September 2008

Summit County
Multi-Hazard Mitigation Plan

Town of Breckenridge

Dillon Colorado

Town of Frisco Colorado

Silverthorne Colorado

Town of Blue River

Summit County Established 1861 Colorado

amec

Summit County
Multi-Hazard Mitigation Plan

September 2008

Developed by Summit County with professional planning assistance from
AMEC Earth and Environmental
Hazard Mitigation and Emergency Management Program
Denver, Colorado

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EXECUTIVE SUMMARY

The purpose of natural hazards mitigation is to reduce or eliminate long-term risk to people and property from natural hazards. Summit County and participating jurisdictions developed this multi-hazard mitigation plan to reduce future losses to the County and its communities resulting from natural hazards. The plan was prepared pursuant to the requirements of the Disaster Mitigation Act of 2000 and to achieve eligibility for the Federal Emergency Management Agency (FEMA) Flood Mitigation Assistance, Pre-Disaster Mitigation, Hazard Mitigation Grant Programs.

The Summit County Multi-Hazard Mitigation Plan is a multi-jurisdictional plan that covers the following local governments that participated in the planning process:

- Summit County
- Town of Blue River
- Town of Breckenridge
- Town of Dillon
- Town of Frisco
- Town of Silverthorne
- Buffalo Mountain Metropolitan District
- Lake Dillon Fire Protection District
- Red, White, and Blue Fire Protection District

The County's planning process followed a methodology prescribed by FEMA, which began with the formation of a Hazard Mitigation Planning Committee (HMPC) comprised of key stakeholders from Summit County, participating jurisdictions, and state and federal agencies. The HMPC conducted a risk assessment that identified and profiled hazards that pose a risk to Summit County, assessed the County's vulnerability to these hazards, and examined the capabilities in place to mitigate them. The County is vulnerable to several hazards that are identified, profiled, and analyzed in this plan. Floods, wildfires, severe winter weather, and avalanche are among the hazards that can have a significant impact on the County.

Based upon the risk assessment, the HMPC identified goals and objectives for reducing risk to hazards. The goals and objectives of this multi-hazard mitigation plan are to:

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

- Minimize the vulnerability of existing and new development to hazards
- Increase education and awareness of hazards and risk reduction measures
- Improve comprehensive wildfire planning, funding, and mitigation

- Strengthen floodplain management programs

Goal 2: Protect critical facilities and infrastructure

- Enhance assessment of multi-hazard risk to critical facilities and infrastructure
- Prioritize mitigation projects based on the enhanced assessment and identify funding sources
- Reduce hazard related closures of transportation routes

Goal 3: Minimize economic losses

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

Goal 4: Implement the mitigation actions identified in the plan

- Improve communication and coordination between communities and state and federal agencies
- Engage collaborative partners, including community organizations, businesses, and others
- Integrate mitigation activities into existing and new community plans and policies
- Monitor, evaluate, and update the mitigation plan

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

The multi-hazard mitigation plan has been formally adopted by the Summit County Board of County Commissioners and the governing bodies of each participating jurisdiction and will be updated within a five-year timeframe.

Mitigation Action Matrix

Jurisdiction-Number	Action	Priority	Goals Addressed	Hazards Addressed
Multi-Jurisdictional—1	Coordinate biannual reviews of the Summit County Multi-Hazard Mitigation Plan to monitor, evaluate, and update the plan.	High	Goal 4	Multi-Hazard
Multi-Jurisdictional—2	Continue public involvement in mitigation activities	High	Goals 1,4	Multi-Hazard
Multi-Jurisdictional—3	Improve coordination of local emergency sheltering plans	High	Goal 1,4	Multi-Hazard, Severe Winter Weather
Multi-Jurisdictional—4	Complete a comprehensive inventory and vulnerability analysis of critical infrastructure and coordinate multi-jurisdictional continuity of operations/continuity of governance (COOP/COOG) planning	High	Goal 2,3	Multi-Hazard
Multi-Jurisdictional—5	Consolidate fragmented meetings into one public safety meeting and/or stimulate interest in local emergency planning committee (LEPC)	High	Goal 4	Multi-Hazard
Multi-Jurisdictional—6	Coordinate wildland-urban interface policies and programs for improved consistency between the towns and the County	High	Goal 1,4	Wildfire
Multi-Jurisdictional—7	Coordinate County emergency planning with Regulated Entities Emergency Planning and hazard vulnerability assessments (HVA)	Medium	Goal 2	Multi-Hazard
Summit County—1	Coordinate vulnerable populations plans	High	Goal 1	Multi-Hazard
Summit County—2	Support and participate in the Summit County Wildfire Council	High	Goal 1,4	Wildfire
Summit County—3	Integrate wildfire mitigation strategies identified in the Summit County Community Wildfire Protection Plan (CWPP) into the multi-hazard mitigation plan	High	Goal 1,4	Wildfire
Summit County—4	Work with the Summit County Forest Health Group (formerly referred to as Mountain Pine Beetle Task Force) to strengthen public and stakeholder educational efforts	High	Goal 1,4	Wildfire
Summit County—5	Continue to enhance mapping of hazard and vulnerability analysis for wildland-urban interface areas of Summit County	High	Goal 1	Wildfire
Summit County—6	Identify and prioritize fuel reduction projects around critical facilities and infrastructure in wildfire hazard areas	High	Goal 2,3	Wildfire
Summit County—7	Review and strengthen floodplain regulations when adopting new digital flood insurance rate maps (DFIRMs)	High	Goal 1	Flood
Summit County—8	Identify and map geologic hazard zones and incorporate into master planning	Medium	Goal 1,2	Avalanche, Landslide, Mudflow/Debris Flow, Rock Fall

Jurisdiction-Number	Action	Priority	Goals Addressed	Hazards Addressed
Summit County—9	Incorporate information from the multi-hazard mitigation plan into community master plans	Medium	Goal 4	Multi-Hazard
Summit County—10	Develop protection plan for roadside ditches to reduce erosion and flooding	Medium	Goal 2	Erosion/ Deposition, Flood
Summit County—11	Enhance flood protection of the Snake River's collection system to prevent potential sanitary sewer overflows or inundation of critical facilities.	Low	Goal 2	Flood
Summit County—12	Remove the North Fork River Estates lift station and replace it with a gravity sewer line system.	Low	Goal 2	Flood
Summit County—13	Improve education and information on the National Flood Insurance Program (NFIP) and flood hazard areas in Summit County.	Low	Goal 1	Flood
Summit County—14	Consider joining the Community Rating System (CRS)	Low	Goal 1,3	Flood
Blue River—1	Replace collapsing culverts and rebuild bridge over the Blue River on Blue River Road.	High		Flood
Blue River-—2	Continue homeowner defensible space program begun in 2007	Medium	Goal 1	Wildfire
Blue River—3	Regrade Spruce Creek Road to allow safe automobile passage to homes and national forest trails	Low	Goal 1,2	Erosion/ Deposition, Flood
Breckenridge—1	Inspect metal culverts to determine risk of failure	High	Goal 1,2	Flood
Breckenridge—2	Install erosion traps	High	Goal 1,2	Erosion/ Deposition, Flood
Breckenridge—3	Promote defensible space and removal of beetle-infested trees	High	Goal 1,2	Wildfire
Breckenridge—4	Educate public about winter preparedness kits	High	Goal 1	Severe Winter Weather
Breckenridge—5	Update and enhance evacuation plan	Low	Goal 1	Multi-Hazard
Breckenridge—6	Inventory and map locations of hazardous materials	Low	Goal 1	Hazardous Materials Release
Breckenridge—7	Locate portable wayfinding signage around Town during emergency events	Low	Goal 1	Multi-Hazard

Jurisdiction-Number	Action	Priority	Goals Addressed	Hazards Addressed
Dillon—1	Develop a Hazard Mitigation Planning Committee to guide policy and implementation	Low	Goal 4	Multi-Hazard
Dillon—2	Improve education on risk and preparedness and mitigation measures	Low	Goal 1	Multi-Hazard
Frisco—1	Continue to implement mountain pine beetle plan to mitigate wildfire hazard	High	Goal 1,3	Mountain Pine Beetle, Wildfire
Frisco—2	Improve information on website about natural hazard risk and mitigation	Low	Goal 1	Multi-Hazard
Silverthorne—1	Pursue implementation of special improvement districts as a mechanism to fund the undergrounding of existing overhead utility lines	High	Goal 1,2,3	Multi-Hazard
Silverthorne—2	Continue to implement mountain pine beetle program and enforce ordinance	High	Goal 1,3	Mountain Pine Beetle, Wildfire
Silverthorne—3	Revise language of Silverthorne flood damage prevention ordinance to improve clarity and ease of use	Medium	Goal 1	Flood
Silverthorne—4	Insure emergency power for wastewater treatment plant during extended power outage	Medium	Goal 2	Multi-Hazard
Silverthorne—5	Insure continued water distribution during extended power outage	Medium	Goal 2	Multi-Hazard
Silverthorne—6	Develop action plan for responding to an explosive gas event at the head works of the Silverthorne/Dillon Joint Sewer Authority	Low	Goal 2	Not profiled
Buffalo Mountain Metropolitan District—1	Reduce the risk of wildfire in the Wildernest subdivision by assisting property owners with the creation of defensible spaces around residential buildings	High	Goal 1	Wildfire
Buffalo Mountain Metropolitan District—2	Enhance the ability to ensure continuity of water and sewer service during emergencies by converting paper as-built infrastructure drawings to digital format	Medium	Goal 2	Multi-Hazard
Buffalo Mountain Metropolitan District—3	Obtain backup power for water pumping stations	Low	Goal 2	Multi-Hazard
Lake Dillon Fire Protection District—1	Maintain and enhance wildfire mitigation program	High	Goal 1,3	Wildfire
Lake Dillon Fire Protection District—2	Install emergency generators in three fire stations	Medium	Goal 1,2,3	Multi-Hazard
Red, White, and Blue Fire Protection District—1	Create public education program encouraging wildfire defensible space	High	Goal 1	Wildfire
Red, White, and Blue Fire Protection District—2	Promote household winter preparedness kits	High	Goal 1	Severe Winter Weather

Jurisdiction-Number	Action	Priority	Goals Addressed	Hazards Addressed
Red, White, and Blue Fire Protection District—3	Provide backup power to fire stations to protect continuity of services	Medium	Goal 2	Multi-Hazard
Red, White, and Blue Fire Protection District—4	Conduct periodic community evacuation drills	Medium	Goal 1	Multi-Hazard
Red, White, and Blue Fire Protection District—5	Inventory and map locations of hazardous materials	Low	Goal 1	Hazardous Materials Release

PREREQUISITES

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

Note to Reviewers: When this plan has been reviewed and approved pending adoption by FEMA Region VIII, the adoption resolutions will be signed by the participating jurisdictions and added to the Prerequisites section. A model resolution is provided below.

The following jurisdictions participated in the development of this plan and have adopted the multi-jurisdictional plan and their jurisdiction's annex. Resolutions of Adoptions are included on the following pages.

- Summit County, lead agency
- Town of Blue River
- Town of Breckenridge
- Town of Dillon
- Town of Frisco
- Town of Silverthorne
- Buffalo Mountain Metropolitan District
- Lake Dillon Fire Protection District
- Red, White, and Blue Fire Protection District

Model Resolution

Resolution # _____ **Adopting the Summit County Multi-Hazard Mitigation Plan**

Whereas, the (Name of Government/District/Organization seeking FEMA approval of hazard mitigation plan) recognizes the threat that natural hazards pose to people and property within our community; and

Whereas, undertaking hazard mitigation actions will reduce the potential for harm to people and property from future hazard occurrences; and

Whereas, the U.S. Congress passed the Disaster Mitigation Act of 2000 ("Disaster Mitigation Act") emphasizing the need for pre-disaster mitigation of potential hazards;

Whereas, the Disaster Mitigation Act made available hazard mitigation grants to state and local governments;

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

Whereas, the (Name of Government/District/Organization) fully participated in the FEMA-prescribed mitigation planning process to prepare this Multi-Hazard Mitigation Plan; and

Whereas, the Colorado Department of Emergency Management and the Federal Emergency Management Agency Region VIII officials have reviewed the "Summit County Multi-Hazard Mitigation Plan", and approved it contingent upon this official adoption of the participating governing body;

Whereas, the (Name of Government/District/Organization) desires to comply with the requirements of the Disaster Mitigation Act and to augment its emergency planning efforts by formally adopting the Summit County Multi-Hazard Mitigation Plan.

Whereas, adoption by the governing body for the (Name of Government/District/Organization), demonstrates the jurisdictions commitment to fulfilling the mitigation goals and objectives outlined in this Multi-Hazard Mitigation Plan.

Whereas, adoption of this legitimacies the plan and authorizes responsible agencies to carry out their responsibilities under the plan.

Now, therefore, be it resolved, that the (Name of Government/District/Organization) adopts the "Summit County Multi-Hazard Mitigation Plan" as an official plan; and

Be it further resolved, the (Name of Government/District/Organization) will submit this Adoption Resolution to the Colorado Department of Emergency Management and Federal Emergency Management Agency Region VIII officials to enable the plan's final approval.

Passed: _____

_____

Certifying Official

1 INTRODUCTION AND PLANNING AREA PROFILE

1.1 Purpose

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

The four goals of the Summit County Multi-Hazard Mitigation Plan are the following:

- Goal 1: Reduce risk to the people, property, and environment of Summit County from the impacts of natural hazards
- Goal 2: Protect critical facilities and infrastructure
- Goal 3: Minimize economic losses
- Goal 4: Implement the mitigation actions identified in the plan

This plan was also developed to make Summit County and participating jurisdictions eligible for certain federal disaster assistance, specifically, the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Grant Program, Pre-Disaster Mitigation program, and Flood Mitigation Assistance program.

1.2 Background and Scope

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

Hazard mitigation is defined by FEMA as "any sustained action taken to reduce or eliminate long-term risk to human life and property from a hazard event." The results of a three-year, congressionally mandated independent study to assess future savings from mitigation activities provides evidence that mitigation activities are highly cost-effective. On average, each dollar spent on mitigation saves society an average of $4 in avoided future losses in addition to saving lives and preventing injuries (National Institute of Building Science Multi-Hazard Mitigation Council 2005).

Hazard mitigation planning is the process through which hazards that threaten communities are identified, likely impacts of those hazards are determined, mitigation goals are set, and appropriate strategies to lessen impacts are determined, prioritized, and implemented. This plan documents Summit County's hazard mitigation planning process and identifies relevant hazards and vulnerabilities and strategies the County and participating jurisdictions will use to decrease vulnerability and increase resiliency and sustainability in Summit County.

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

- Summit County
- Town of Blue River
- Town of Breckenridge
- Town of Dillon
- Town of Frisco
- Town of Silverthorne
- Buffalo Mountain Metropolitan District
- Lake Dillon Fire Protection District
- Red, White, and Blue Fire Protection District

This plan was prepared pursuant to the requirements of the Disaster Mitigation Act of 2000 (Public Law 106-390) and the implementing regulations set forth by the Interim Final Rule published in the *Federal Register* on February 26, 2002, (44 CFR §201.6) and finalized on October 31, 2007. The 2007 amendments also incorporate mitigation planning requirements of the Flood Mitigation Assistance (FMA) program authorized by the National Flood Insurance Act of 1968. While the Disaster Mitigation Act emphasized the need for mitigation plans and more coordinated mitigation planning and implementation efforts, the regulations established the requirements that local hazard mitigation plans must meet in order for a local jurisdiction to be eligible for certain federal disaster assistance and hazard mitigation funding under the Robert T. Stafford Disaster Relief and Emergency Act (Public Law 93-288).

Information in this plan will be used to help guide and coordinate mitigation activities and decisions for local land use policy in the future. Proactive mitigation planning will help reduce the cost of disaster response and recovery to communities and their residents by protecting critical community facilities, reducing liability exposure, and minimizing overall community impacts and disruptions. The Summit County planning area has been affected by hazards in the past and is thus committed to reducing future impacts from hazard events and becoming eligible for mitigation-related federal funding.

This plan addresses natural hazards and one manmade hazard—hazardous materials release. Although the members of the Summit County Hazard Mitigation Planning Committee (HMPC)

recognize that FEMA encourages communities to integrate manmade hazards into the mitigation planning process, the scope of this effort did not address other manmade hazards for two reasons.

First, many of the planning activities for the mitigation of these hazards are either underway or complete and are addressed in the emergency operations plan for Summit County. Second, the Disaster Mitigation Act of 2000 requires extensive public information and input, and this is in direct conflict with the confidentiality necessary in planning for chemical, biological, and radiological terrorism. Summit County is currently working on security measures related to terrorism and the Dillon Dam with Denver Water, the dam's owner and operator. The HMPC determined it was not in the planning area's best interests to publicly share specific information about its vulnerability to manmade hazards.

1.3 Jurisdictional Annexes

Each jurisdiction participating in this plan developed its own annex, which provides a more detailed assessment of the jurisdiction's unique risks as well as their mitigation strategy to reduce long-term losses. Each jurisdictional annex contains the following:

- Community profile summarizing geography and climate, history, economy, and population
- Hazard information on location, previous occurrences, probability of future occurrences, and magnitude/severity for geographically specific hazards
- Hazard map(s) at an appropriate scale for the jurisdiction, if available
- Number and value of buildings, critical facilities, and other community assets located in hazard areas, if available
- Vulnerability information in terms of future growth and development in hazard areas
- A capability assessment describing existing regulatory, administrative, technical, and fiscal resources and tools as well as outreach efforts and partnerships and past mitigation projects
- Mitigation actions specific to the jurisdiction

1.4 Plan Organization

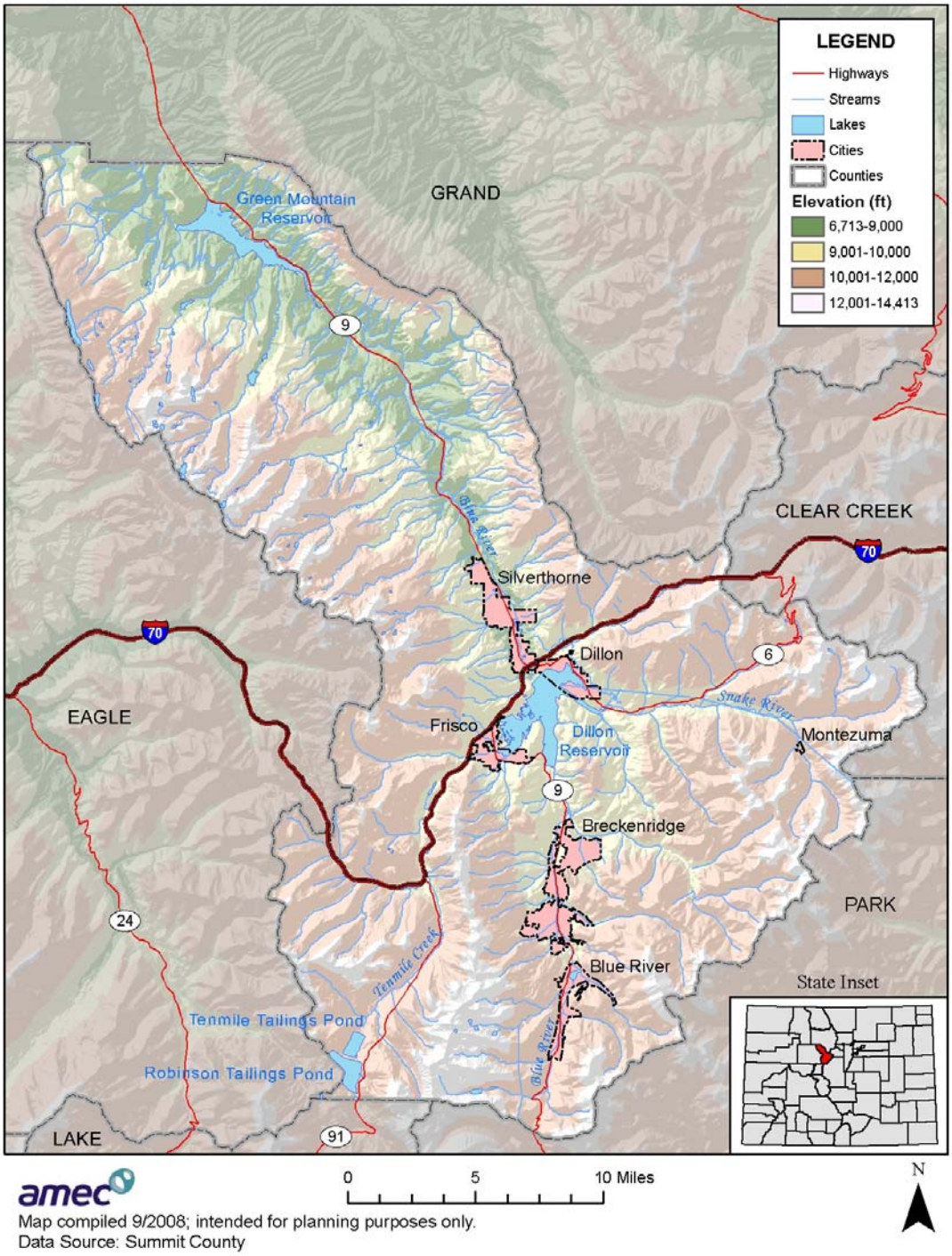
The Summit County Multi-Hazard Mitigation Plan is organized as follows:

- Executive Summary
- Prerequisites
- Chapter 1: Introduction and Planning Area Profile
- Chapter 2: Planning Process
- Chapter 3: Risk Assessment
- Chapter 4: Mitigation Strategy
- Chapter 5: Plan Implementation and Maintenance
- Jurisdictional Annexes
- Appendices

1.5 Planning Area Profile

Figure 1.1 shows a map of the Summit County planning area.

Figure 1.1. Summit County



1.5.1 Geography and Climate

Summit County is located high in the Colorado Rockies along the west side of the Continental Divide. It encompasses approximately 619 square miles and is located slightly northwest of the geographic center of Colorado. Interstate 70, the state's main east-west transportation corridor, bisects the County. The County is bounded by Grand (north), Clear (east), Park (southeast), Lake (southwest), and Eagle counties (west). The eastern section of White River National Forest and Eagles Nest Wilderness are located in Summit County.

