa County Noxious Weed Management Plan)

### B. Vulnerability Assessment and Impacts

Noxious weeds have become a threat to the natural resources of Colorado, as thousands of acres of crop rangeland, and habitat for wildlife and native plant communities are being destroyed by noxious weeds each year. The first and foremost important step in developing a plan of attack on noxious weeds is species identification. The following weeds are listed on the Mesa County noxious weed list: Bull Thistle, Canada Thistle, Dalmation Toadflax, Diffuse Knapweed, Dyer’s Woad, Hoary Cress/Whitetop, Houndstongue, Leafy Spurge, Musk Thistle, Oxeye Daisy, Plumeless Thistle, Purple Loosestrife, Russian Knapweed, Scotch Thistle Spotted Knapweed, Tamarisk/Salt Cedar, Yellow Starthistle, and Yellow Toadflax.

### C. Mitigation Measures

Goal 1: Identify and contain, reduce or eradicate current weed infestations, and reduce or eliminate weed seed production in certain species.

Goal 2: Develop and implement Integrated Weed Management Plans for noxious weeds on county owned property, easements, and rights of way.

Goal 3: Protect agricultural production, native plant ecosystems, watersheds, and recreational lands from degradation by noxious weed by enforcing the Noxious Weed Act and working through cooperative agreements with city, state and federal agencies and adjacent counties and states.

Goal 4: Educate Mesa County citizens on the impact of noxious weeds on the economy and the environment, and provide information on Best Management Practices for noxious weeds.

## **Public Participation on Plan**

The Planning Committee consists of the Mesa County Emergency Management Department, Mesa County GIS, and the City of Grand Junction. Additional agencies and representatives provided valuable information, reviewed draft documents, and provided assistance in the approval process of the plan.

- Grand Junction Public Works Department, Fruita Public Works Department, Mesa County Public Works Department
- Grand Valley Municipal Separate Storm Sewer System (MS4) Permitted Entities.
- Mesa County Interagency Fire Advisory Board: BLM, USFS, CSFS, MCSO, NPS
- Mesa County Incident Management Group: Grand Junction Fire Department, Grand Junction Police Department, Colorado State Patrol, Mesa County Sheriff's Office, American Red Cross, Clifton Fire Department, Palisade Fire Department, Lower Valley Fire Department, Grand Junction Regional Communications Center, Mesa County Health Department, and St. Mary's EMS Outreach.
- Mesa County Local Emergency Planning Committee, National Weather Service Grand Junction Office, Excel Energy, Grand Valley Power.
- The following communities: DeBeque, Collbran, Palisade, Grand Junction, Fruita, and Mesa County.
- Excel Energy
- Grand Valley Power
- National Weather Service, Grand Junction Office

Subsequent evaluations and updating of the plan within the five year cycle will involve public display ads in the local paper and copies of the plan made available on the county web page. Paper copies will also be made available upon request.

## **Public Meetings Calendar:**

1. Meeting with City of Grand Junction to discuss development of plan. March 18, 2004
2. Meeting with the Grand Valley Municipal Separate Storm Sewer System (MS4) Permitted Entities to discuss plan development. March 26, 2004
3. Meeting with Mesa State College and National Monument to discuss mitigation projects. April 22, 2004
4. Meeting with the Town of Fruita to review draft document, August 12, 2004.
5. Meeting with National Weather Service to review draft document, August 13, 2004.
6. Posted draft document on Mesa County Emergency Management Web Page, August 18, 2004.
7. Meeting with Town of DeBeque to review draft plan, August 25, 2004.

8. Meeting with the Mesa County Incident Management Group, Sept. 1, 2004 to review draft document.
9. Planning Committee Meeting
10. Open House for public comment held at the Mesa County Courthouse, September 13, 2004 from 6:00 p.m. to 9:00 p.m.
11. DeBeque Town Council Meeting: Formal Adoption of Pre-Disaster Mitigation Plan, September 20, 2004 at 7:00 p.m.
12. Fruita City Council Meeting: Formal Adoption of Pre-Disaster Mitigation Plan, September 21, 2004 at 7:00 p.m.
13. Palisade Town Council Meeting: Formal Adoption of Pre-Disaster Mitigation Plan, September 28, 2004 at 7:30 p.m.
14. Collbran Town Council Meeting: Formal Adoption of Pre-Disaster Mitigation Plan, October 5, 2004 at 7:00 p.m.
15. Grand Junction City Council Meeting: Formal Adoption of Pre-Disaster Mitigation Plan, October 6, 2004 at 7:30 p.m.
16. Mesa County Board of County Commissioners public hearing: Formal Adoption of Pre-Disaster Mitigation Plan, October 11, 2004 at 9:00 a.m.

## **Implementation**

Mesa County Emergency Management Department will implement this plan by the methods outlined in this section. In addition to a positive cost/benefit ratio, projects will be prioritized and selected for implementation based on community goals, planning objectives, funding availability, environmental concerns and public support. The Board of County Commissioners is responsible for authorizing the implementation of this plan and projects as resources allow. The Mesa County Emergency Management Department is responsible for plan implementation leadership and funding requests and applications. Projects selected for funding will follow a public process with the Emergency Manager making recommendations to the Mesa County Board of County Commissioners.

This mitigation plan will be updated by the Office of Emergency Management when a disaster occurs that significantly affects Mesa County, whether or not it receives a Presidential Declaration, assuming funding is available to update the plan. The update will be completed as soon as possible, but not later than 12 months following the date the disaster occurred.

The Emergency Manager with the Planning Committee will be responsible for updating this plan. Securing grant monies and developing a project plan will occur the two years before the end of the five year requirement. Public participation and writing of the update will happen one year before the end of the five year cycle.



## References

Mesa County Noxious Weed Management Plan  
Federal Emergency Management Flood Insurance Study report for Mesa County  
Mesa County Fire Plan 2004 (Colorado State Forest Service)  
Colorado National Monument Flood Report (Mesa State College)  
Earthquake Information Report (David G. Wolny Adjunct Faculty, Mesa State College  
and Dr. Verner C. Johnson, Professor of Geology, Mesa State College)  
Mesa County Strategic Plan  
City of Grand Junction, "Big Pipe Project"  
Colorado Office of Emergency Management Risk Assessment Survey  
Colorado Drought Mitigation Plan  
Colorado Climate Center @ CSU, Drought Impact and Mitigation Report  
National Weather Service, Grand Junction Office  
EXCEL Energy web page  
EXCEL Energy Grand Junction Office  
Grand Valley Power Company  
American Gas Association  
Grand Junction Daily Sentinel Newspaper

## Adoption Resolutions