The County's topography includes broad mountain valleys flanked by high peaks. Several mountain ranges converge in the County, including portions of the Gore Range, the Ten Mile Range, and the Front Range. Elevations range from 7,500 feet at the northern end of the County where the Blue River enters Grand County to 14,270 feet at the summit of Grays Peak.

Vegetation is based primarily on elevation. The lowest elevation areas in the Lower Blue Basin are composed primarily of sage meadows. At around 9,000 feet and above, coniferous forest predominates. Timberline is located at approximately 11,500 feet, with areas above that elevation comprised of snow, rock, and alpine tundra.

The County has one drainage basin, that of the Blue River. The river flows northerly throughout the County. Two large reservoirs, Dillon and Green Mountain, are located in the central and northern portions of the County, respectively. These reservoirs impound the Blue River, which intersects with the Colorado River about 15 miles north of the County border. Two large tributaries, the Snake River and Ten Mile Creek, also enter Dillon Reservoir.

At the lowest elevations, around Green Mountain Reservoir, summer high temperatures reach into the low 80s. At the County's higher elevations, high temperatures can be significantly cooler, with evening temperatures that can dip into the 30s. Winter lows occasionally drop below -35°F, though daytime temperatures are often in the 20s and 30s. The relative humidity is quite low throughout the year. Much of the annual precipitation comes in the form of winter snow, but afternoon summer thunderstorms are common. Snow is possible at any time of year in the highest elevations.

1.5.2 Population

Summit County has the 20th largest population of the 64 counties in Colorado. Summit County has grown by 18.7 percent since the 2000 U.S. Census. The estimated County population in 2006 was 27,964. The majority of the County's population is in unincorporated areas. Population estimates for the year 2006 for each of the incorporated towns and the unincorporated County are provided in Table 1.1.

Table 1.1. Summit County Population

Jurisdiction	April 2000	July 2006*
Town of Blue River	685	752
Town of Breckenridge	2,408	3,439
Town of Dillon	802	818
Town of Frisco	2,443	2,742
Town of Montezuma	42	49
Town of Silverthorne	3,196	3,956
Unincorporated Summit County	13,972	16,208
Total Summit County	**23,548**	**27,964**

Source: Colorado Department of Local Affairs, www.dola.colorado.gov/
*Estimate

Select 2000 U.S. Census demographic and social characteristics for Summit County are shown in Table 1.2. Characteristics for Summit County are for the entire County.

Table 1.2. Summit County Demographic and Social Characteristics

Characteristic	Summit County	Town of Blue River	Town of Breckenridge	Town of Dillon	Town of Frisco	Town of Montezuma	Town of Silverthorne
Gender/Age							
Male (%)	58.2	55	61.7	55.2	57.9	57.1	56.6
Female (%)	41.8	45	38.3	44.8	42.1	42.9	43.4
Under 5 Years (%)	5.3	5.3	3.0	3.6	3.5	4.8	6.8
65 Years and Over (%)	3.3	2.6	2.1	9.0	5.0	0	2.0
Race/Ethnicity (one race)							
White (%)	91.8	98.4	95.6	95.6	96.4	100	82.2
Hispanic/Latino (Any Race) (%)	9.8	2.0	5.4	10.3	3.5	2.4	23.5
Other							
Average Household Size	2.48	2.56	2.16	2.17	2.32	2.1	2.9
High School Grad or Higher (%)	93.3	98.3	96.9	90.7	92.2	100	84.8

Source: U.S. Census Bureau, 2000, www.census.gov/

With the reputation as a national and international center for winter sports and outdoor recreation, peak seasonal population in Summit County may swell to nearly 150,000 people. According to the County's general plan, monthly average population fluctuation indexes indicate that March has the highest seasonal population, with 147.4 percent of average occupation; May has the lowest with 54.1 percent of average.

1.5.3 History

Summit County's history has included several waves of settlement and activity. Native Americans, who hunted in the area in the summer months, represented the first wave of settlers. In 1859, the second wave marked the official settlement of the area when gold was discovered in the Blue River just north of present-day Breckenridge. The Town of Breckenridge was founded,

and it became the first permanent town on Colorado's Western Slope. Soon, other areas of the County were prospected and dozens of town settlements were established, including Frisco and Dillon.

While mining was the dominant employment activity in most of the County during the late 1800s and early 1900s, another source of income came from ranching. Ranching occurred throughout the valley areas of the County, but was most prevalent in the Lower Blue River valley. Because of the high elevation, ranching in the County has been mostly limited to raising cattle and growing hay. Some of the ranches in the County have been handed down through the family for generations and continue to be actively ranched.

By the 1960s, mining was mainly a memory of the past (with the exception of the Climax Molybdenum Mine at Fremont Pass), and the Arapahoe Basin and Breckenridge ski areas started to draw a new wealth to the County in the form of tourism. As skiing increased in popularity, the Keystone and Copper Mountain ski areas were created in the early 1970s, and the County experienced its third wave of settlement and growth. Today's economy is based primarily on the County's recreational amenities.

1.5.4 Economy

Tourism and recreation dominate the County's economy. The local economy has transitioned from a dependence on mining in the late 1800s to dependence on some of the country's best-known and premier recreation and winter resorts. What started decades ago as a traditional seasonal ski economy is developing into a diverse year-round tourism-based economy. Four major ski areas are located in Summit County: Arapahoe Basin, Breckenridge, Copper Mountain, and Keystone. In the summer months, Dillon and Green Mountain reservoirs are popular recreation destinations. Approximately 80 percent of the land area in Summit County is publicly owned and is managed by the U.S. Forest Service. These lands offer a full spectrum of backcountry and wilderness recreation opportunities.

According to the 2000 U.S. Census, the industries that employed the highest percentages of Summit County's labor force were arts, entertainment, recreation, accommodation, and food services (30.2%); construction (13.8%); retail trade (12.3%); and finance, insurance, real estate, and rental and leasing (10.3%). Select economic characteristics for Summit County from the 2000 Census and the Bureau of Labor Statistics are shown in Table 1.3. Characteristics for Summit County are for the entire County.

Table 1.3. Summit County Economic Characteristics

Characteristic	Summit County	Town of Blue River	Town of Breckenridge	Town of Dillon	Town of Frisco	Town of Montezuma	Town of Silverthorne
Families below Poverty Level*	150	4	17	9	9	0	21
Individuals below Poverty Level*	2,098	45	200	50	170	3	228
Median Home Value ($)	317,500	337,000	580,100	364,300	298,800	118,800	264,300
Median Household Income ($)*	56,587	61,964	43,938	49,821	62,267	38,750	58,839
Per Capita Income ($)	28,676	28,411	29,675	32,727	31,232	31,924	24,271
Population in Labor Force	17,081	382	1,939	516	1,789	26	2,161
Unemployment**	2.9%	n/a	n/a	n/a	n/a	n/a	n/a

Source: U.S. Census Bureau (2000), www.census.gov/; Bureau of Labor Statistics, www.bls.gov
*1999; **March 2008

2 PLANNING PROCESS

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

The Summit County Office of Emergency Management recognized the need and importance of this plan and was responsible for its initiation and for securing funding. The County contracted with AMEC Earth and Environmental (AMEC) in January 2008 to facilitate and develop a multi-jurisdictional, multi-hazard mitigation plan. AMEC's role was to:

- Assist in establishing a Hazard Mitigation Planning Committee (HMPC) for the County that incorporates key stakeholders and representatives from each participating jurisdiction
- Meet all of the planning requirements of the Disaster Mitigation Act (DMA) and the Flood Mitigation Assistance program as established by federal regulations and following FEMA's planning guidance
- Facilitate the planning process
- Identify the data requirements that the HMPC can provide and conduct the research and documentation necessary to augment that data
- Develop and facilitate the public input process
- Produce the draft and final plan documents
- Coordinate the Colorado Division of Emergency Management, Colorado Water Conservation Board, and FEMA Region VIII reviews of the plan and its formal adoption by the Summit County Board of County Commissioners and the governing bodies of each of the participating jurisdictions

The remainder of this chapter provides a narrative description of the steps taken to prepare the hazard mitigation plan.

2.1 Multi-Jurisdictional Participation

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

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

- Designate a representative to serve on the HMPC
- Participate in HMPC meetings
- Complete and return the AMEC Data Collection Guide
- Identify mitigation actions for the plan
- Review and comment on plan drafts
- Inform the public, local officials, and other interested parties about the planning process and provide opportunity for them to comment on the plan
- Formally adopt the mitigation plan

All of the jurisdictions with annexes to this plan met all of these participation requirements. In most cases, the representative for each jurisdiction brought together a planning team to help collect data, identify mitigation actions and implementation strategies, and review annex drafts. Table 2.1 shows the attendance of representatives at each HMPC meeting; sign-in sheets are included in Appendix B: Planning Process Documentation.

Table 2.1. Jurisdictional Participation in HMPC Meetings

Jurisdiction	Kickoff Meeting	Meeting #2	Meeting #3	Open House
Summit County	✓	✓	✓	✓
Town of Blue River			✓	
Town of Breckenridge	✓	✓	✓	✓
Town of Dillon	✓	✓	✓	✓
Town of Frisco			✓	✓
Town of Silverthorne		✓	✓	✓
Buffalo Mountain Metropolitan District	✓	✓	✓	
Lake Dillon Fire Protection District	✓			✓
Red, White, and Blue Fire Protection District	✓	✓		✓

2.2 The 10-Step Planning Process

AMEC and the Summit County Office of Emergency Management worked together to establish the framework and process for this planning effort using FEMA's *Local Multi-Hazard Mitigation Planning Guidance* (2008) and the State and Local Mitigation Planning How-To Guides (2001), which include *Multi-Jurisdictional Mitigation Planning* (2006). The plan is structured around a four-phase process:

1) Organize resources
2) Assess risks
3) Develop the mitigation plan
4) Implement the plan and monitor progress

Into this process, AMEC integrated a more detailed 10-step planning process used for FEMA's Community Rating System (CRS) and Flood Mitigation Assistance programs. Thus, the modified 10-step process used for this plan meets the funding eligibility requirements of the Hazard Mitigation Grant Program, Pre-Disaster Mitigation program, Community Rating System, and Flood Mitigation Assistance program. Table 2.2 shows how the modified 10-step process fits into FEMA's four-phase process.

Table 2.2. Mitigation Planning Process Used to Develop the Plan

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

Phase I Organize Resources

Step 1: Organize the Planning Effort

The planning process officially began with a kickoff meeting in Frisco, Colorado, on February 15, 2008. The Summit County Office of Emergency Management mailed letters of invitation to the kickoff meeting to county, municipal, district, state, and other stakeholder representatives. This list is included in Appendix B.

The Disaster Mitigation Act requires that each jurisdiction participate in the planning process and officially adopt the multi-jurisdictional hazard mitigation plan. A planning committee was created that includes representatives from each participating jurisdiction, departments of the County, and other local, state, and federal organizations responsible for making decisions in the plan and agreeing upon the final contents. Kickoff meeting attendees discussed potential participants and made decisions about additional stakeholders to invite to participate on the HMPC.

The following agencies or organizations participated on the HMPC:

- Summit County Office of Emergency Management
- Summit County Engineering
- Summit County Environmental Health
- Summit County Information Systems (GIS)
- Summit County Planning
- Summit County Sheriff's Office
- Snake River Wastewater Treatment Plant
- Town of Blue River
- Town of Breckenridge
- Town of Dillon
- Town of Frisco
- Town of Silverthorne
- Buffalo Mountain Metropolitan District
- Lake Dillon Fire Protection District
- Lower Blue Fire Protection District
- Red, White, and Blue Fire Protection District
- Northwest Colorado Council of Governments
- Colorado Division of Emergency Management
- U.S. Forest Service

Summit County Multi-Hazard Mitigation Plan Kickoff Meeting

The HMPC contributed to this planning process by:

- providing facilities for meetings,
- attending meetings,
- collecting data,
- managing administrative details,
- making decisions on plan process and content,
- submitting mitigation action implementation worksheets,
- reviewing drafts, and
- coordinating and assisting with public involvement and plan adoptions.

The HMPC communicated during the planning process with a combination of face-to-face meetings, phone interviews, email correspondence, and an FTP (file transfer protocol) site. The meeting schedule and topics are listed in Table 2.3. The sign-in sheets and agendas for each of the meetings are included in Appendix B.

Table 2.3. Schedule of HMPC Meetings

Meeting	Topic	Date
Kickoff Meeting	Introduction to DMA and the planning process; Identification of hazards impacting Summit County	February 15, 2008
HMPC #2	Review of risk assessment; Identification of goals and objectives	May 9, 2008
HMPC #3	Identification and prioritization of mitigation actions; Discussion of process to monitor, evaluate, and update plan	July 24, 2008

During the kickoff meeting, AMEC presented information on the scope and purpose of the plan, participation requirements of HMPC members, and the proposed project work plan and schedule. Plans for public involvement (Step 2) and coordination with other agencies and departments (Step 3) were discussed. AMEC also introduced hazard identification requirements and data. The HMPC discussed past events and impacts and future probability for each of the hazards required by FEMA for consideration in a local hazard mitigation plan. The HMPC refined the list of hazards to make it relevant to Summit County. Participants were given the AMEC Data Collection Guide to facilitate the collection of information needed to support the plan, such as data on historic hazard events, values at risk, and current capabilities. Each participating jurisdiction completed and returned the worksheets in the data collection guide to AMEC.

Step 2: Involve the Public

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

At the kickoff meeting, the HMPC discussed options for soliciting public input on the mitigation plan and developed an outreach strategy by consensus.

During the plan's drafting stage, the HMPC held a Natural Hazards Planning Open House at the Community and Senior Center in Frisco on July 24, 2008. The public was informed of the meeting through flyers placed at community locations and announcements on the Krystal 93 FM radio station on July 24, 2008. The HMPC provided information to the local newspaper, but it was accidentally overlooked and not printed. A copy of the sign-in sheet is provided in Appendix B.

At the open house, AMEC presented information on the purpose of the plan and its planning process, the results of the risk assessment, and the mitigation strategy developed by the HMPC. Members of the HMPC then presented the mitigation actions identified at their morning meeting. The mitigation actions were listed on posters placed around the room. Each attendee at the public meeting was given five sticky dots and asked to vote on their top five mitigation actions by placing one dot next to each one. They used the same prioritization criteria as the HMPC. This

input was used in the final prioritization of the mitigation actions. See Section 4.3 Implementation of Mitigation Actions for more detailed information on the prioritization.

The public was also given an opportunity to provide input on a draft of the complete plan prior to its submittal to the State and FEMA. Summit County provided the plan draft for review and comment on the Office of Emergency Management website at http://www.co.summit.co.us/emergencymanagement/ and in hard copy at the following locations:

- Summit County Sheriff's Office (Breckenridge)
- Summit County Library Main Branch - Frisco
- Summit County Library North Branch - Silverthorne

The plan was available at these locations from September 8 to 21, 2008. The jurisdictions announced the availability of the draft plan and the public comment period in the *Summit Daily News* on September 7, 2008. A copy of this notice is provided in Appendix B.

The Summit County Office of Emergency Management also emailed all County staff involved in the planning process, including the County Managers Office and the Summit County Board of County Commissioners on September 11, 2008, asking for final review and comment on the plan prior to submittal to the State and FEMA.

One member of the public submitted comments on the plan and identified concerns related to the Town of Silverthorne's role in the planning process, employment and economic assets, and risk of dam failure to Silverthorne and Heeney. Most of these comments were addressed in Chapters 2 and 3. The comment is on file with the Summit County Office of Emergency Management.

Step 3: Coordinate with Other Departments and Agencies

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

There are numerous organizations whose goals and interests interface with hazard mitigation in Summit County. Coordination with these organizations and other community planning efforts is vital to the success of this plan. The Summit County Office of Emergency Management invited other local, state, and federal departments and agencies to the kickoff meeting to learn about the hazard mitigation planning initiative. Many of the agencies participated throughout the planning process on the HMPC and were listed previously in Step 1: Organize the Planning Effort.

In addition, the HMPC developed a list of neighboring communities and local and regional agencies involved in hazard mitigation activities, as well as other interested parties, to invite by letter to the open house on July 24, 2008. The list of stakeholders invited and the invitation letter are included in Appendix B. The invitation letter was also distributed on email lists to two community groups: Our Future Summit and Friends of the Lower Blue.

As part of the coordination with other agencies, the HMPC collected and reviewed existing technical data, reports, and plans. State and federal agency data sources, including National Weather Service web pages and FEMA Flood Insurance Studies, were used to collect information. Summit County and its communities use a variety of comprehensive planning mechanisms, such as land use and general plans, emergency operations plans, and municipal ordinances and building codes, to manage community growth and development. This information was used in the development of the hazard identification, vulnerability assessment, and capability assessment and in the formation of goals, objectives, and mitigation actions. These sources are documented throughout the plan and specifically in the capability assessment sections of each jurisdictional annex.

Phase 2 Assess Risk

Step 4: Identify the Hazards

AMEC assisted the HMPC in a process to identify the natural hazards that have impacted or could impact communities in Summit County. At the kickoff meeting, the HMPC discussed past events and impacts and future probability for each of the hazards required by FEMA for consideration in a local hazard mitigation plan. The HMPC refined the list of hazards to make it relevant to Summit County. A profile of each of these hazards was then developed. Web resources, existing reports and plans, and existing GIS layers were used to compile information about past hazard events and determine the location, previous occurrences, probability of future occurrences, and magnitude/severity of each hazard. The Summit County Data Collection Guide distributed at the kickoff meeting helped identify hazards and vulnerabilities. Information on the methodology and resources used to identify and profile hazards is provided in Sections 3.1-3.2.

HMPC Members Discuss Risk Assessment Findings

Step 5: Assess the Risks

After profiling the hazards that could affect Summit County, the HMPC collected information to describe the likely impacts of future hazard events on the participating jurisdictions. This step included two parts: a vulnerability assessment and a capability assessment.

Vulnerability Assessment—Participating jurisdictions inventoried their assets at risk to natural hazards—overall and in identified hazard areas. These assets included total number and value of structures; critical facilities and infrastructure; natural, historic, and cultural assets; and economic assets. The HMPC also analyzed development trends in hazard areas. FEMA's loss estimation computer software, HAZUS-MH, was used to estimate potential losses due to a 100-year flood for major streams in the County (those with a minimum drainage area of 10 square miles).

Capability Assessment—This assessment consisted of identifying the existing mitigation capabilities of participating jurisdictions. This involved collecting information about existing government programs, policies, regulations, ordinances, and plans that mitigate or could be used to mitigate risk to disasters. Participating jurisdictions collected information on their regulatory, personnel, fiscal, and technical capabilities, as well as ongoing initiatives related to interagency coordination and public outreach. This information is included in the jurisdictional annexes.

AMEC provided the draft risk assessment to the HMPC in May 2008 for review and comment. Results of the risk assessment were presented and comments discussed at the second meeting of the HMPC.

Phase 3 Develop the Mitigation Plan

Step 6: Set Goals

AMEC facilitated a brainstorming and discussion session with the HMPC during their second meeting to identify goals and objectives for the overall multi-jurisdictional mitigation plan. The HMPC discussed definitions and examples of goals, objectives, and actions and considered the goals of the state hazard mitigation plan and other relevant local plans when forming their own goals and objectives. Then, each attendee identified and presented three ideas for plan goals and relevant objectives for each one. The group discussed the ideas and came to consensus on the final goals and objectives for the multi-jurisdictional plan, which are further discussed in Chapter 4.

Step 7: Review Possible Activities

The HMPC identified and prioritized mitigation actions at their third meeting. The group was presented with six different categories of mitigation actions and examples of each. The HMPC then participated in a brainstorming process, in which each committee member identified at least one mitigation action to address each of the plan's four goals. The HMPC then reviewed potential mitigation alternatives and identified new actions by hazard to ensure that all of the plan's profiled hazards were addressed.

The HMPC discussed criteria for narrowing down and prioritizing the identified actions. The group approved the STAPLEE criteria, which assesses the social, technical, administrative, political, legal, economic, and environmental implications of each action. Each member used this criteria to vote for their four highest priority projects. Projects were then sorted into high,

medium, or low priority based upon the number of votes they received. This process is described in more detail in Chapter 4 Mitigation Strategy.

The HMPC also identified the responsible agency for implementing each action. The identified agencies then completed a mitigation action implementation worksheet for each action. The purpose of these worksheets is to document background information, ideas for implementation, alternatives, responsible agency, partners, potential funding, cost estimates, benefits, and timeline for each identified action.

Each jurisdiction was responsible for completing mitigation action implementation worksheets for each action identified by the HMPC that they would need to implement on the jurisdictional level. The jurisdictions were also responsible for working with their local staff to submit additional mitigation actions unique to their jurisdiction.

Step 8: Draft the Plan

Drafts of the jurisdictional annexes to the plan were developed and submitted to the HMPC for internal review in August. Once the committee's comments were incorporated, a complete draft of the plan was made available online and in hard copy for review and comment by the public and other agencies and interested stakeholders. This review period was from September 8-21, 2008. Methods for inviting interested parties and the public to review and comment on the plan were discussed in Steps 2 and 3, and materials are provided in Appendix B. Comments were integrated into a final draft for submittal to the Colorado Division of Emergency Management, Colorado Water Conservation Board, and FEMA Region VIII.

Phase 4 Implement the Plan and Monitor Progress

Step 9: Adopt the Plan

To secure buy-in and officially implement the plan, the governing bodies of each participating jurisdiction adopted the plan and their jurisdictional annex. Scanned copies of resolutions of adoption are included in the Prerequisites section at the beginning of this plan.

Step 10: Implement, Evaluate, and Revise the Plan

The HMPC developed and agreed upon an overall strategy for plan implementation and for monitoring and maintaining the plan over time during Meeting #3. This strategy is described in Chapter 5.

3 RISK ASSESSMENT

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

Risk to natural hazards is a combination of hazard, vulnerability, and capability. This chapter will examine hazards and vulnerability. Jurisdictional annexes to the plan discuss the capabilities for each of the participating jurisdictions as well as the hazards and vulnerability particular to their area.

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

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

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

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

- **Section 3.1 Hazard Identification** identifies the hazards that threaten the planning area and describes why some hazards have been omitted from further consideration.
- **Section 3.2 Hazard Profiles** discusses the geographic location, past events, future probability, magnitude/severity, and overall vulnerability of the planning area to each hazard.
- **Section 3.3 Vulnerability Assessment** assesses the County's total exposure to natural hazards and considers assets at risk, including critical facilities and infrastructure; natural, historic, and cultural resources; and economic assets. This section also describes vulnerability and estimates potential losses to structures in identified hazard areas and addresses development and land use trends.

3.1 Hazard Identification

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

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

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

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

- State of Colorado Natural Hazards Mitigation Plan (2007)
- Information on past hazard events from the Spatial Hazard Event and Loss Database (SHELDUS), a component of the University of South Carolina Hazards Research Lab, that compiles county-level hazard data for 18 different natural hazard event types
- Information on past extreme weather and climate events from the National Oceanic and Atmospheric Administration's (NOAA) National Climatic Data Center
- Disaster declaration history from FEMA, the Public Entity Risk Institute, and the U.S. Department of Agriculture (USDA) Farm Service Agency

The HMPC eliminated some hazards from further profiling because they do not occur in the planning area or their impacts were not considered significant in relation to other hazards. Table 3.1 lists these hazards and provides a brief explanation for their elimination.

Table 3.1. Hazards Not Profiled in the Plan

Hazard	Explanation for Omission
Coastal Storm	Planning area is not near coastal areas.
Expansive Soils	Expansive soils are not a common soil type in the planning area and the HMPC was unaware of past impacts.
Extreme Heat*	The hazard has not created problems in the past. Due to the high altitude and alpine environment of Summit County temperatures are rarely hot enough to affect human health.
Hailstorm*	Hailstorms occur, but large-sized damaging hail similar to that occurring on the Front Range of Colorado is very rare. Past damage has been negligible.
Hurricane	Planning area is not near coastal areas.
Land Subsidence	Hazard is primarily related to coal mining in Colorado. There are no coal mines in Summit County. The HMPC are unaware of any areas of concern or past impacts.
Tornado	Past events have been rare and weak in strength (F0). Damages are addressed in the profile for windstorm.
Tsunami	Planning area is not near coastal areas.
Volcano	Dotsero, near Glenwood Canyon, is the only volcano of concern in Colorado. It has not erupted in 4,000 years.

Source: Summit County Hazard Mitigation Planning Committee, 2008
*Although Summit County has received USDA disaster declarations for these hazards, it was as a contiguous county, and no information has been found to suggest that the County was seriously impacted.

The HMPC identified 13 natural hazards that significantly affect the planning area and organized these hazards to be consistent with the State of Colorado Natural Hazards Mitigation Plan (2007). These hazards are profiled in further detail in the next section and are listed in Table 3.2 along with a checkmark indicating the jurisdictions impacted by the hazard.

Although not required by the Disaster Mitigation Act, the HMPC decided to address one manmade hazard—hazardous materials release. The risk from this hazard is related primarily to the transportation of hazardous materials through the County, and the HMPC believed this was an important issue to incorporate into this hazard planning process.

The HMPC also decided to profile mountain pine beetle infestation. This hazard affects the lodgepole pine tree population in the County and exacerbates wildfire risk.

Table 3.2. Hazards Identified for Each Participating Jurisdiction

Hazard	Summit County	Blue River	Breckenridge	Dillon	Frisco	Silverthorne	Buffalo Mountain Metropolitan District	Lake Dillon FPD*	Red, White, and Blue FPD*
Avalanche	✓	✓	✓				✓		
Dam Failure	✓		✓		✓	✓			
Drought	✓	✓	✓	✓	✓	✓	✓	✓	✓
Earthquake	✓	✓	✓	✓	✓	✓	✓		
Erosion and Deposition	✓	✓	✓	✓	✓	✓	✓	✓	✓
Flood	✓	✓	✓	✓	✓	✓	✓	✓	✓
Hazardous Materials Release (Transportation)	✓	✓	✓	✓	✓	✓		✓	✓
Landslide, Mudflow/Debris Flow, Rock Fall	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lightning	✓	✓	✓	✓	✓	✓		✓	✓
Mountain Pine Beetle Infestation	✓	✓	✓	✓	✓	✓	✓	✓	✓
Severe Winter Weather	✓	✓	✓	✓	✓		✓		
Wildfire	✓	✓	✓	✓	✓	✓	✓	✓	✓
Windstorm	✓	✓	✓	✓	✓	✓	✓	✓	✓

Source: Summit County Hazard Mitigation Planning Committee, 2007
*FPD=Fire Protection District

3.1.3 Disaster Declaration History

One method used by the HMPC to identify hazards was to examine events that triggered federal and/or state disaster declarations. Federal and/or state declarations may be granted when the severity and magnitude of an event surpasses the ability of the local government to respond and recover. Disaster assistance is supplemental and sequential. When the local government's capacity has been surpassed, a state disaster declaration may be issued, allowing for the provision of state assistance. Should the disaster be so severe that both the local and state governments' capacities are exceeded; a federal emergency or disaster declaration may be issued allowing for the provision of federal assistance.

The federal government may issue a disaster declaration through FEMA, the USDA, and/or the Small Business Administration (SBA). FEMA also issues emergency declarations, which are more limited in scope and without the long-term federal recovery programs of major disaster declarations. The quantity and types of damage are the determining factors.

A USDA disaster declaration certifies that the affected county has suffered at least a 30 percent loss in one or more crop or livestock areas and provides affected producers with access to low-interest loans and other programs to help mitigate the impact of the disaster. In accordance with the Consolidated Farm and Rural Development Act, all counties neighboring those receiving

disaster declarations are named as contiguous disaster counties and, as such, are eligible for the same assistance.

Table 3.3 lists state and federal disaster declarations received by Summit County. Many of the disaster events were regional or statewide; therefore, reported costs are not accurate reflections of losses to Summit County.

Table 3.3. Disaster Declaration History in Summit County, 1953-Present

Date Declared	Disaster Name	Declaration Type	Disaster Number	Cost ($)
8/8/2006	Heat, high winds, and ongoing drought	USDA (contiguous)	S2351	
7/11/2006	Heat, high winds, insect pests, late freeze, and ongoing drought	USDA (contiguous)	S2329	
7/10/2006	Drought, fire, high winds, and heat	USDA (contiguous)	S2327	
1/4/2006	Drought	USDA (contiguous)	S2188a	
1/4/2006	Wind, heavy rain, and hail	USDA (contiguous)	S2188b	
4/9/2003	Snow	Presidential Emergency Declaration	3185	9,198,775[1]
6/19/2002	Wildfires	Presidential Major Disaster Declaration	1421	7,131,538[1]
2002	Drought	USDA		
1995	Flooding	State		
1/29/1977	Drought	Presidential Emergency Declaration	3025	4,624,607[1]

Source: State of Colorado Natural Hazards Mitigation Plan; Public Entity Risk Institute Presidential Disaster Declaration Site, www.peripresdecusa.org/mainframe.htm; USDA Farm Service Agency, www.fsa.usda.gov/Internet/FSA_File/2005_2007eligible_county.xls
[1]Costs are in 2006 dollars and are statewide

More than half of the declarations were for, or included, drought. These declarations, which were USDA declarations with the exception of one, were in 1977, 2002, and 2006 (four declarations). Summit County was included in the Presidential Major Disaster Declaration for wildfire in 2002; however; major fires or losses were not sustained in the County itself. The County provided aid to affected areas but no reimbursement was involved.

It is important to be aware that hazard events that happen outside of the County boundaries also can have direct and indirect impacts to Summit County. For instance, transportation routes or power supply could be interrupted by severe winter storms or wildfire hazards outside of the County.

3.2 Hazard Profiles

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

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

The hazards identified in Section 3.1 Hazard Identification are profiled individually in this section. The section will conclude by summarizing the probability of future occurrence and potential magnitude of each hazard for each jurisdiction, as well as assigning an overall vulnerability, or planning significance, rating of high, moderate, or low for each hazard.

The sources used to collect information for these profiles include the following:

- Disaster declaration history from FEMA, the Public Entity Risk Institute, and the USDA Farm Service Agency
- State of Colorado Natural Hazards Mitigation Plan (2007)
- Summit County Community Wildfire Protection Plan (2006)
- Summit County Countywide Comprehensive Plan (2003)
- Internet resources on past hazard events, such as the SHELDUS database created by the University of South Carolina Hazards Research Lab and the National Climatic Data Center Storm Events Database
- Geographic information systems (GIS) data from the Summit County GIS Department
- Statewide GIS datasets compiled by state and federal agencies
- Other existing plans and reports
- Personal interviews with HMPC members and other stakeholders
- Summit County Data Collection Guide completed by each participating jurisdiction

Detailed profiles for each of the identified hazards include information on the following characteristics of the hazard:

Hazard Description

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

Geographic Location

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

- **Large**—More than 50 percent of the planning area affected
- **Medium**—25-50 percent of the planning area affected
- **Small**—10-25 percent of the planning area affected
- **Isolated**—Less than 10 percent of the planning area affected

Previous Occurrences

This section includes information on historic incidents, including impacts and costs, if known. A historic incident worksheet was used to capture information from participating jurisdictions on past occurrences. Information from the HMPC was combined with other data sources, including those previously mentioned.

Probability of Future Occurrence

The frequency of past events is used to gauge the likelihood of future occurrences. Based on historical data, the Probability of Future Occurrence is categorized as follows:

- **Highly Likely**—Near 100 percent chance of occurrence next year or happens every year
- **Likely**—10-100 percent chance of occurrence in next year or has a recurrence interval of 10 years or less
- **Occasional**—1-10 percent chance of occurrence in the next year or has a recurrence interval of 11 to 100 years
- **Unlikely**—Less than 1 percent chance of occurrence in next 100 years or has a recurrence interval of greater than every 100 years

The probability, or chance of occurrence, was calculated where possible based on existing data. Probability was determined by dividing the number of events observed by the number of years and multiplying by 100. This gives the percent chance of the event happening in any given year. An example would be three droughts occurring over a 30-year period, which suggests a 10 percent chance of a drought occurring in any given year.

Magnitude/Severity

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

- **Catastrophic**—Multiple deaths; property destroyed and severely damaged; and/or interruption of essential facilities and service for more than 72 hours
- **Critical**—Isolated deaths and/or multiple injuries and illnesses; major or long-term property damage that threatens structural stability; and/or interruption of essential facilities and services for 24-72 hours

- **Limited**—Minor injuries and illnesses; minimal property damage that does not threaten structural stability; and/or interruption of essential facilities and services for less than 24 hours
- **Negligible**—No or few injuries or illnesses; minor quality of life loss; little or no property damage; and/or brief interruption of essential facilities and services

3.2.1 Avalanche

Hazard Description

Avalanche hazards occur predominantly in the mountainous regions of Colorado above 8,000 feet. The vast majority of avalanches occur during and shortly after winter storms. Avalanches occur when loading of new snow increases stress at a rate faster than strength develops, and the slope fails. Critical stresses develop more quickly on steeper slopes and where deposition of wind-transported snow is common. While most avalanches are caused simply by the weight of accumulated snow, other triggers can be a human (e.g., skier, snowshoer, snowmobiler), animal, or a sonic boom.

The combination of steep slopes, abundant snow, weather, snowpack, and an impetus to cause movement create an avalanching episode. According to the Colorado Avalanche Information Center (CAIC), about 90 percent of all avalanches start on slopes of 30-45 degrees; about 98 percent of all avalanches occur on slopes of 25–50 degrees. Avalanches release most often on slopes above timberline that face away from prevailing winds (leeward slopes collect snow blowing from the windward sides of ridges). Avalanches can run, however, on small slopes well below timberline, such as gullies, road cuts, and small openings in the trees. Very dense trees can anchor the snow to steep slopes and prevent avalanches from starting; however, avalanches can release and travel through a moderately dense forest. An average-sized avalanche travels around 80 miles mph; the typical range of impact pressure from an avalanche is from 0.5 to 5.0 tons per foot.

Historically in Colorado, avalanches have occurred during the winter and spring months between November and April. The avalanche danger increases with major snowstorms and periods of thaw. About 2,300 avalanches are reported to the CAIC in an average winter. More than 80 percent of these fall during or just after large snowstorms. The most avalanche-prone months are, in order, February, March, and January. Avalanches caused by thaw occur most often in April.

Geographic Location

The geographic extent of this hazard in Summit County is **isolated**—less than 10 percent of the planning area affected

The prevailing winds in the region are westerlies, and most slides start on the lee (downwind) or eastern side of ridges where snow accumulates, such as on the east side of the Ten Mile Range in the southern part of the County. Avalanches and fatalities have occurred on Quandary Peak in

the Ten Mile Range and in the Arapahoe Basin ski area and surrounding backcountry terrain in the eastern part of the County near Loveland Pass (see Previous Occurrences).

The most severe avalanche terrain in Summit County is on federally owned lands. Unincorporated Summit County is the jurisdiction with the most avalanche risk. However, highway closures due to an event can affect all participating jurisdictions.

Previous Occurrences

According to information from a *History of Colorado Avalanche Accidents, 1859–2006*, there were 58 avalanche-related deaths in Summit County between 1859 and 2006. The National Climatic Data Center Storm Events Database and the CAIC have information on 12 notable avalanches (e.g., avalanches that involved people) that occurred in Summit County between 1997 and 2006, details of these and others are summarized below.

- **May 20, 2005**—A 53-year-old skier from Boulder was buried and killed in a medium-sized wet slab avalanche at Arapahoe Basin. The avalanche occurred in an area known as the First Alley, immediately below the roll on the west side of the Pallavicini Run. (See Figure 3.1.)
- **May 18, 2005**—A backcountry snowboarder triggered a small slab avalanche on the north side of Buffalo Mountain. He received leg and facial injuries.
- **March 24, 2005**—Two climbers were caught in an avalanche on the south side of Quandary Peak, about 6.5 miles south southwest of Breckenridge. One man survived with only minor injuries; the other was buried and killed.
- **March 10, 2004**—A snowmobiler was killed in an avalanche on Mt. Guyot.
- **March 20, 2003**—Two out-of-area skiers were caught in an avalanche on Porcupine Peak west of Loveland Pass. One was injured, the other killed.
- **November 11, 2002**—Two climbers were caught and one was seriously injured when swept down the south side of Quandary Peak.
- **February 2, 2002**—A snowmobiler triggered an avalanche on Mt. Guyot that left him buried up to his neck in snow. He was rescued by friends.
- **April 3, 2001**—A snowmobiler was buried and killed in an avalanche east of the Copper Mountain ski area.
- **December 2, 2000**—Two men were glissading (sitting) when the snow fractured and swept them down for a short and bumpy ride. The pair were lucky the snow did not sweep them into the large rocks near the toe of the debris. Both men remained on the surface and were able to walk away.
- **April 21, 2000**—Two out-of-area skiers were caught in an avalanche at Arapahoe Basin. One died from his injuries a few days later.
- **January 25, 2000**—An out-of-area snowboarder was buried and killed at Arapahoe Basin.
- **December 21, 1999**—A lone backcountry skier was buried and killed on the south side of Quandary Peak.

- **March 15, 1987**—Two brothers died in an avalanche while snowmobiling in the Shrine Pass area.
- **February 18, 1987**—The Peak 7 avalanche near the Breckenridge Ski Area ripped across the entire face of the peak and left debris piled up to 20 feet deep across 23 acres. Despite the warnings, eight backcountry skiers were caught in the slide, which resulted in one of the largest search and rescue missions ever in Colorado. Four of the skiers were killed.

Figure 3.1. Arapahoe Basin Avalanche, May 20, 2005

Source: Colorado Avalanche Information Center, http://avalanche.state.co.us/ (© Dan Moroz, 2005)

There were several other notable events discussed by the HMPC that did not involve deaths or injuries. An avalanche slid onto the parking lot at Arapahoe Basin ski area (year unknown). In 2003, an avalanche near Silver Plume (Clear Creek County) took out a power transmission line and cellular phone tower causing the Loveland Ski Area to close for the day. An avalanche on Buffalo Mountain just above the Wildernest Subdivision in February 1987, cleared swaths of forest, which are still visible as scars today.

Probability of Future Occurrence

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

Between 1997 and 2006, there were 12 notable avalanches in Summit County (e.g., avalanches that involved people). This suggests that at least one notable avalanche occurs each year in Summit County.

Magnitude/Severity

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

Avalanches in Summit County can injure and kill multiple people, damage property and infrastructure, and cause road closures.

3.2.2 Dam Failure

Hazard Description

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

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

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

Geographic Location

The geographic extent of this hazard in Summit County is **small**—10-25 percent of the planning area affected.

HAZUS-MH contains a database of dams based on the National Inventory of Dams. This database lists nine dams in the County and classifies dams based on the potential hazard to the downstream area resulting from failure or misoperation of the dam or facilities:

- **High Hazard Potential**—Probable loss of life (one or more)
- **Significant Hazard Potential**—No probable loss of human life but can cause economic loss, environment damage, disruption of lifeline facilities, or impact other concerns; often located

in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure

- **Low Hazard Potential**—No probable loss of human life and low economic and/or environmental losses; losses are principally limited to the owner's property

Based on these classifications, there are five high hazard dams, two significant hazard dams, and two low hazard dams in Summit County. These dams are listed in Table 3.4 and illustrated in Figure 3.2 The high and significant hazard dams all have emergency action plans in place.

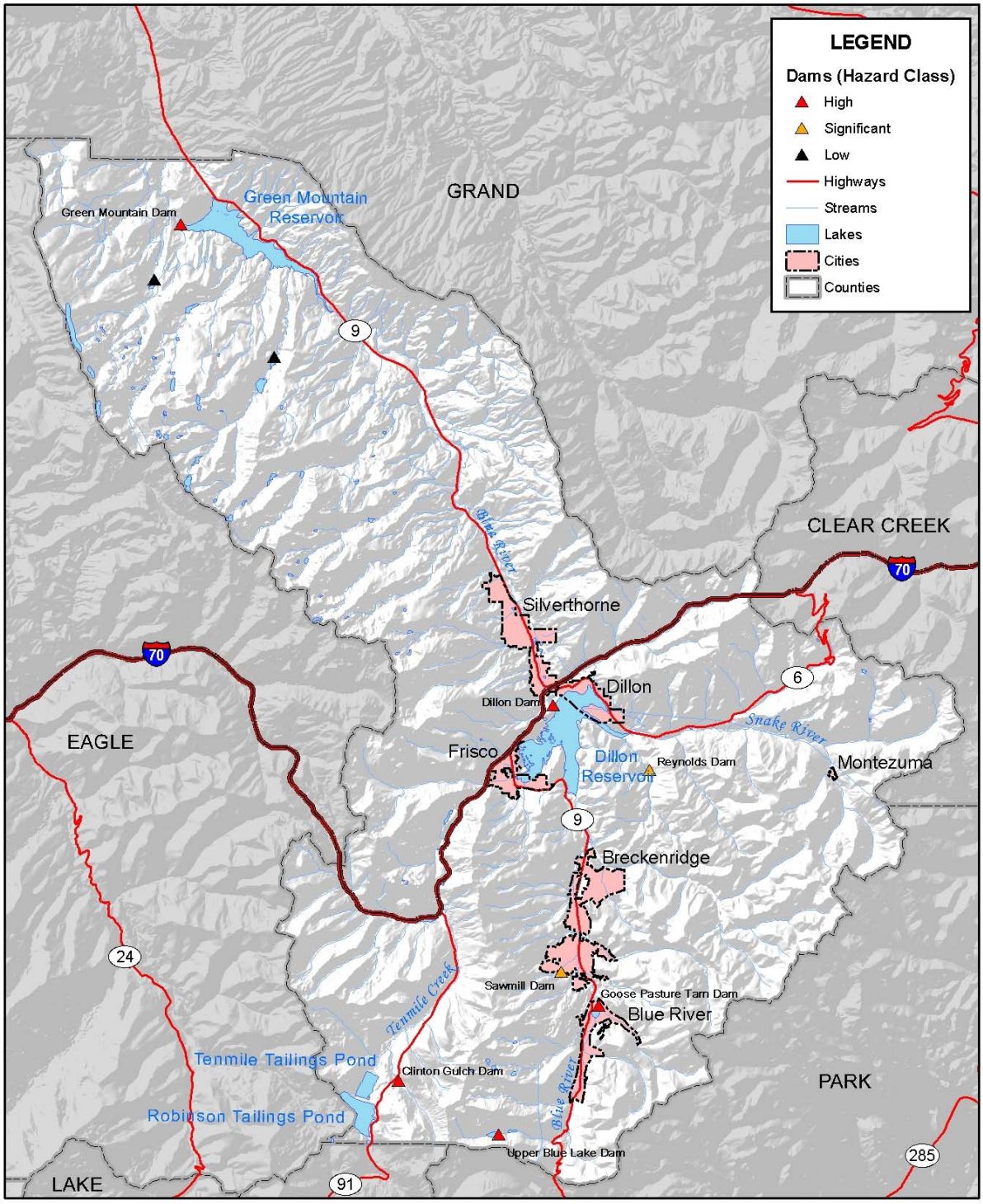
Table 3.4. Summit County Dams

Name	River	Near City	Maximum Storage (cubic feet)	Hazard Class
Black Creek	Black Creek	Kremmling	276	Low
Clinton Gulch	Ten Mile Creek	Frisco	5,915	High
Dillon	Blue River	Frisco	305,000	High
Goose Pasture Tarn	Blue River	Breckenridge	2,075	High
Green Mountain	Blue River	Kremmling	161,850	High
Hoagland #1	Elliott Creek	Kremmling	476	Low
Reynolds	Soda Creek	Dillon	221	Significant
Sawmill	Sawmill Gulch	Breckenridge	29	Significant
Upper Blue Lake	Monte Cristo Creek	Breckenridge	2,635	High

Source: HAZUS-MH MR3 National Inventory of Dams

Risk to dam failure is greatest to the Town of Silverthorne immediately downstream of the Dillon Dam. Breckenridge could be impacted by a failure of the Goose Pasture Tarn Dam. Unincorporated areas downstream of all high hazard dams are at risk if a failure occurred. There is little risk to Blue River, Montezuma, or the Town of Dillon.

Figure 3.2. Summit County Dams



Map compiled 9/2008; intended for planning purposes only.
Data Source: Summit County, HAZUS-MH MR3

Previous Occurrences

There was no information available indicating that dam failures had occurred in Summit County in the past.

Probability of Future Occurrence

Unlikely—Less than 1 percent chance of occurrence in next 100 years or has a recurrence interval of greater than every 100 years

Using the methodology adopted for natural hazards in this plan, no past events represent an unlikely probability of future occurrence. However, because dam failure is a manmade hazard, the methodology for calculating probability based on past occurrences does not necessarily reflect the actual risk of future occurrence. Further information on this risk is unknown.

Magnitude/Severity

Catastrophic—Multiple deaths; property destroyed and severely damaged; and/or interruption of essential facilities and service for more than 72 hours

Water released by a failed dam generates tremendous energy and can cause a flood that is catastrophic to life and property located in the inundation area. Of particular concern is the Green Mountain Dam, where exposure conditions at the dam site are very harsh, with many cycles of freezing and thawing and large temperature swings, particularly on south-facing slopes. In 1998, the Bureau of Reclamation, the agency that manages the dam, conducted a condition assessment of the spillway. It determined that overall the spillway was in good condition. However, there were a number of areas that needed repair. Some of the previous repairs had failed and needed to be replaced.

A failure of the Dillon Dam would be catastrophic to the Town of Silverthorne and unincorporated areas of the County from the dam downstream to the Grand County border.

3.2.3 Drought

Hazard Description

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

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

Due to Colorado's semiarid conditions, drought is a natural but unpredictable occurrence in the state. Single season droughts over some portion of the state are quite common. The onset of drought in western Colorado mountain counties is usually signaled by a lack of significant winter snowfall. Hot and dry conditions that persist from spring into summer and fall can aggravate drought conditions, making the effects of drought more pronounced as water demands increase during the growing season and summer months.

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

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

Drought affects the water supply of communities and water districts in the County, as well as the ski and recreation industries that drive the County's economy.

Geographic Location

The geographic extent of this hazard in Summit County is **large**—more than 50 percent of the planning area affected.

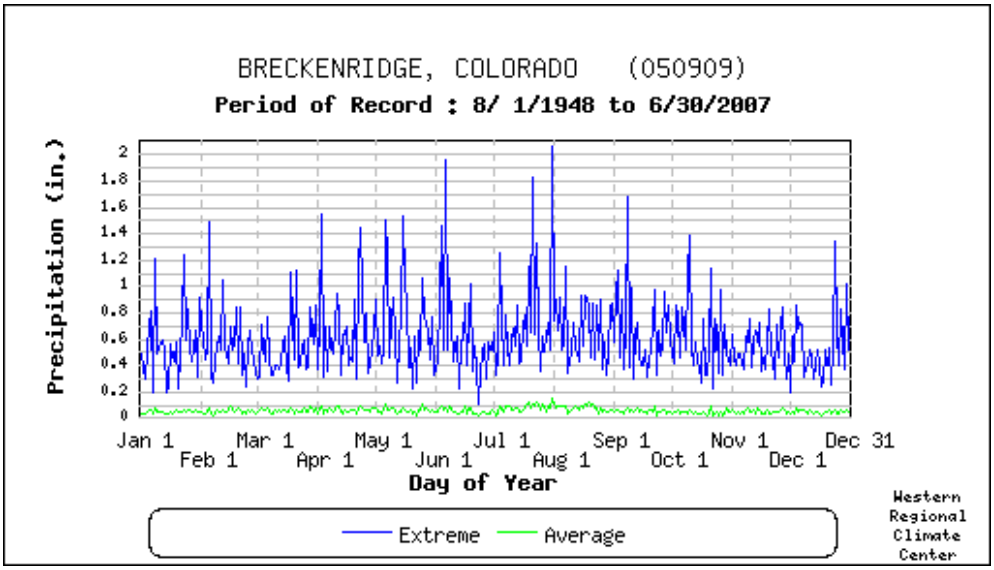
The Western Regional Climate Center reports precipitation data from weather stations in and around Summit County. The data reported here are from three of the stations: Breckenridge, Dillon, and Green Mountain Dam. Precipitation is greatest in Breckenridge, where the month with the most average precipitation is July. Precipitation is least at the Green Mountain reservoir, where May is the month with the most average precipitation. Table 3.5 contains precipitation summaries for the three stations, and Figures 3.3-3.5 show monthly average total precipitation.

Table 3.5. Summit County Precipitation Summaries[1]

Station	Average Annual Precipitation	Month with Most Precipitation/Average Precipitation	Highest Monthly Precipitation	Highest Annual Precipitation
Breckenridge[2]	19.52	July/2.39	6.73/Aug. 1963	29.96/1995
Dillon[3]	16.02	July/1.88	6.97/Feb. 1936	26.28/1936
Green Mountain Dam[4]	14.90	May/1.56	5.95/Sept. 1961	21.68/1984

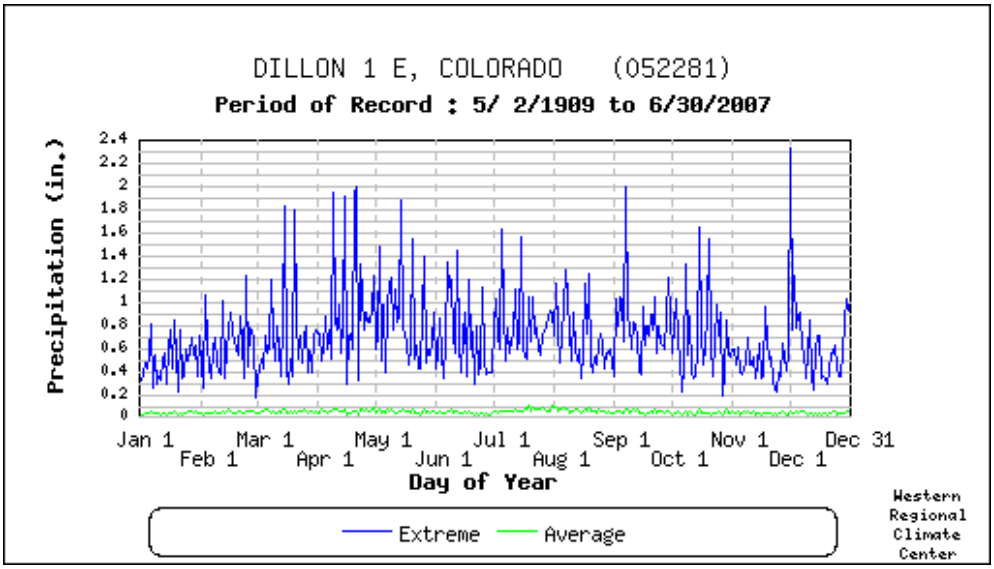
Source: Western Regional Climate Center, www.wrcc.dri.edu/.
[1]All totals are reported in inches;
[2]Period of Record: 8/1/1948-6/30/2007; [3]Period of Record: 5/2/1909-6/30/2007; [4]Period of Record: 8/1/1948-6/28/2007

Figure 3.3. Breckenridge Station Monthly Average Total Precipitation



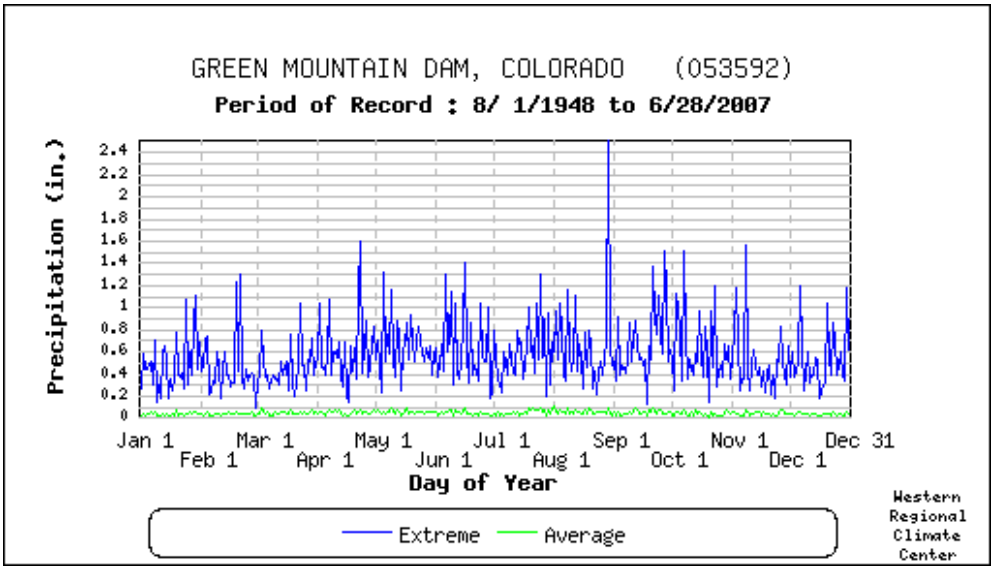
Source: Western Regional Climate Center, www.wrcc.dri.edu/

Figure 3.4. Dillon Station Monthly Average Total Precipitation



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

Figure 3.5. Green Mountain Station Monthly Average Total Precipitation



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

Previous Occurrences

According to the 2004 Drought and Water Supply Assessment, Colorado has experienced multiple severe droughts. The most significant of the instrumented period (which began in the late 1800s), are listed in Table 3.6. Summit County may or may not have been affected by these droughts.

Table 3.6. Significant Colorado Drought Periods of the Modern Instrumented Era

Years	Worst Years	Major State Impact Areas
1890–1894	1890 and 1894	Severe drought east of mountains
1898–1904	1902–1904	Very severe drought over southwestern Colorado
1930–1940	1931–1934, 1939	Widespread, severe, and long lasting drought in Colorado
1950–1956	1950, 1954–1956	Statewide, worse than the 1930s in the Front Range
1974–1978	1976-1977	Statewide, driest winter in recorded history for Colorado's high country and Western Slope
1980–1981	Winter 1980–1981	Mountains and Western Slope; stimulated writing of the Colorado Drought Response Plan and the formation of the Water Availability Task Force.
2000-2003	2001–2002	Significant multi-year statewide drought, with many areas experiencing most severe conditions in Colorado in instrumented history. Estimated losses of $1.1 billion to Colorado's agricultural, tourism, and recreation industries.

Source: Drought and Water Supply Assessment, 2004, http://cwcb.state.co.us/Conservation/Drought/Drought_Water/index_DWSA.html

The following droughts were significant to Summit County:

- **2006**—The U.S. Agriculture Secretary designated Summit among 59 counties in Colorado as disaster area due to the ongoing drought, high winds, insect pests, and a late freeze (Summit received its designation as a contiguous county).
- **2002**—This year was the driest year on record for the Denver region and much of the state. For the first time in state history, the Colorado governor asked the federal government to declare all of Colorado a drought disaster area. With an average temperature of 52 degrees, 2001 was the warmest year since 1986. The drought started in late 1999 and was compounded by scarce snowfall in 2001. Total precipitation for 2002 was 7.48 inches; the average is 15.81 inches (National Weather Service, Denver Office). In Summit County, the drought depleted reservoirs and the resulting exposed soils along the shorelines caused problems with dust and air pollution.
- **2000**—Strong La Niña conditions created below average precipitation and above average temperatures for most months in 2000. Statewide, snowpack started out well below average but recovered to near average in March. However, an early snowmelt resulted in low stream flows, and by June, drought conditions began to affect most of the state. By fall, weather patterns returned to near normal with average precipitation and below average temperatures.
- **1989**—In March 1989, the State Drought Water Availability Task Force met to access drought conditions within Colorado. Warm dry conditions during April of 1989 reduced snowpack to 50 percent of average.
- **1980–1981**—This drought, beginning in the fall of 1980 and lasting until the summer of 1981, had costly impacts to the ski industry.
- **1976–1977**—This drought was characterized as a winter event, limited in duration. It was the driest winter in recorded history for much of Colorado's high country and western slope, severely impacting the ski industry. Colorado agriculture producers and municipalities received over $110 million in federal drought disaster aid.

The National Drought Mitigation Center developed the Drought Impact Reporter in response to the need for a national drought impact database for the United States. Information comes from a variety of sources: online drought-related news stories and scientific publications, members of the public who visit the website and submit a drought-related impact for their region, members of the media, and members of relevant government agencies. The database is being populated beginning with the most recent impacts and working backward in time.

The Drought Impact Reporter contains information on 99 drought impacts from droughts that affected Summit County between 1990 and 2007. The list is not comprehensive. Most of the impacts, 27, were classified as "agricultural." Other impacts include "social" (14), "fire" (13), "environment" (8), "water/energy" (3), and "other" (34). These categories are described as follows:

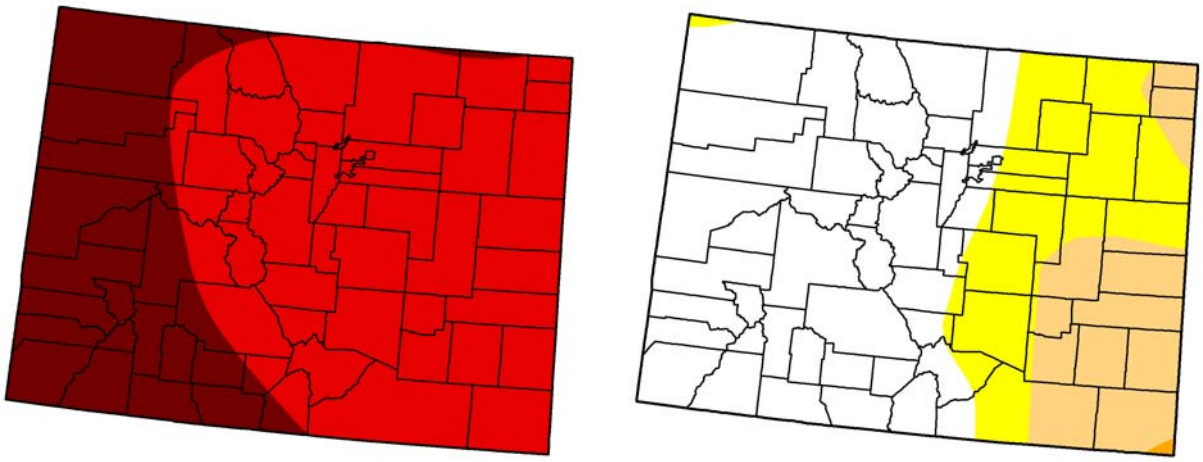
- **Agriculture**—Impacts associated with agriculture, farming, and ranching. Examples include damage to crop quality, income loss for farmers due to reduced crop yields, reduced productivity of cropland, insect infestation, plant disease, increased irrigation costs, cost of new or supplemental water resource development, reduced productivity of rangeland, forced

reduction of foundation stock, closure/limitation of public lands to grazing, high cost/unavailability of water for livestock, and range fires.

- **Water/Energy**—Impacts associated with surface or subsurface water supplies (i.e., reservoirs or aquifers), stream levels or streamflow, hydropower generation, or navigation. Examples include lower water levels in reservoirs, lakes, and ponds; reduced flow from springs; reduced streamflow; loss of wetlands; estuarine impacts; increased groundwater depletion, land subsidence, reduced recharge; water quality effects; revenue shortfalls and/or windfall profits; cost of water transport or transfer; cost of new or supplemental water resource development; and loss from impaired navigability of streams, rivers, and canals.
- **Environment**—Impacts associated with wildlife, fisheries, forests, and other fauna. Examples include loss of biodiversity of plants or wildlife; loss of trees from urban landscapes, shelterbelts, wooded conservation areas; reduction and degradation of fish and wildlife habitat; lack of feed and drinking water; greater mortality due to increased contact with agricultural producers, as animals seek food from farms and producers are less tolerant of the intrusion; disease; increased vulnerability to predation; migration and concentration; and increased stress to endangered species.
- **Fire**—Impacts associated with forest and range fires that occur during drought events. The relationship between fires and droughts is very complex. Not all fires are caused by droughts and serious fires can result when droughts are not taking place.
- **Social**—Impacts associated with the public, or the recreation/tourism sector. Examples include health-related low-flow problems (e.g., cross-connection contamination, diminished sewage flows, increased pollutant concentrations, reduced fire fighting capability, etc.), loss of human life (e.g., from heat stress, suicides), public safety from forest and range fires, increased respiratory ailments; increased disease caused by wildlife concentrations, population migrations, loss of aesthetic values; reduction or modification of recreational activities, losses to manufacturers and sellers of recreational equipment, and losses related to curtailed activities.
- **Other**—Drought impacts that do not easily fit into any of the above categories.

Figure 3.6 compares the severity of the drought in Colorado in July of 2002 with the severity of the drought in late April 2008. The maps illustrate significantly improved conditions in Colorado as a whole and no drought conditions in Summit County in April 2008. Additionally, the seasonal forecast, through July 2008, did not forecast drought conditions for Summit County.

Figure 3.6. U.S. Drought Monitor for Colorado, July 23, 2002 (left) vs. April 29, 2008 (right)



State drought conditions (percent area)

Week	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
02/19/08	59.37	40.64	3.79	0.00	0.00	0.00
06/11/02	0.00	100.00	100.00	100.00	68.13	9.26

Intensity:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

Source: National Drought Mitigation Center, www.drought.unl.edu/

Probability of Future Occurrence

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

According to information from the Colorado Drought Mitigation and Response Plan, Colorado was in drought for 48 of the past 115 years (1893-2007). Thus, there is a 42 percent chance that a drought will happen in Colorado in any given year, and a drought can be expected somewhere in the state every 2.4 years. Summit County has had significant impacts in five drought in the last 30 years.

Magnitude/Severity

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

Drought impacts in Summit County can be wide-reaching: economic, environmental, and societal. The most significant impacts associated with drought are those related to water intensive activities such as wildfire protection, commerce, tourism, recreation, municipal usage, and wildlife preservation. Drought during the winter season impacts the ski industry and economy of Summit County. Drought in the summer increases problems with dust and erosion and can cause deterioration in water quality. Drought conditions can also cause soil to compact and not absorb water well, potentially making an area more susceptible to flooding. It also increases the wildfire hazard. Drought impacts increase with the length of a drought, as carry-over supplies in reservoirs are depleted and water levels in groundwater basins decline.

3.2.4 Earthquake

Hazard Description

An earthquake is caused by a sudden slip on a fault. Stresses in the earth's outer layer push the sides of the fault together. Stress builds up and the rocks slip suddenly, releasing energy in waves that travel through the earth's crust and cause the shaking that is felt during an earthquake.

Earthquakes can cause structural damage, injury, and loss of life, as well as damage to infrastructure networks, such as water, power, communication, and transportation lines. Other damage-causing effects of earthquakes include surface rupture, fissuring, settlement, and permanent horizontal and vertical shifting of the ground. Secondary impacts can include landslides, seiches, liquefaction, fires, and dam failure.

The amount of energy released during an earthquake is usually expressed as a Richter magnitude and is measured directly from the earthquake as recorded on seismographs. Another measure of earthquake severity is intensity. Intensity is an expression of the amount of shaking, typically the greatest cause of losses to structures during earthquakes, at any given location on the surface as felt by humans and defined in the Modified Mercalli Intensity Scale. Table 3.7 features abbreviated descriptions of the 12 levels of intensity.

Table 3.7. Modified Mercalli Intensity (MMI) Scale

MMI	Felt Intensity
I	Not felt except by a very few people under special conditions. Detected mostly by instruments.
II	Felt by a few people, especially those on upper floors of buildings. Suspended objects may swing.
III	Felt noticeably indoors. Standing automobiles may rock slightly.
IV	Felt by many people indoors, by a few outdoors. At night, some people are awakened. Dishes, windows, and doors rattle.
V	Felt by nearly everyone. Many people are awakened. Some dishes and windows are broken. Unstable objects are overturned.
VI	Felt by everyone. Many people become frightened and run outdoors. Some heavy furniture is moved. Some plaster falls.
VII	Most people are alarmed and run outside. Damage is negligible in buildings of good construction, considerable in buildings of poor construction.
VIII	Damage is slight in specially designed structures, considerable in ordinary buildings, great in poorly built structures. Heavy furniture is overturned.
IX	Damage is considerable in specially designed buildings. Buildings shift from their foundations and partly collapse. Underground pipes are broken.
X	Some well-built wooden structures are destroyed. Most masonry structures are destroyed. The ground is badly cracked. Considerable landslides occur on steep slopes.
XI	Few, if any, masonry structures remain standing. Rails are bent. Broad fissures appear in the ground.
XII	Virtually total destruction. Waves are seen on the ground surface. Objects are thrown in the air.

Source: Multi-Hazard Identification and Risk Assessment, FEMA 1997

According to the Colorado Geological Survey, Colorado is comprised of areas with low to moderate potential for damaging earthquakes. There are about 90 potentially active faults that have been identified in Colorado, with documented movement within the last 1.6 million years. However, there are several thousand other faults that have been mapped in Colorado that are believed to have little or no potential for producing future earthquakes.

Geographic Location

The geographic extent of this hazard in Summit County is **large**—more than 50 percent of the planning area affected.

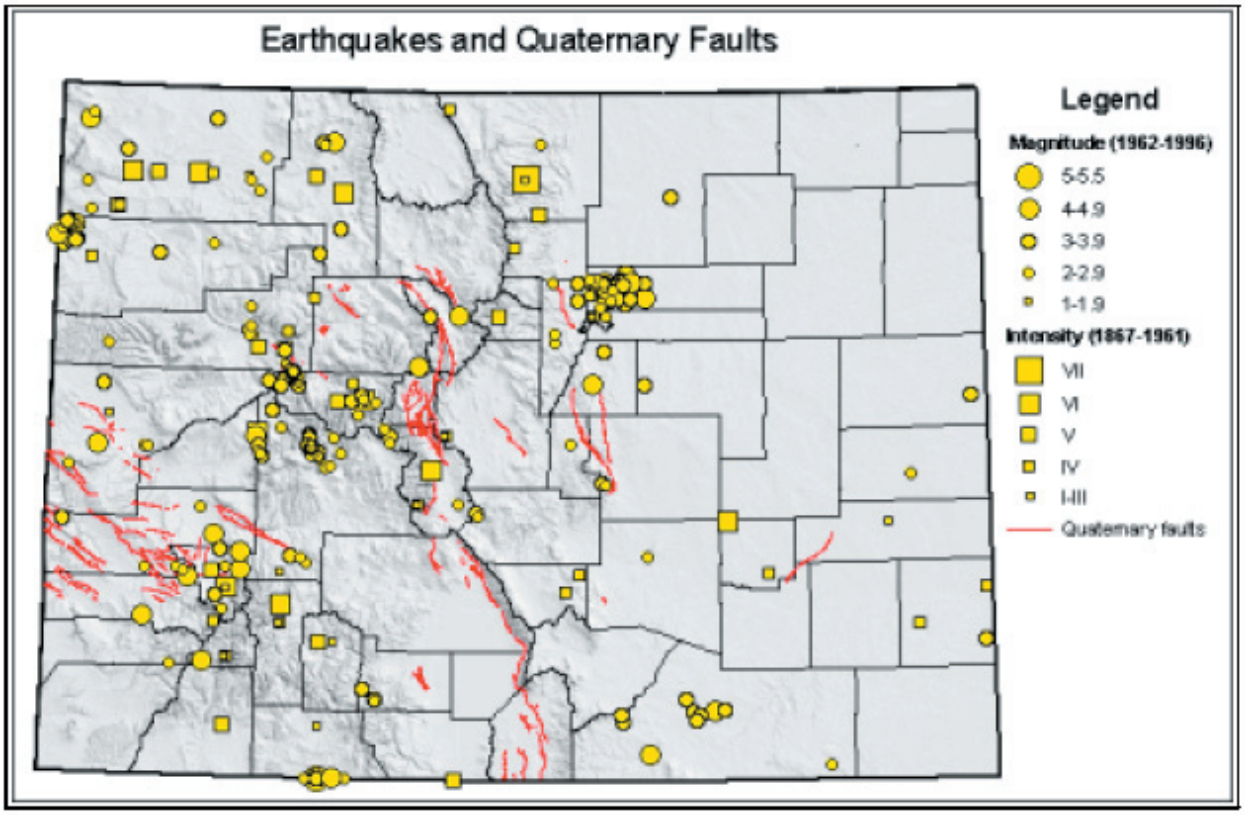
All of Summit County is at risk to a potential earthquake. Known faults in Summit County include the Blue River Graben Faults (LC), Blue River Fault West (LC), Frontal (LQ), Gore (LC), Green Mountain Reservoir Faults (LC), Mosquito (LQ), Mount Powell Faults (LC), and Sheephorn Mountain Faults (LC). Of these faults, only the Frontal and Mosquito faults are of concern to the state. Other faults that could affect Summit County (e.g., other faults that were analyzed by the state for their potential impact on the County) are Chase Gulch (LQ), Golden (Q), N Sangre de Cristo (H), N Sawatch (LQ), S Sawatch (H), Ute Pass (MLQ), and Williams Fork (H) (which is in Grand County but very close to the Summit County border). (See Section 3.3.3 for the results of the state's analysis.) Some of these faults are illustrated in Figure 3.7.

Time of most recent fault activity (in order of activity occurrence, most recent is listed first):

- **H**—Holocene
- **LQ**—Late Quaternary
- **MLQ**—Middle to Late Quaternary

- **LC**—Late Cenozoic

Figure 3.7. Colorado Earthquakes and Quaternary Faults

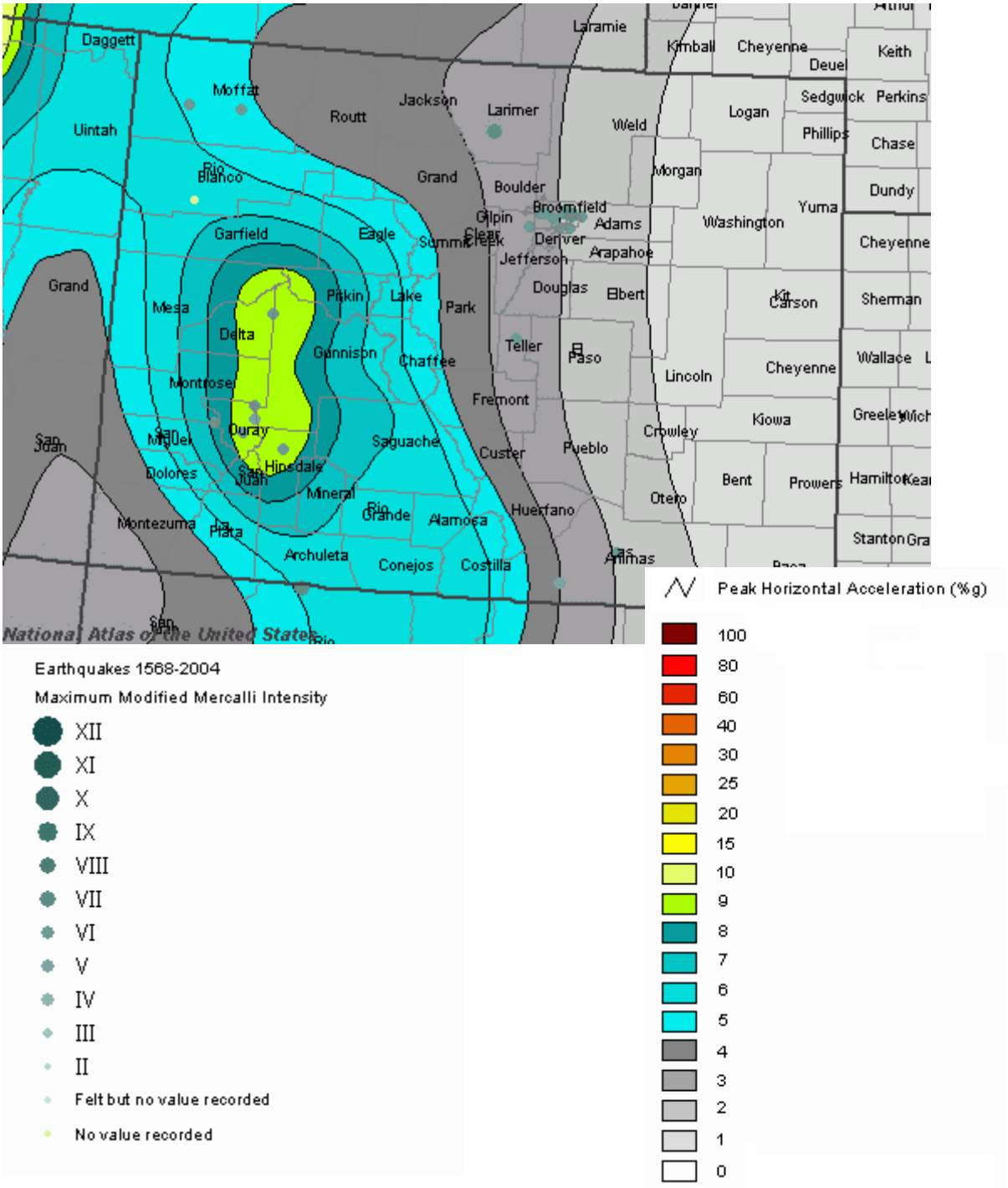


Source: State of Colorado Natural Hazards Mitigation Plan, 2007

Seismic hazard zone maps and earthquake fault zone maps are used to identify where such hazards are most likely to occur based on analyses of faults, soils, topography, groundwater, and the potential for earthquake shaking that can trigger landslide and liquefaction.

Figure 3.8 is a probabilistic seismic hazard map of Colorado from the U.S. Geological Survey that depicts the probability that ground motion will reach a certain level during an earthquake. It shows the shaking level that has a 10 percent chance of being exceeded over a period of 50 years (as well as earthquakes in Colorado between 1568 and 2004). Western Summit County lies in the range of 5 percent peak acceleration (the fastest measured change in speed for a particle at ground level that is moving horizontally because of an earthquake), and eastern Summit County lies in the range of 4 percent peak acceleration. Thus, western Summit County has a greater earthquake risk. Significant earthquake damage typically does not occur until peak accelerations are greater than 30 percent.

Figure 3.8. Colorado Seismic Hazard Map—10% Probability of Exceedance in 50 Years



Source: USGS, www.nationalatlas.gov

Previous Occurrences

Colorado Earthquake Information 1867-1996 from the Colorado Geological Survey features the following two earthquake events in the planning area.

- **September 12, 1990**—A magnitude 3.0 earthquake with an epicenter in Vail caused intensity V shaking in Vail, Frisco, and Minturn and intensity III shaking in Silverthorne.
- **August 4, 1964**—A magnitude 4.0 earthquake had an epicenter in Dillon.

Note: The third earthquake in Figure 3.7 that appears to be in or near Summit County was actually the result of a blast from mining operations in Climax.

Probability of Future Occurrence

Occasional—1-10 percent chance of occurrence in the next year or has a recurrence interval of 11 to 100 years

Two small events in the County in the last 130 years, equals one event every 65 years, or a 1.5 percent chance in any given year. Although neither were damaging events, the occurrence of earthquakes is relatively infrequent in Colorado and the historical earthquake record is relatively short (roughly 130 years). The earthquake hazard in Colorado is not well understood and the potential for unknown active faults exists.

Magnitude/Severity

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

As shown in Figure 3.8, the shaking level that has a 10 percent chance of being exceeded over a period of 50 years is in the range of 4 to 5 percent peak acceleration in Summit County. Significant earthquake damage typically does not occur until peak accelerations are greater than 30 percent.

3.2.5 Erosion/Deposition

Hazard Description

The Colorado Geological Survey defines erosion as “the removal and simultaneous transportation of earth materials from one location to another by water, wind, waves, or moving ice” and sedimentation (deposition) as “the placing of the eroded material in a new location. All material that is eroded is later deposited in another location.”

While these are natural processes, human activities greatly influence the rate and extent of erosion and sedimentation. Examples of these activities include removal of vegetation, alteration

of natural drainages, and actions that rearrange the earth, such as subdivision development, highway construction, and modification of drainage channels.

Geographic Location

The geographic extent of this hazard in Summit County is **small**—10-25 percent of the planning area affected.

Soil erosion and the associated deposition have proven to be problems in Summit County due to steep slopes and frequent slide activity.

Sanding on Interstate 70 to improve winter driving conditions also causes major deposition problems. Since the Town of Dillon gets 75 percent of its water supply from Straight Creek, which runs down from the Continental Divide at the Eisenhower Tunnel, along Interstate 70 and into the Blue River in Silverthorne, the water quality of the creek requires monitoring. Along Highway 6 between Loveland Pass and Keystone, there are numerous places where traction sand has covered U.S. Forest Service land, ultimately ending up in the North Fork of the Snake River.

Previous Occurrences

Erosion was a problem during the 2002 drought, when the exposed soils along shorelines of depleted reservoirs created large amounts of dust and air pollution. Data on other specific past events was not available.

Probability of Future Occurrence

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

Magnitude/Severity

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

In severe conditions, erosion can lead to exacerbated stream bank deterioration; channel instability; loss of agricultural, residential, industrial or private property; loss of infrastructure; and increased sediment loads to downstream reaches. Similarly, sedimentation in an uncontrolled or unmanaged system can lead to loss of channel and reservoir capacity, habitat, and fisheries; decreased channel stability; increased floodplain widths; more variable channel meander patterns; plugging of stormwater outlets; loss of agricultural, residential, industrial, or private property; and increased probabilities of flooding. Undercutting caused by erosion can lead to landslides and rock falls.

Over time, the processes of erosion and sedimentation can have negative impacts on communities and the environment in Summit County. Resultant economic losses may include damage to property and infrastructure, and lost recreational or development opportunities.

3.2.6 Flood

Hazard Description

Riverine flooding is defined as when a watercourse exceeds its “bank-full” capacity and is usually the most common type of flood event. Riverine flooding generally occurs as a result of prolonged rainfall, or rainfall that is combined with soils already saturated from previous rain events. It also occurs as a result from snowmelt, in which case the extent of flooding depends on the depth of winter snowpack and spring weather patterns.

The area adjacent to a river channel is its floodplain. In its common usage, “floodplain” most often refers to that area that is inundated by the 100-year flood, the flood that has a 1 percent chance in any given year of being equaled or exceeded. Other types of floods include general rain floods, thunderstorm generated flash floods, alluvial fan floods, dam failure floods (see Section 3.2.1), and local drainage floods. The 100-year flood is the national standard to which communities regulate their floodplains through the National Flood Insurance Program.

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

According to the Summit County Flood Insurance Study dated August 9, 2001, major stream flooding on Summit County streams is caused by snowmelt, which increases as temperatures rise. Snowmelt runoff generally reaches its peak in June and recedes to a normal flow by mid-July or August. Spring rains do not appreciably increase streamflows, but rainfall does tend to increase runoffs following the early summer peak runoffs. It is these rains, in July and August, that have the greatest potential for causing major flooding in the County. These events typically include localized flooding and debris-flow activity.

Ice jam flooding also occurs in Summit County. This flooding generally occurs when warm weather and rain break up frozen rivers or any time there is a rapid cycle of freezing and thawing. The broken ice floats down rivers until it is blocked by an obstruction such as a bridge or a shallow area. An ice dam forms, blocking the channel and causing flooding upstream (FEMA, 2005).

Geographic Location

The geographic extent of this hazard in Summit County is **small**—10-25 percent of the planning area affected.

The Blue River Basin covers all of Summit County. It generally drains in a north to northwest direction. The basin width ranges from 21 miles at Dillon Reservoir to 9 miles at Green Mountain Reservoir. The topography is mountainous with larger rivers in deep broad valleys and smaller creeks in steep gullies. The average elevation in the basin is approximately 10,000 feet.

The Upper and Lower Blue River are classified as high flood risks. The Upper Blue River threatens Breckenridge, and the Lower Blue River threatens Silverthorne. Ten Mile Creek, also classified as a high flood risk, threatens Frisco and Copper Mountain (from the State of Colorado Natural Hazards Mitigation Plan). Other notable streams in the County include Straight Creek and Soda Creek (around Summit Cove).

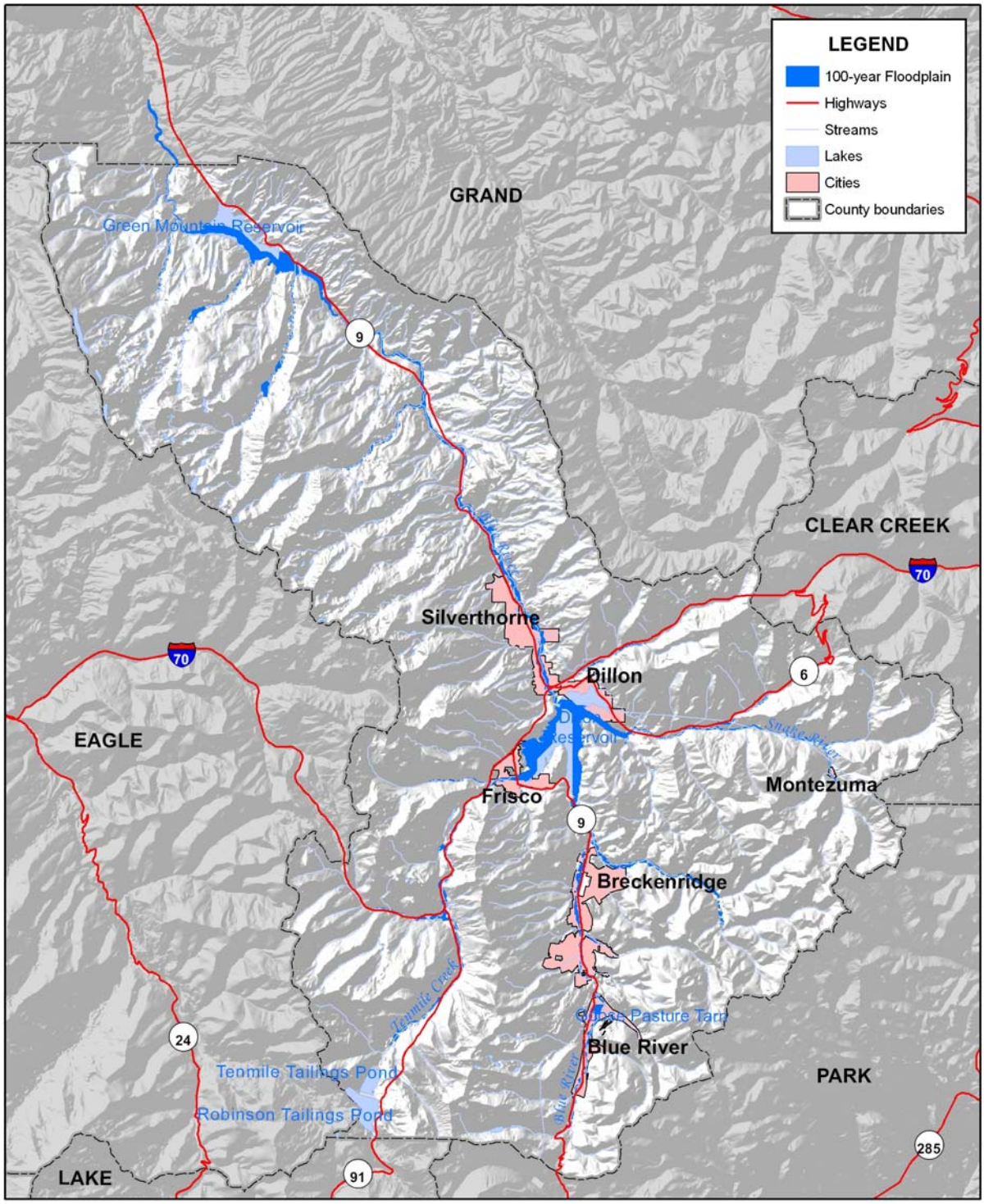
In Breckenridge, flooding along the Blue River, Sawmill Gulch, Illinois Gulch, and Lehman Gulch occurs primarily in mid-June and is largely due to snowmelt. County Road 3 is subject to flooding, which threatens access to Peak 7 in Breckenridge. Past flooding in Breckenridge has been mitigated through culvert replacement and changes to the Blue River channel. The channel improvements were made to contain a 100-year flood.

In Frisco, flooding along the Ten Mile and Meadow creeks normally occurs from May through September and results from snowmelt and or/intense storms.

In Silverthorne, flooding along the Blue River, Straight Creek, and Willow Creek normally occurs from April to July. Again, the most common cause is snowmelt. Floodwaters can breach a private road to the south of Willow Creek and cause ponding along State Highway 9. Since the Dillon Reservoir began operating in 1963, there have been no serious flood problems in Silverthorne.

With the exception of Dillon, every town in Summit County is at risk to riverine flooding. Localized stormwater flooding is fairly minor problems in the communities of Breckenridge, Dillon, and Silverthorne, and is more significant along Main Street in Frisco. More specific information on flooding is provided in the jurisdictional annexes. The effective flood insurance rate map (FIRM) for the County was revised in 2001 and a complete digital version of this map is not available. The County began the process to update FIRMs through FEMA's map modernization program in 2007. The best available data for flooding in Summit County was generated by HAZUS-MH MR3, FEMA's software program for estimating potential losses from disasters. HAZUS was used to generate a 1 percent annual flood, or base flood, event for major rivers and creeks in the County. The software produces a flood polygon and flood-depth grid that represents the base flood. While not as accurate as official flood maps, such as digital FIRMs, these floodplain boundaries are for use in GIS-based loss estimation. Figure 3.9 is a map of Summit County's HAZUS-generated 100-year floodplain.

Figure 3.9. Summit County HAZUS 100-Year Floodplain



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Map Compilation: AMEC, May 2008
Data Source: Summit County and HAZUS-MH

Flood Protection Measures

The major flood protection measures in Summit County are Dillon Dam and Reservoir, which are just upstream from Silverthorne on the Blue River. The reservoir receives flows from three of the major streams in the County: Blue River, Snake River, and Ten Mile Creek. The reservoir storage significantly reduces the peak discharges of frequent floods and is also used to control discharges of the Blue River through Silverthorne to the Green Mountain Reservoir. The primary function of the Dillon Reservoir is collection and storage of snowmelt runoff for domestic use on the eastern slope.

The Goose Pasture Tarn, a small reservoir immediately upstream of Breckenridge, also serves as a flood protection measure for the Blue River. The reservoir is important in reducing the peak discharge of Blue River due to rainfall, but is only marginally effective for runoff due to snowmelt.

Previous Occurrences

According to the flood insurance studies, there is little evidence of significant flooding in Summit County in recent years. Noted exceptions from the studies and the HMPC include the following:

- **February 2007**—A frozen culvert caused water backup from a Reynolds Reservoir overflow, causing minimal water damage to a home in Summit Cove and the closure of Summit Drive for part of a day. Sandbagging kept damage to a minimum.
- **Spring 1996**—Flooding occurred on the Blue River in Breckenridge and on Straight Creek in Dillon Valley. Straight Creek Drive was washed out and has since been repaired with a culvert.
- **July 23, 1965**—Rainfall runoff from a high-intensity storm centered over a small tributary above Breckenridge caused flooding along the Blue River. Damage was not very extensive. Other rivers in the County were also at their peaks during this storm.
- **July 17, 1965**—The largest recorded discharge on the Blue River, 1,250 cubic feet per second, resulted from snowmelt and a high-intensity storm centered over a tributary above Breckenridge. It had a return period of 50 years. Flooding in Breckenridge was caused by backwater from blocked culverts and bridges (many of the culverts have since been replaced).

Probability of Future Occurrence

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

Despite the lack of information about past flood events, the HMPC agreed that some level of flooding is almost an annual occurrence in Summit County.

Magnitude/Severity

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

In Summit County, floods can cause injuries and deaths. Flood water, as well as debris from steep tributary channels, can damage property and infrastructure and close roads. However, past flood damages have been limited.

3.2.7 Hazardous Materials Release (Transportation)

Hazard Description

Summit County is susceptible to accidents involving the transport of hazardous materials on County roads and highways. A hazardous material is any item or agent (biological, chemical, physical, radiological) that has the potential to cause harm to humans, animals, or the environment, either by itself or through interaction with other factors. An accident could occur at any time or as a result of a natural disaster. The release of hazardous materials can threaten people and natural resources in the immediate vicinity of the accident, including residences, resorts, and businesses along transportation routes.

Geographic Location

The geographic extent of this hazard in Summit County is **isolated**—less than 10 percent of the planning area affected—(based on historical experience), but depending on the type and quantity of spill and the medium affected, the geographic extent could become large.

Summit County is particularly concerned about the transport of hazardous materials on Interstate 70 (I-70) and U.S. 6. I-70 serves as a major east-west corridor for the state, as well as for the United States. Closure of the road due to a hazardous materials incident would significantly disrupt traffic flow between the Denver metropolitan area and the western slope of the Rocky Mountains and could cause severe economic impacts to the Summit County area. Similarly, the economies of Dillon and the Keystone and Arapahoe Basin ski areas are all dependent on U.S. 6 and would be severely impacted if an incident were to occur on the route, especially one that caused soil or water contamination.

At present, hazardous materials trucks, such as gas tankers, are not allowed passage through the Eishenhower/Johnson Memorial Tunnels on I-70 and are routed to U.S. 6 and over Loveland Pass, which is a mountain pass with tight switchbacks and steep grades. Loveland Pass is also the boundary between Clear Creek County and Summit County.

Previous Occurrences

Hazardous materials incidents in Summit County have been relatively insignificant. Statistics from the National Response Center, which serves as the sole national point of contact for reporting all oil, chemical, radiological, biological, and etiological discharges into the environment anywhere in the United States and its territories, indicate that between 1990 and the end of 2007, 40 transportation-related hazardous materials incidents were reported in Summit County. The majority of the incidents were related to gasoline and diesel fuel spills resulting from an accident (i.e., not from cargo). Seven of the events involved hazardous materials carriers (as identified in the reports). Spills from these events were largely gasoline.

The most notable spill that involved hazardous cargo occurred on April 28, 2006, when a double box trailer truck combination overturned on U.S. 6 on the west side of Loveland Pass, closing the highway. The two trailers were reportedly carrying eight different types of hazardous products. Some of the products spilled and appeared to have reached a stream. There was concern that the products would contaminate water sources that could affect Denver Water, the Snake River Water District, and Dillon Reservoir.

In 2003, a tanker rolled into the oncoming lane on I-70 near the Copper Mountain Fire Station and closed the interstate for 18 hours. The tanker spilled between 950-1,000 gallons of gasoline, which ran down the interstate under the snow into a storm drain.

Probability of Future Occurrence

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

Transportation- related hazardous materials incidents occur in Summit County every year. These are most often fuel spills that are not related to the cargo being transported. Based on previous experience, the probability of a spill of a nonfuel hazardous material or a spill with significant impact to people, the environment, or the economy is much less likely.

Magnitude/Severity

Catastrophic—Multiple deaths; property destroyed and severely damaged; and/or interruption of essential facilities and service for more than 72 hours

Impacts in the past have been limited but depending on the type and quantity of spill and the medium affected, an event's magnitude and severity could become catastrophic. A hazardous materials release could cause personal injury or death to humans or damage to property or the environment. Humans are affected through inhalation, ingestion, or direct contact with skin. Air releases can prompt large-scale population evacuations and spills into water or onto the ground can adversely affect public water and sewer systems.

According to a recent study for the Colorado Department of Transportation, *Risk Analysis Study of Hazardous Materials Trucks through Eisenhower/Johnson Memorial Tunnels*, a hazardous materials incident on U.S. 6 would result in roadway damage with a replacement cost of approximately $5.5 million per mile. It is also possible that adjacent buildings and other infrastructure in Keystone, the Arapahoe Basin ski area, and Dillon could be damaged in an explosion or spreading fire caused by a hazardous materials incident. The Snake River and Dillon Reservoir are also at risk. The Colorado Department of Transportation estimates that 150 hazardous materials trucks travel along Loveland Pass each day.

Population centers along I-70 and the hazardous materials bypass route on U.S. 6 are vulnerable to accidents involving hazardous materials. Damage to the environment and road closures due to accidents would negatively impact the tourism and recreation based economy.

3.2.8 Landslide, Mudflow/Debris Flow, Rock Fall

Hazard Description

A landslide is a general term for a variety of mass-movement processes that generate a downslope movement of soil, rock, and vegetation under gravitational influence. For the purposes of this plan, the term “landslide” includes mudslides, debris flows, and rock falls. Some of the natural causes of ground instability are stream and lakeshore erosion, heavy rainfall, and poor quality natural materials. In addition, many human activities tend to make the earth materials less stable and, thus, increase the chance of ground failure. Human activities contribute to soil instability through grading of steep slopes or overloading them with artificial fill, by extensive irrigation, construction of impermeable surfaces, excessive groundwater withdrawal, and removal of stabilizing vegetation.

A mudslide is a mass of water and fine-grained earth materials that flows down a stream, ravine, canyon, arroyo, or gulch. If more than half of the solids in the mass are larger than sand grains (e.g., rocks, stones, boulders), the event is called a debris flow. Many of Colorado’s older mountain communities built in major mountain valleys are located on or near debris fans. A debris fan is a conical landform produced by successive mud and debris flow deposits, and the likely spot for a future event. The mud and debris flow problem can be exacerbated by wildfires that remove vegetation that serves to stabilize soil from erosion. Heavy rains on the denuded landscape can lead to rapid development of destructive mudflows.

A rock fall is the falling of a detached mass of rock from a cliff or down a very steep slope. Weathering and decomposition of geological materials produce conditions favorable to rock falls. Rock falls are caused by the loss of support from underneath through erosion or triggered by ice wedging, root growth, or ground shaking. Changes to an area or slope such as cutting and filling activities can also increase the risk of a rock fall. Rocks in a rock fall can be of any dimension, from the size of baseballs to houses. Rock fall occurs most frequently in mountains

or other steep areas during the early spring when there is abundant moisture and repeated freezing and thawing.

Landslides, mudslides, and rock falls occur commonly throughout Colorado, and the annual damage is estimated to exceed $3 million to buildings alone. California, Washington, and Colorado were the first three states to use federal disaster funds to acquire property in landslide hazard areas.

Geographic Location

The geographic extent of this hazard in Summit County is **isolated**—less than 10 percent of the planning area affected.

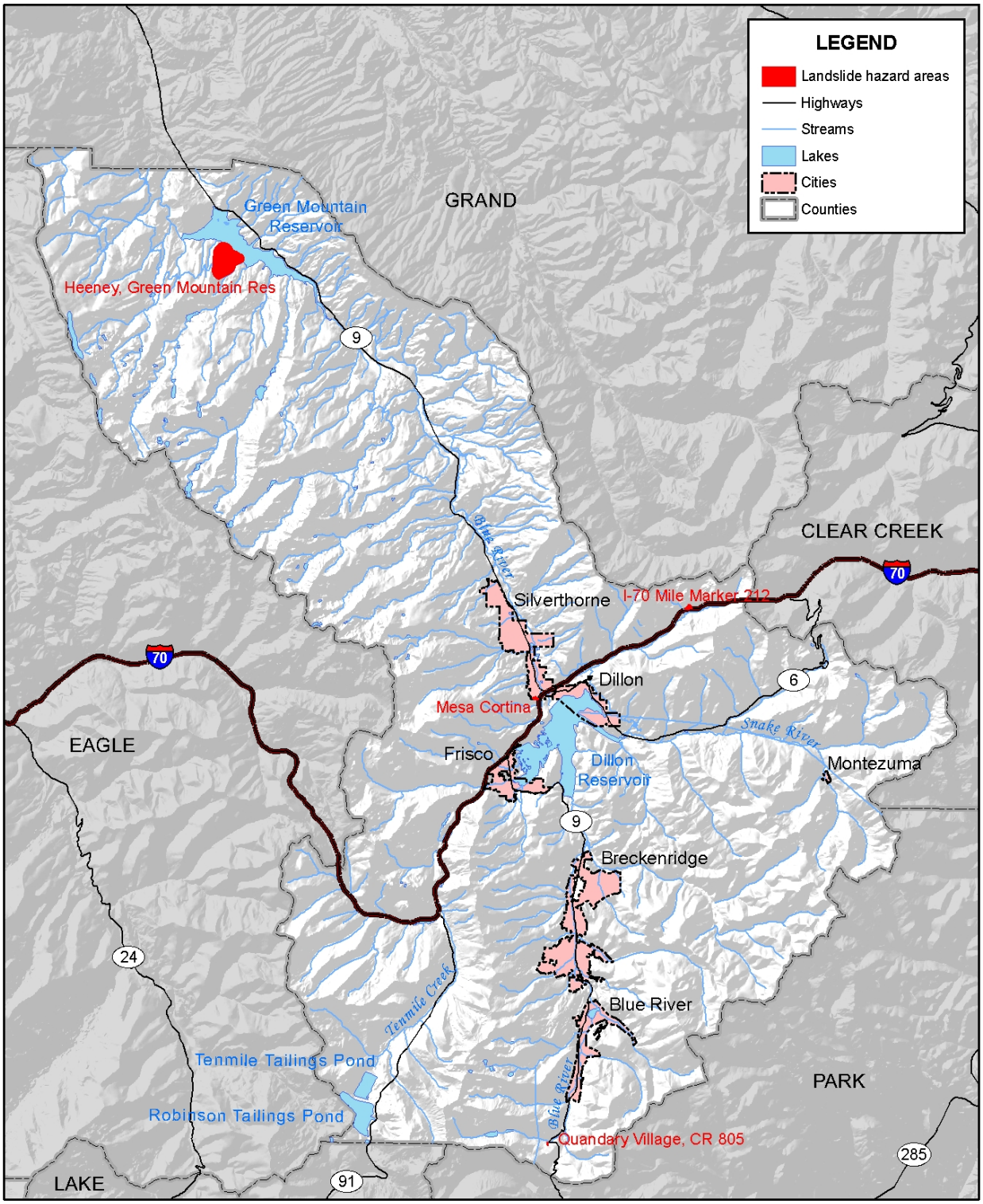
According to the 2002 update to the 1988 Colorado Landslide Mitigation Plan, a landslide complex on the south side of Green Mountain Reservoir in the Town of Heeney is a tier two landslide/rock fall area. Geologic hazards mapping by the Colorado Geological Survey showed a large old landslide that includes all of Heeney and adjacent developed shore area for about 1.5 miles. Although there were no signs of large scale active sliding on the old landslide, it was considered to have the potential to become a large and serious landslide that could threaten the Town and the reservoir. This hazard area encompasses approximately 710 acres.

According to the Heeney/Green Mountain Reservoir Subbasin Plan, low water levels in the reservoir in 2002 created heightened concerns about the landslide potential in the area. Homes began to noticeably slip, and the last time that happened was in 1963, when a rapid drawdown of the water resulted in the loss of several homes. In 2002, the dramatic drop in water levels did not give the shoreline time to dry and solidify. It is anticipated that low reservoir levels in the future, as a result of possible drought conditions and high demand from water users downstream, will pose development challenges. The Bureau of Reclamation is studying the problem.

According to the HMPC, other problem areas in the County include Keystone Mountain (condos), a slump on I-70 west of the Eisenhower/Johnson Memorial tunnels at mile marker 212 (approximately 23 acres), Quandary Village (approximately 4 acres), and Mesa Cortina in Silverthorne (approximately 14 acres).

Figure 3.10 illustrates significant landslide hazard areas in Summit County.

Figure 3.10. Summit County Landslide Hazard Areas



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Map compiled 9/2008; intended for planning purposes only.
Data Source: Summit County

Previous Occurrences

Previous occurrences of landslide hazards are not well known. According to the Colorado Natural Hazards Mitigation Plan (2007), an area being planned as a subdivision in Summit County was engulfed by a mudslide caused by saturated soils below the Town of Breckenridge water reservoir and a beaver pond. No structures were involved. Geologic investigation showed several similar slides had occurred previously. The property lost its prime value and extensive regrading and mitigation work was required. It is unknown when this occurred.

In 1963, a rapid drawdown of the water in Green Mountain Reservoir caused a landslide that resulted in the loss of several homes in the Town of Heeney.

Probability of Future Occurrence

Occasional—1-10 percent chance of occurrence in the next year or has a recurrence interval of 11 to 100 years

Based on the two known past events and the identified areas currently being monitored, probability of damaging landslide events in the future is occasional.

Magnitude/Severity

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

Landslide is a serious geological hazard that can threaten human life, impact transportation corridors and communication systems, and result in other infrastructure (e.g., reservoirs) and property damage. Actual losses can range from mere inconvenience or high maintenance costs where very slow or small-scale destructive slides are involved. Rapidly moving large slides have the capacity to completely destroy buildings, roads, bridges, and other costly manmade structures. Such slides also have the potential for inflicting loss of life when they occur in developed areas.

3.2.9 Lightning

Hazard Description

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

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

According to the National Lightning Safety Institute, lightning causes more than 26,000 fires in the United States each year. The institute estimates property damage, increased operating costs, production delays, and lost revenue from lightning and secondary effects to be in excess of $6 billion per year. Impacts can be direct or indirect. People or objects can be directly struck, or damage can occur indirectly when the current passes through or near it.

Geographic Location

The geographic extent of this hazard in Summit County is **large**.

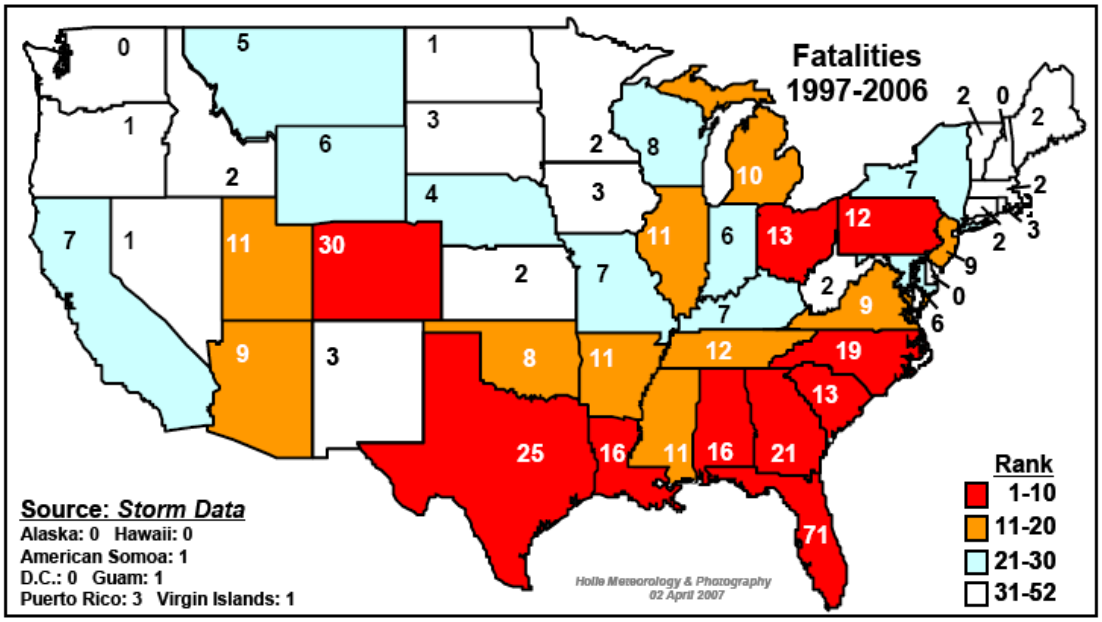
Lightning can occur anywhere in the County.

Previous Occurrences

Data from the National Lightning Detection Network ranks Colorado 31st in the nation (excluding Alaska and Hawaii) with respect to the number of cloud-to-ground lightning flashes with an average number of 517,217 flashes per year (based on data collected between 1996 and 2005). Summit County has an average of 1,700 cloud-to-ground lightning flashes per year.

Figure 3.11 shows state-by-state lightning deaths between 1997 and 2006. Colorado ranks second for the number of deaths at 30. Only Florida, with 71 deaths, had more. Texas followed Colorado with 25 deaths. In 2006, there were 5 lightning deaths and 15 reported lightning injuries in Colorado. None of these were in Summit County. In an average year in Colorado, 3 people are killed and 13 are injured.

Figure 3.11. Lightning Fatalities in the United States, 1997-2006



Source: National Weather Service, www.lightningsafety.noaa.gov/

While lightning is a regular occurrence in Summit County, damaging lightning is not. According to the National Climatic Data Center Storm Event Database, there were three notable lightning events in Summit County between 1993 and August 2007:

- **August 1, 2004**—Lightning killed a woman as she was hiking in French Gulch near Breckenridge. Four other people hiking with the woman were knocked down but suffered only minor injuries.
- **July 9, 2001**—Lightning struck a home in Keystone, damaging the roof.
- **June 8, 1997**—Two search and rescue volunteers were injured while rescuing a skier atop Peak 10 at Breckenridge Ski Area. Lightning struck the first man as he was towing the injured skier by snowmobile and toboggan. The bolt struck the snowmobile, then the rescuer, causing the rescuer permanent disability in eyesight. The other rescuer was injured 1/4 mile away. Apparently the ground current created by the lightning travelled up his ski pole. He suffered temporary dizziness as a result of the strike.

It should be noted that this database captures only small portion of damaging lightning events; most go unreported.

Probability of Future Occurrence

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

It is highly likely that lightning will occur every year in Summit County, but not all will be damaging. In the last 15 years, the County experienced three damaging lightning events. This averages to a damaging lightning event every five years, or a 20 percent chance of an event in any given year.

Magnitude/Severity

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

Lightning can cause deaths, injuries, and property damage, including damage to buildings, communications systems, power lines, and electrical systems. It also causes forest and brush fires.

3.2.10 Mountain Pine Beetle Infestation

Hazard Description

Mountain pine beetle is native to western North America. The insect develops in and affects primarily pines, such as ponderosa, lodgepole, Scotch, and limber pines, and less commonly bristlecone and piñon pines. Beetle epidemics are a natural part of forest ecosystems, but certain factors, such as age of forests, drought, crowding, poor growing conditions, and warm temperatures, can fuel epidemics. While the stressed trees are targeted first, as beetle populations increase, they attack most of the large trees in an outbreak area.

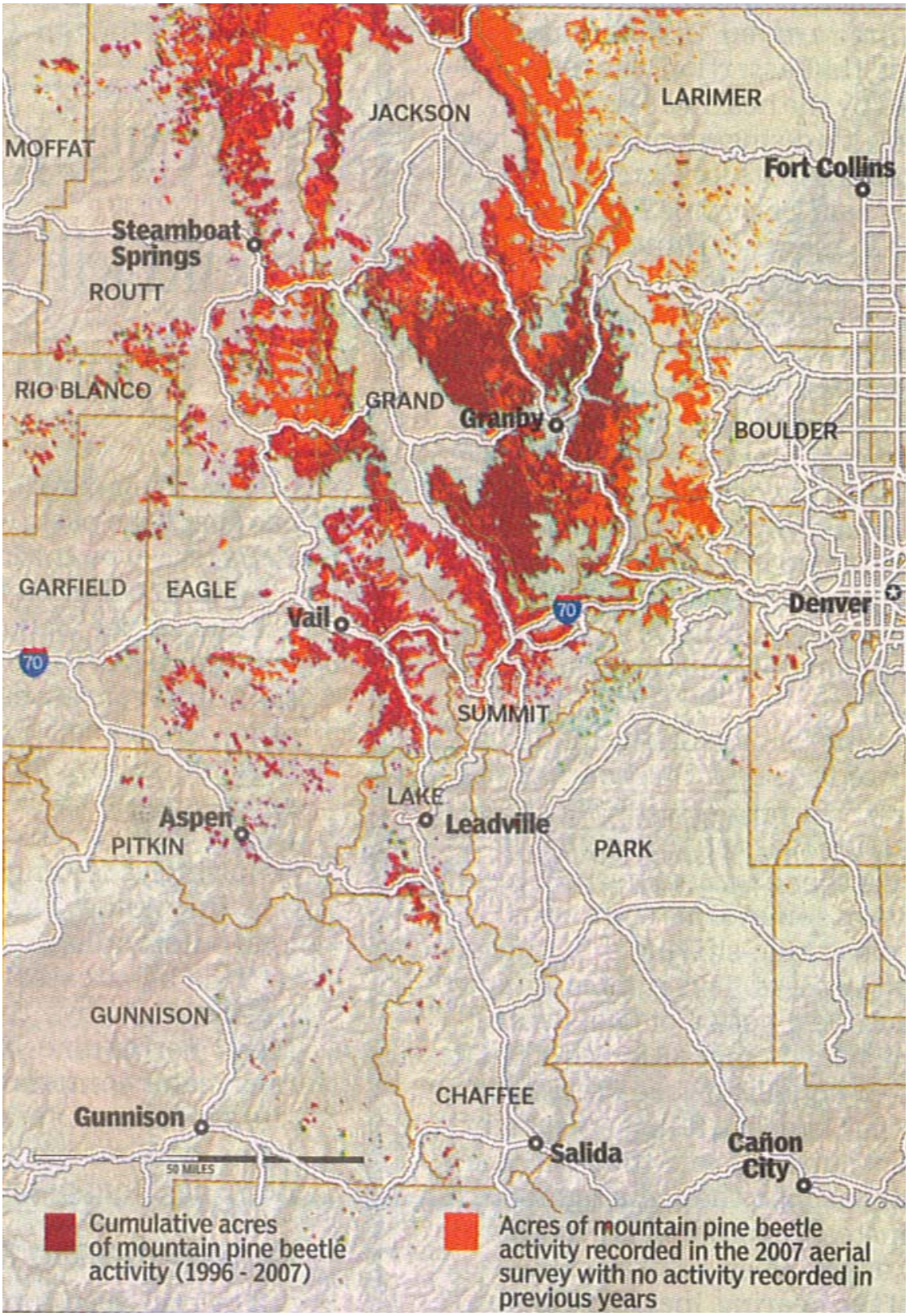
During an epidemic, enough beetles can emerge from an infested tree to kill at least two, and possibly more, trees the following year. The direction and spread rate of an infestation is impossible to predict. However, attacked trees usually are adjacent to or near previously killed trees. Once the beetle infests a tree, nothing practical can be done to save it, so prevention is critical. Prevention includes forest management (e.g., creating diversity in age and structure) and treating infested trees to kill developing beetles before they emerge as adults. Discolored foliage is generally the first sign of beetle-caused mortality. Needles on infested trees begin changing color several months to one year after attack, going from green to yellowish green, then sorrel and red to rusty brown.

Geographic Location

The geographic extent of this hazard in Summit County is **large**—more than 50 percent of the planning area affected.

The entire County, (wilderness areas, mountain subdivisions, and backyards) is susceptible to mountain pine beetle infestation. Figure 3.12 shows mountain pine beetle activity in and around Summit County.

Figure 3.12 Mountain Pine Beetle Activity in Central Colorado



Source: U.S. Forest Service

Previous Occurrences

Summit County is in the midst of a statewide mountain pine beetle infestation. Tree mortality from this infestation is unprecedented in Colorado's recorded history. Colorado lost 500,000 acres of lodgepole pines in 2007 alone and approximately 1.5 million acres since the infestation began in 1996. At current rates of spread and intensification, it is likely that the beetle will kill the majority of Colorado's mature lodgepole pine forests by 2013. However, younger lodgepole pines will survive and seedlings will regenerate naturally.

Probability of Future Occurrence

Highly Likely—Near 100 percent chance of occurrence in next year or has a recurrence interval of 10 years or less

Magnitude/Severity

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

The definitions for Magnitude/Severity are not well-suited to this hazard. Although the Mountain Pine Beetle is unlikely to cause deaths or injuries or significant damage to property and infrastructures, it is killing millions of trees each year. Widespread tree mortality can alter the forest ecosystem in numerous ways, including:

- Converting forested areas to grass and shrubs,
- Changing wildlife species composition,
- Increasing water yield, which may contribute to flooding and landslides, and
- Creating a source of fuel for wildfire.

Overall vulnerability to mountain pine beetle is moderate. The hazard is widespread and the infestation is likely to continue to grow. Although it is unlikely to cause deaths or injuries or damage to structures, it has the potential to have significant impacts on the forest ecosystems and the recreation and tourism-based economy of Summit County, as well as increase wildfire risk.

3.2.11 Severe Winter Weather

Hazard Description

Winter weather includes snow, ice, blizzard conditions, and extreme cold. Heavy snow can immobilize a region, stranding commuters, stopping the flow of supplies, and disrupting emergency and medical services. Accumulations of snow can collapse roofs and knock down trees and power lines. The cost of snow removal, damage repair, and business losses can have a tremendous impact on cities and towns.

Heavy accumulations of ice can bring down trees, electrical wires, telephone poles and lines, and communication towers. Communications and power can be disrupted for days until damage can be repaired. Even small accumulations of ice may cause extreme hazards to motorists and pedestrians.

Some winter storms are accompanied by strong winds, creating blizzard conditions with blinding wind-driven snow, severe drifting, and dangerous wind chills. Strong winds with these intense storms and cold fronts can knock down trees, utility poles, and power lines. Blowing snow can reduce visibilities to only a few feet in areas where there are no trees or buildings. Serious vehicle accidents can result with injuries and deaths.

Extreme cold often accompanies a winter storm or is left in its wake. Prolonged exposure to the cold can cause frostbite or hypothermia and can become life-threatening. Infants and the elderly are most susceptible. Pipes may freeze and burst in homes or buildings that are poorly insulated or without heat. Extreme cold is most likely to occur in the winter months of December, January, and February.

In 2001, the National Weather Service implemented an updated Wind Chill Temperature index. This index was developed to describe the relative discomfort/danger resulting from the combination of wind and temperature. Wind chill is based on the rate of heat loss from exposed skin caused by wind and cold. As the wind increases, it draws heat from the body, driving down skin temperature and eventually the internal body temperature. The National Weather Service will issue a Wind Chill Warning for Summit County when wind and temperature combine to produce wind chill values of -35°F.

The coldest months on average in Summit County are January and February and record minimum temperatures have fallen below -46°F. The average minimum temperatures are approximately 1°F in Dillon and 8°F in Breckenridge.

Geographic Location

The geographic extent of this hazard in Summit County is **large**—more than 50 percent of the planning area affected.

Winter weather can occur throughout Summit County.

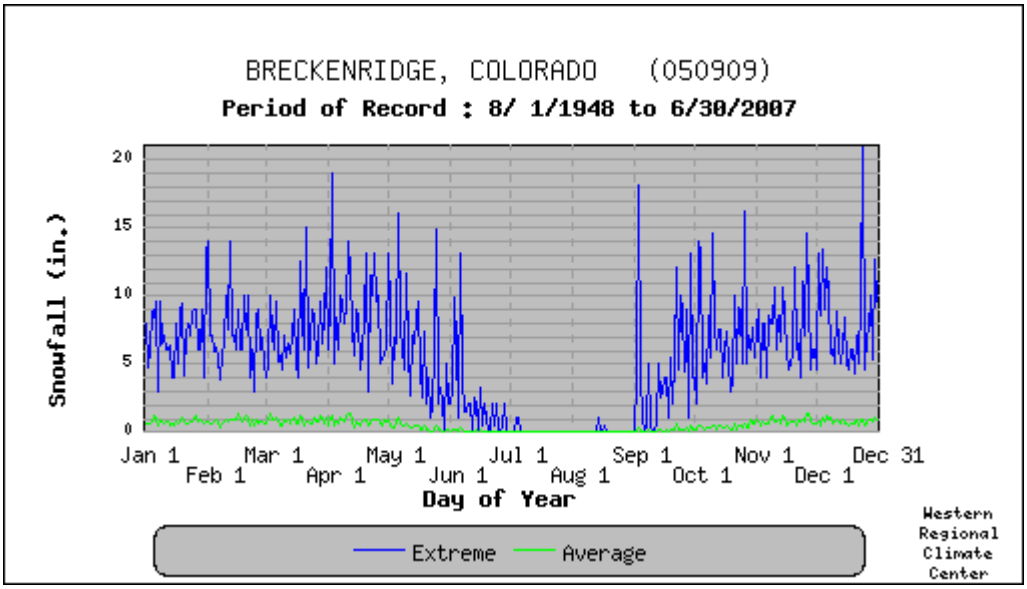
The Western Regional Climate Center reports data from weather stations in and around Summit County. The data reported here are from three of the stations: Breckenridge, Dillon, and Green Mountain Dam. Table 3.8 contains winter weather summaries for the three stations and illustrates differences within the County. Figures 3.13 through 3.18 show daily snowfall and temperature averages and extremes.

Table 3.8. Summit County Winter Weather Summaries[1]

Station	Average Annual Snowfall	Snowiest Month/ Average Snowfall	Highest Daily Snowfall	Highest Monthly Snowfall	Highest Seasonal Snowfall	Average Snow Depth	Winter[2] Average Minimum Temp.	Minimum Temp.	# Days <32°F/ Year
Breckenridge[3]	164.0	Mar./24.8	20.9 12/24/1983	94.10 Dec. 1983	269.3 1983-84	6.0	7.5°F	-26°F 1/2/1978	n/a
Dillon[4]	127.2	Mar./22.0	24 4/9/1944 4/15/1921	73.3 Feb. 1936	227.3 1935-36	3.0	.5°F	-46°F 12/24/1924	291.4
Green Mountain Dam[5]	72.4	Jan./13.5	24 11/8/1985	57.5 Jan. 1980	151.6 1979-80	3.0	5.8°F	-46°F 2/7/1989	228.2

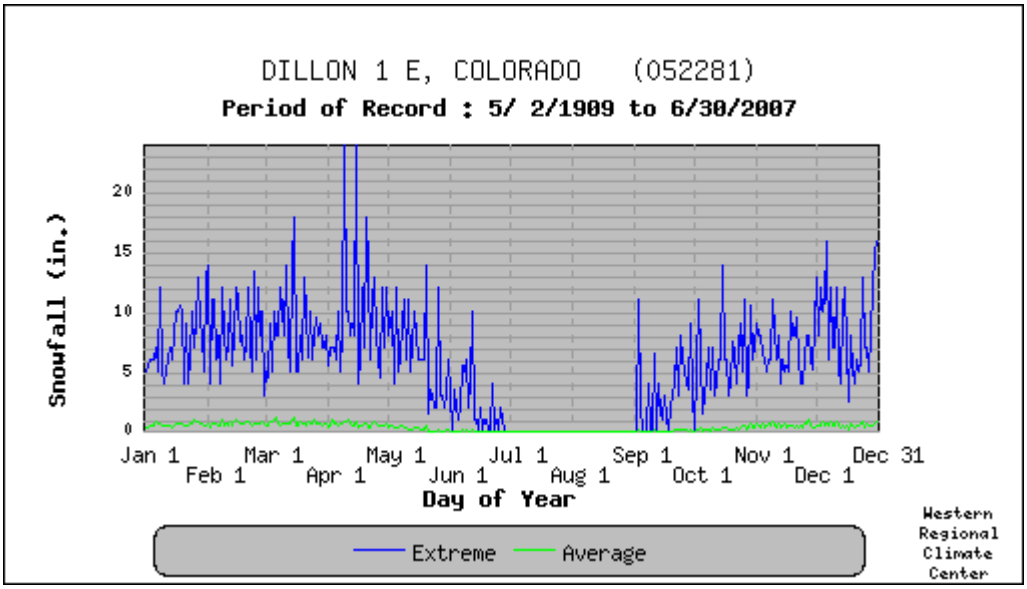
Source: Western Regional Climate Center, www.wrcc.dri.edu/
[1]All snowfall and snow depths are reported in inches
[2]Winter: December, January, February
[3]Period of Record: 8/1/1948-6/30/2007
[4]Period of Record: 5/2/1909-6/30/2007
[5]Period of Record: 8/1/1948-6/28/2007

Figure 3.13. Breckenridge Station Snowfall Averages and Extremes



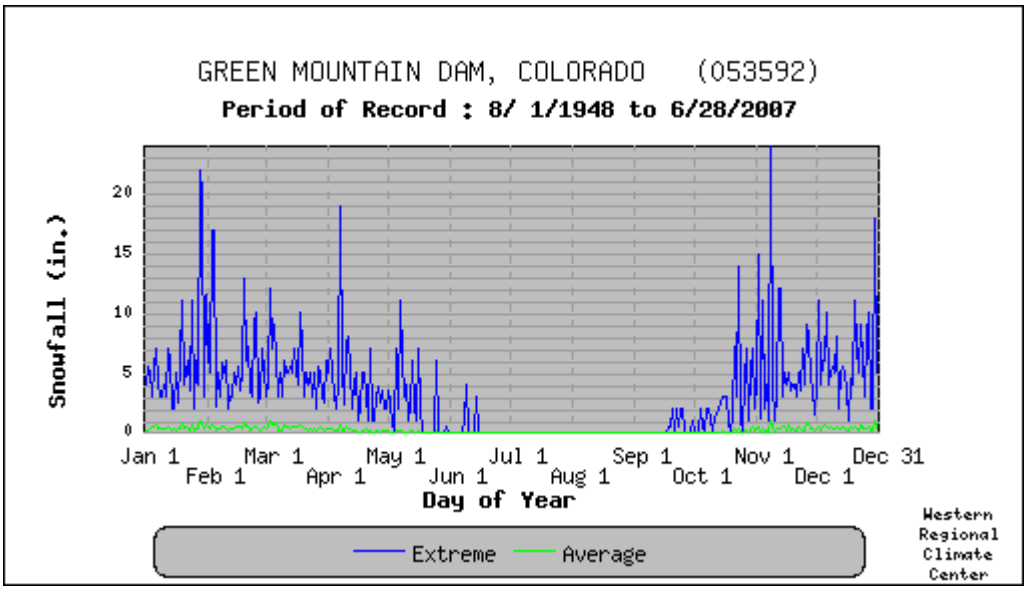
Source: Western Regional Climate Center, www.wrcc.dri.edu/

Figure 3.14. Dillon Station Snowfall Averages and Extremes



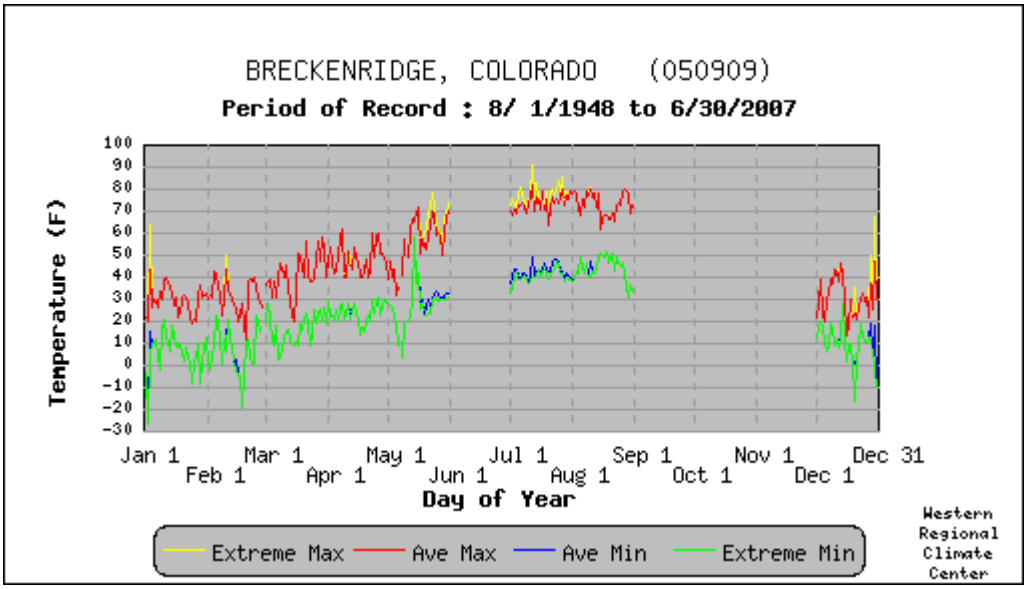
Source: Western Regional Climate Center, www.wrcc.dri.edu/

Figure 3.15. Green Mountain Dam Station Snowfall Averages and Extremes



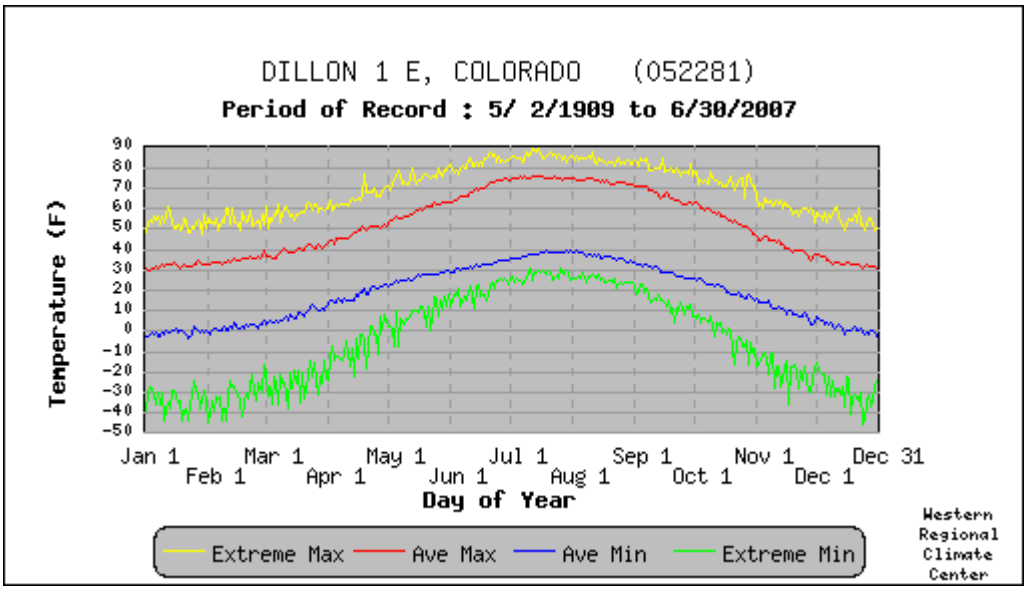
Source: Western Regional Climate Center, www.wrcc.dri.edu/

Figure 3.16. Breckenridge Station Temperature Averages and Extremes



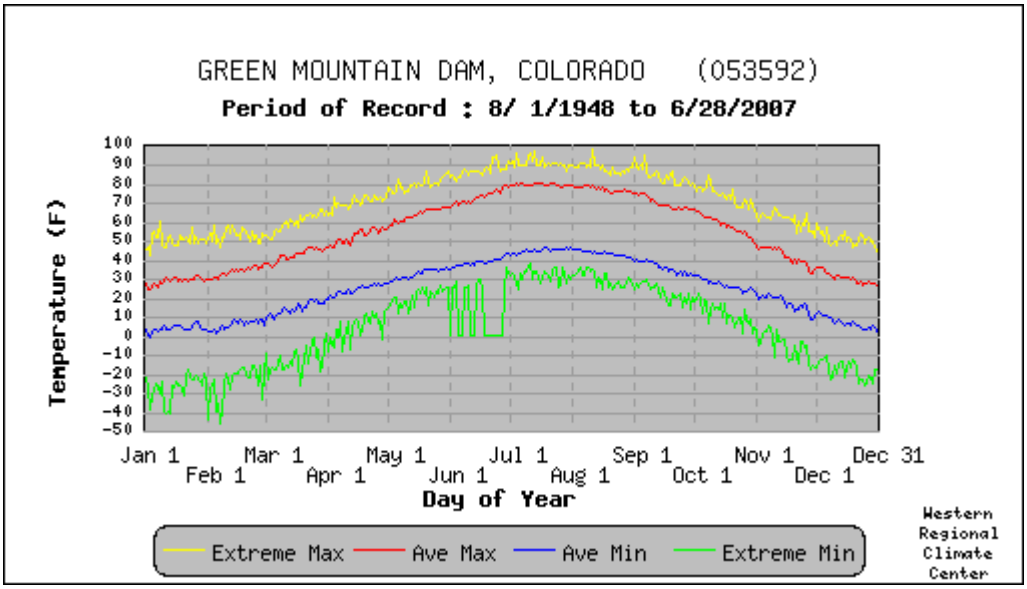
Source: Western Regional Climate Center, www.wrcc.dri.edu/

Figure 3.17. Dillon Station Temperature Averages and Extremes



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

Figure 3.18. Green Mountain Dam Station Temperature Averages and Extremes



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

Previous Occurrences

Historical data from SHELDUS and the National Climatic Data Center Storm Events Database was combined to determine that there were roughly 148 recorded winter weather events in Summit County between 1960 and August 2007. Of the 148 recorded events for Summit County or its National Weather Service forecast zones (Zones 32 and 34) in the period of record, 6 were specifically for freeze or cold.

Data limitations: Some events may have been missed due to limitations in the manner in which events that occurred over multiple forecast zones are reported. Dollar figures reported for winter weather events in both SHELDUS and the National Climatic Data Center Storm Events database are total damages for all counties associated with an event. Specific Summit County losses are not available.

Descriptions of notable events from the HMPC are included below:

- **December 30, 2007**—More than 2,100 travelers required sheltering when high winds and blowing snow forced the closure of I-70 in both directions. Driving conditions were treacherous and the danger of avalanches was high. Needs exceeded capacity, so the County coordinated with churches to accommodate the overflow. It was the County's largest shelter mobilization to date. The fact that the storm hit on a Sunday over a holiday weekend, and came with little warning contributed to the problems. Cellular phones jammed communication networks, which affected emergency communications capabilities. Storm-related traffic accidents included a multi-car pileup on I-70 near Silverthorne.

Probability of Future Occurrence

Highly Likely—Near 100 percent chance of occurrence in next year or has a recurrence interval of 10 years or less

There were 148 recorded winter weather events in Summit County between 1960 and August 2007. On average, there are 3.1 severe winter weather events in the County each year, which equals over 100 percent chance of occurrence in each year.

Magnitude/Severity

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

Winter weather in Summit County, including strong winds and blizzard conditions, can result in property damage, localized power and phone outages, and closures of streets, highways, schools, businesses, and nonessential government operations. People can also become isolated from essential services in their homes and vehicles. A winter storm can escalate, creating life threatening situations when emergency response is limited by severe winter conditions. Other issues associated with severe winter weather include hypothermia and the threat of physical overexertion that may lead to heart attacks or strokes. Snow removal costs can impact budgets significantly. Heavy snowfall during winter can also lead to flooding or landslides during the spring if the area snowpack melts too quickly. High snow loads also cause damage to buildings and roofs.

Summit County can be isolated on all sides by highway closures or blocked vehicles stopped on the interstate for miles. The County usually has about three days worth of commodities (food and gasoline). This supply is based upon the needs of a community of 27,000 and is quickly depleted during peak tourism periods when the average daily population is over 100,000. During the December 2007 winter storm event, stores already were in short supply from the weekend and were quickly emptied in one day with 2,500 stranded motorists.

3.2.12 Wildfire

Hazard Description

Fire conditions arise from a combination of hot weather, an accumulation of vegetation, and low moisture content in air and fuel. These conditions, especially when combined with high winds and years of drought, increase the potential for wildfire to occur. The wildfire risk is predominantly associated with wildland-urban interface areas, areas where development is interspersed or adjacent to landscapes that are prone to wildfire. Wildfire in the wildland-urban interface can result in major losses of property and structures.

Generally, there are three major factors that sustain wildfires and predict a given area's potential to burn. These factors are fuel, topography, and weather.

- **Fuel**—Fuel is the material that feeds a fire and is a key factor in wildfire behavior. Fuel is generally classified by type and by volume. Fuel sources are diverse and include everything from dead tree needles and leaves, twigs, and branches to dead standing trees, live trees, brush, and cured grasses. Also to be considered as a fuel source are manmade structures, such as homes and associated combustibles. The type of prevalent fuel directly influences the behavior of wildfire. Light fuels such as grasses burn quickly and serve as a catalyst for fire spread. In addition, "ladder fuels" can spread a ground fire up through brush and into trees, leading to a devastating crown fire that burns in the upper canopy and cannot be controlled. The volume of available fuel is described in terms of fuel loading.
- **Topography**—An area's terrain and land slopes affect its susceptibility to wildfire spread. Both fire intensity and rate of spread increase as slope increases due to the tendency of heat from a fire to rise via convection. The arrangement of vegetation throughout a hillside can also contribute to increased fire activity on slopes.
- **Weather**—Weather components such as temperature, relative humidity, wind, and lightning also affect the potential for wildfire. High temperatures and low relative humidity dry out the fuels that feed the wildfire creating a situation where fuel will more readily ignite and burn more intensely. Wind is the most treacherous weather factor. The greater the wind, the faster a fire will spread and the more intense it will be. In addition to wind speed, wind shifts can occur suddenly due to temperature changes or the interaction of wind with topographical features such as slopes or steep hillsides. Lightning also ignites wildfires, which often occur in terrain that is difficult for firefighters to reach. Drought conditions contribute to concerns about wildfire vulnerability. During periods of drought, the threat of wildfire increases.

Wildfires are of significant concern throughout Colorado. According to the Colorado State Forest Service, vegetation fires occur on an annual basis; most are controlled and contained early with limited damage. For those ignitions that are not readily contained and become wildfires, damage can be extensive. There are many causes of wildfire, from naturally caused lightning fires to human-caused fires linked to activities such as smoking, campfires, equipment use, and arson.

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

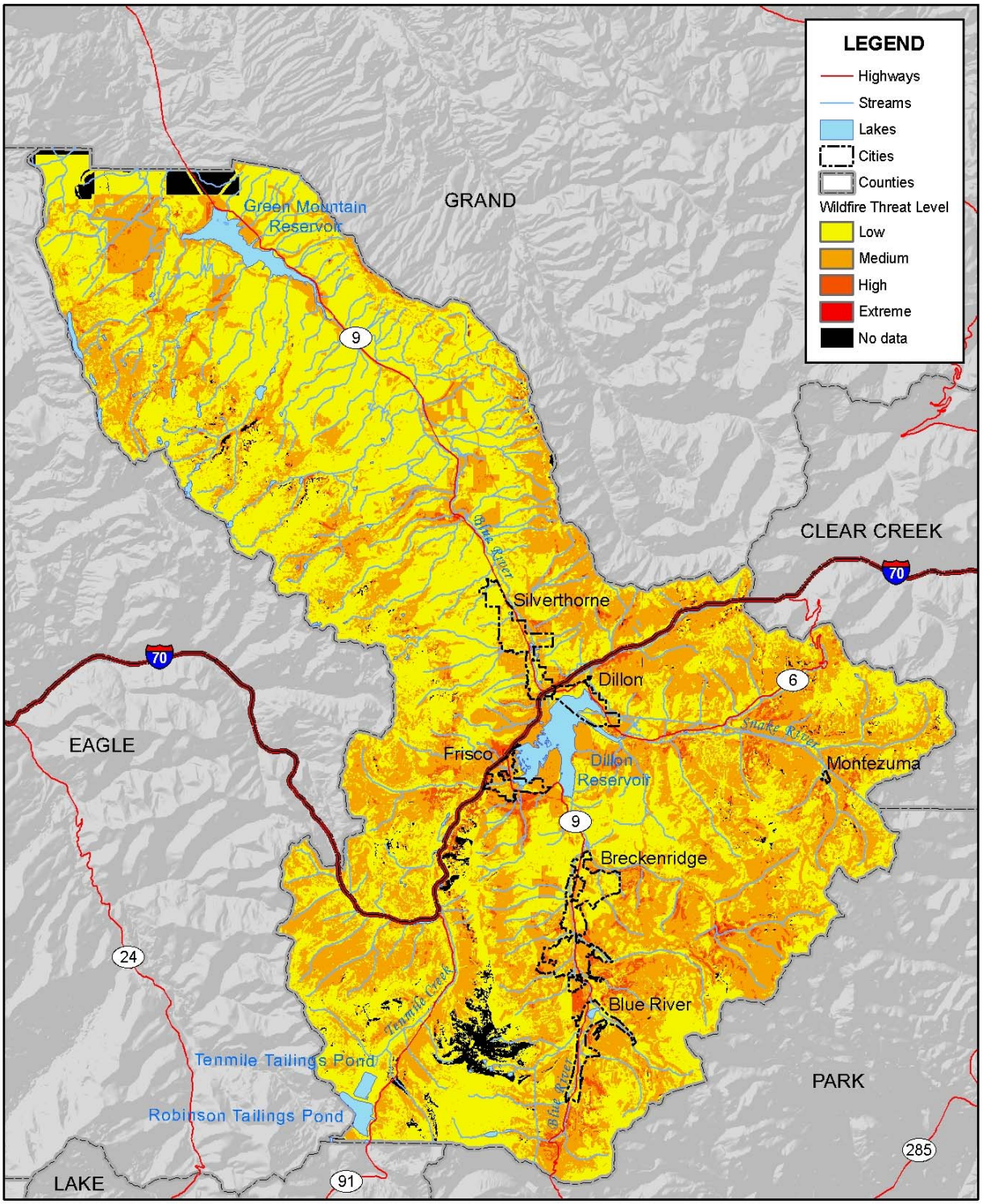
Geographic Location

The geographic extent of this hazard in Summit County is **medium**—25-50 percent of the planning area affected.

Figure 3.19 shows the wildfire threat in Summit County classified as low, medium, high, and extreme. This threat ranking was developed for the Summit County Community Wildfire Protection Plan by the County, fire protection districts, and U.S. Forest Service. It is based on fuel hazards, risk of wildfire occurrence, essential infrastructure at risk, community values at risk, and local preparedness and firefighting capability.

The wildfire threat GIS layer was used to determine the number of acres in each wildfire threat zone by town and fire protection district. The results are shown in Table 3.9. The fire protection districts cumulative acreage represents the total acreage for the County; however, these boundaries are not completely accurate. There are remote areas of the County that are not part of a fire protection district.

Figure 3.19. Summit County Wildfire Threat



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0 5 10 Miles

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Map compiled 9/2008; intended for planning purposes only.
Data Source: Summit County

Table 3.9. Acreage in Wildfire Threat Zones by Jurisdiction

Jurisdiction	No Data		Low		Medium		High		Extreme		Total Acres
	Acres	% Total	Acres	% Total	Acres	% Total	Acres	% Total	Acres	% Total	
Blue River	n/a	n/a	805	55.7	632	43.7	9	0.6	0	0.0	1,445
Breckenridge	n/a	n/a	1,805	48.7	1,775	47.9	124	3.4	.5	0.0	3,705
Dillon	n/a	n/a	1,061	71.6	421	28.4	1	0.1	0	0.0	1,483
Frisco	n/a	n/a	265	23.5	796	70.7	65	5.8	0	0.0	1,127
Montezuma	n/a	n/a	21	41.3	24	48.2	5	10.6	0	0.0	50
Silverthorne	n/a	n/a	1,560	63.0	908	36.7	7	0.3	0	0.0	2,475
Unincorporated Areas	7,223	1.9	215,921	56.0	149,566	38.8	12,621	3.3	206	0.1	385,538
Copper Mountain FPD	2,336	5.0	25,814	55.0	18,320	39.0	496	1.1	0	0.0	46,966
Lake Dillon FPD	933	0.5	89,417	52.4	73,648	43.1	6,619	3.9	84	0.0	170,701
Lower Blue FPD	2,432	2.5	69,220	70.5	24,942	25.4	1,549	1.6	3	0.0	98,146
Red, White, and Blue FPD	1,522	1.9	36,986	46.2	37,212	46.5	4,169	5.2	120	0.2	80,009
Total County	**7,223**	**1.8**	**221,437**	**55.9**	**154,122**	**38.9**	**12,833**	**3.2**	**207**	**0.1**	**395,822**

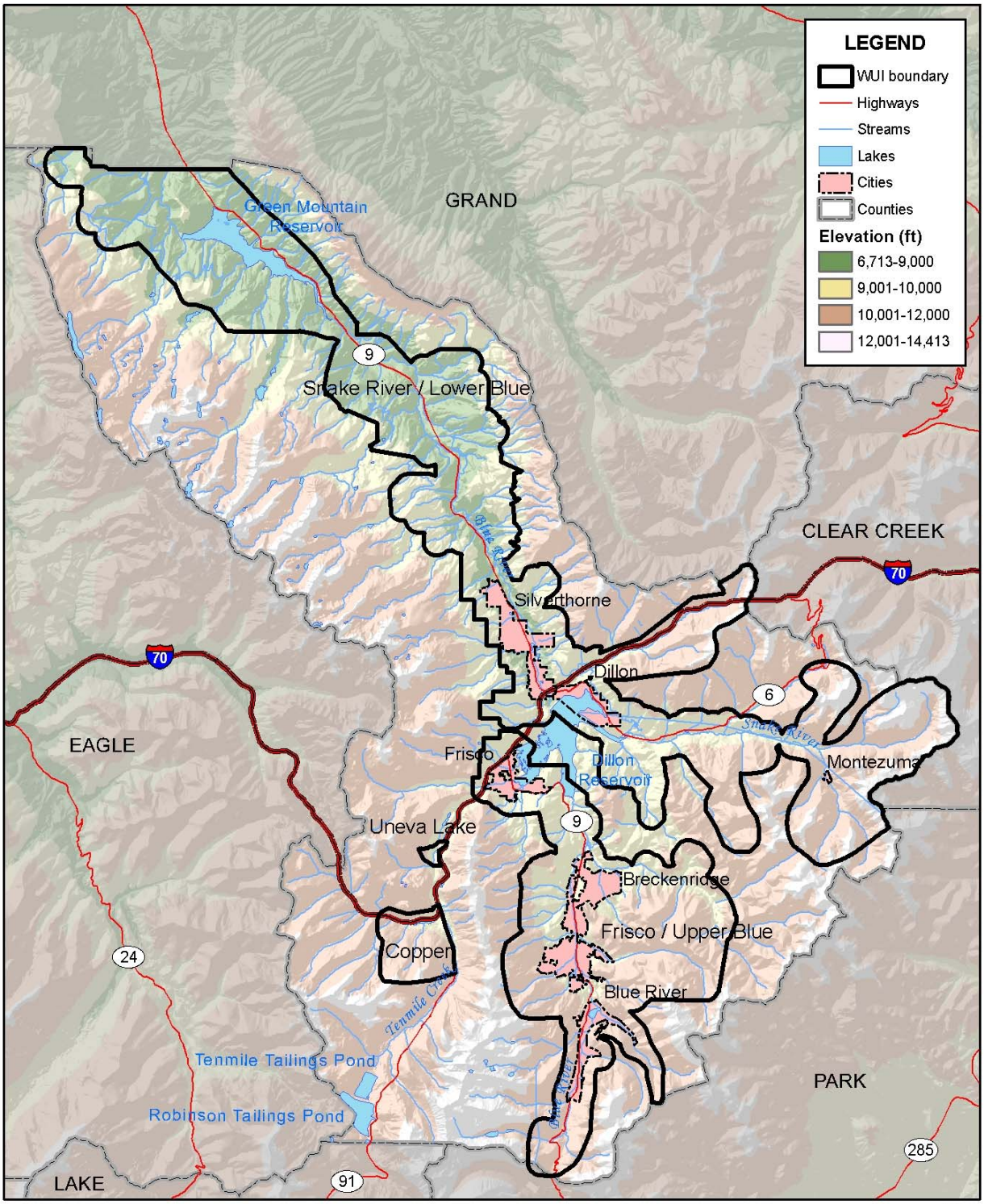
Source: Summit County
Notes: FPD=fire protection district

Based on the information presented in Table 3.9, unincorporated Summit County has the most acreage at risk to wildfire, with 162,393 acres (42.1 percent of the County's unincorporated acreage) in medium to extreme wildfire threat zones. Among the incorporated municipalities, Breckenridge has the most acreage at risk to wildfire; it is the only town with acreage in the extreme fire threat zone (.5 acres) and has 124 acres in the high threat zone and 1,775 acres in the medium threat zone, which, in both instances, is significantly more than the other towns. But, in regard to percent of total acreage in medium to extreme wildfire threat zones, Frisco (76.5 percent) and Montezuma (58.7 percent) are more at risk than Breckenridge (51.3 percent).

Among the fire protection districts, the Lake Dillon Protection District has the most acreage at risk (80,351 acres in medium to extreme wildfire threat zones). In regard to percent of total acreage in medium to extreme wildfire threat zones, the Red White and Blue Fire Protection District has the most to lose, with 51.9 percent of its acreage in a medium to extreme wildfire threat zone. Overall, the County has 167,162 acres (42.2 percent of its acreage) in medium to extreme wildfire threat zones.

Figure 3.20 illustrates Summit County's wildland-urban interface and Figure 3.21 shows the level of community protection needed as extreme, high, medium, and low as determined in the Summit County Community Wildfire Protection Plan.

Figure 3.20. Summit County Wildland-Urban Interface



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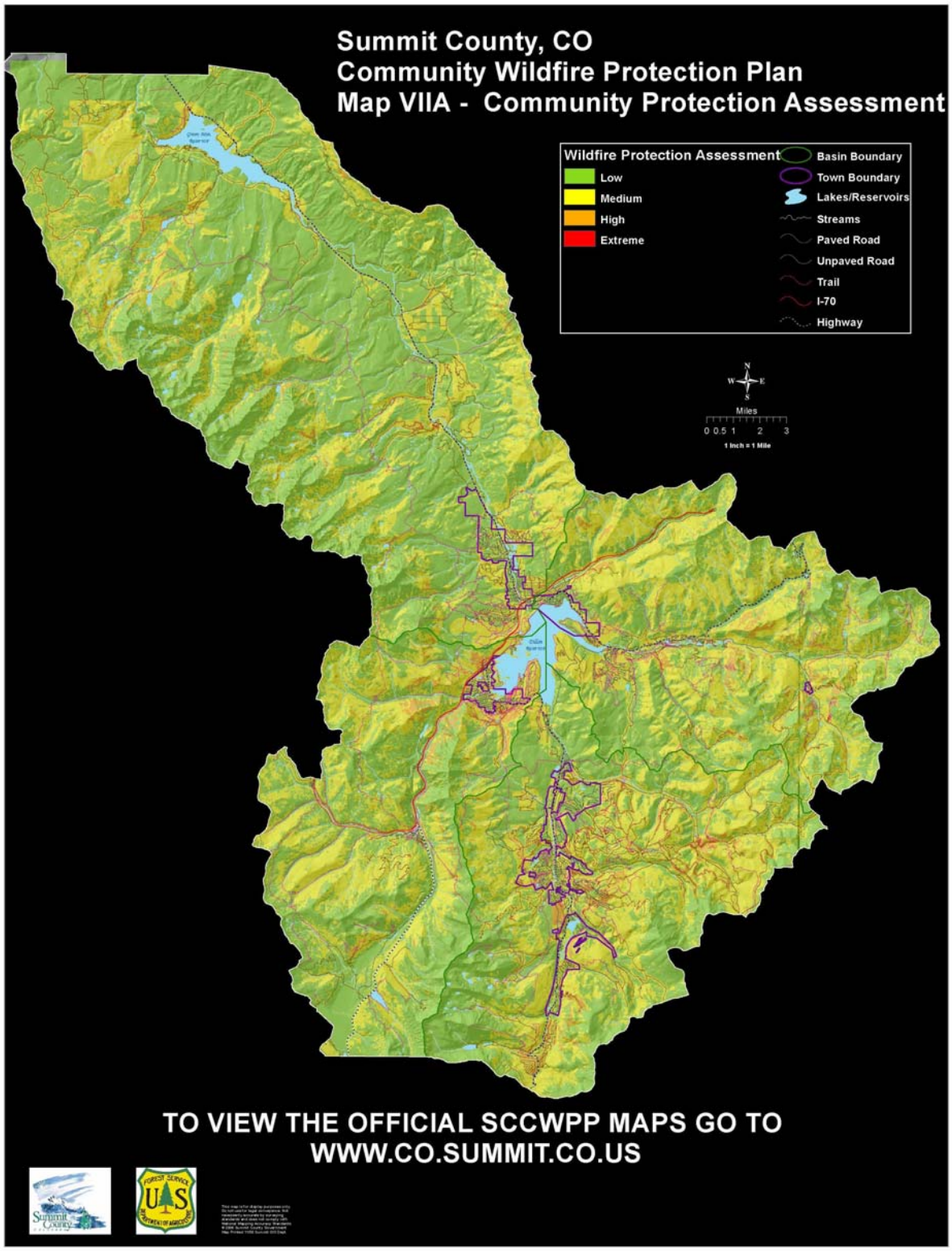
Map compiled 9/2008; intended for planning purposes only.
Data Source: Summit County

Figure 3.21. Community Protection Assessment



Previous Occurrences

According to the Federal Wildland Fire Occurrence Data website (which reports official fire occurrence data collected from five federal agencies), there were 199 wildland fires in Summit County between 1980 and 2006. Of these fires, all but one (the Ophir Mountain fire) burned on four acres or less. 2005 was Summit County's worst wildfire season in 30 years. It saw 10 wildfires in 10 days. Eighty percent of the fires were human-caused. Notable fires in Summit County (that burned at least one acre) include the following:

- **June 2006**—The Brinker Fire, near the Williams Fork Reservoir, on the Summit and Grand County line, burned about 30 acres.
- **September 19-20, 2005**—The Ophir Mountain Fire (Red, White, and Blue Fire Protection District) burned approximately 16 acres. Summit High School and about 50 homes were evacuated. Up to five homes were in immediate danger of being destroyed. Likely human-caused, the fire spread quickly through beetle-killed lodgepole pine trees, mostly in the White River National Forest near Farmer's Korner. The fire burned on land designated in the County's Community Wildfire Protection Plan as high priority because of heavy fuel loads, ground litter, and its proximity to development. The plan was still under development at the time of the fire. Southbound U.S. Highway 9 was closed at the Nordic Center in Frisco.
- **July 17, 2005**—The Meadow Creek fire burned 2 acres near the Meadow Creek trailhead in Frisco. It was human-caused and took four days to extinguish.
- **August 1, 2003**—The Spruce Creek fire burned 1 acre.
- **August 16, 2002**—The Old Dillon Reservoir fire burned 2.5 acres.
- **June 24, 2002**—The Otter Creek fire burned 1 acre between Black and Surprise lakes in the Eagles Nest Wilderness.
- **July 24, 2000**—The Black Lake fire burned 4 acres.
- **November 14, 1999**—Keystone fire burned 1-acre fire and was human-caused.
- **May 20, 1999**—The Lowery fire burned 4 acres and was human-caused.
- **July 8, 1994**—A fire burned 1.5 acres.
- **June 8, 1994**—A fire burned 2 acres.
- **July 4, 1992**—A fire burned 1 acre.
- **June 17, 1990**—A fire burned 1.5 acres.

Probability of Future Occurrence

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

According to the Federal Wildland Fire Occurrence website, there were 199 wildland fires in Summit County between 1980 and 2006. Thus, there is a 100 percent chance that at least one wildfire will occur each year in Summit County. It is worth noting that the majority (94 percent) of these fires burned less than one acre. Nevertheless, given the conditions described above and the mountain pine beetle infestation, a small fire could easily become a big one.

Magnitude/Severity

Catastrophic—Multiple deaths; property destroyed and severely damaged; interruption of essential facilities and service for more than 72 hours

Potential losses from wildfire include human life; structures and other improvements; natural and cultural resources; the quality and quantity of the water supply; assets such as timber and range; and recreational opportunities; and economic losses. Smoke and air pollution from wildfires can be a severe health hazard. In addition, wildfire can lead to secondary impacts due to vegetation loss such as future flooding and landslides and erosion during heavy rains.

3.2.13 Windstorm

Hazard Description

High winds occur year round in Summit County. In the spring and summer, high winds often accompany severe thunderstorms. These winds are typically straight-line winds, which are generally any thunderstorm wind that is not associated with rotation (i.e., is not a tornado). It is these winds, which can exceed 100 miles per hour (mph) that represent the most common type of severe weather and are responsible for most wind damage related to thunderstorms.

In the mountains of Colorado, strong winds are also common throughout the winter months and can exceed 50 to 100 mph in exposed locations. Specifically, these winter winds can force the closure of highways (blowing snow) and induce avalanches (see Section 3.2.1 Avalanche and Section 3.2.11 Severe Winter Weather).

Geographic Location

The geographic extent of this hazard in Summit County is **large**—more than 50 percent of the planning area affected.

High winds can occur throughout Summit County and may be most severe at high elevations. Frequent high winds at Dillon Reservoir make it a popular challenging technical sailing destination. There are sailing races here each weekend throughout the summer, and high winds often create hazardous conditions.

Previous Occurrences

Historical data from SHELDUS and the National Climatic Data Center Storm Events Database was combined to determine that there were roughly 43 recorded wind events in Summit County or its National Weather Service forecast zones (Zones 32 and 34) between 1955 and April 2007. (Note: These wind events were reported as wind only or thunderstorm wind events. The summary does not include winds that were part of severe winter weather (see Section 3.2.11 Severe Winter Weather.)

Data limitations: Some events may have been missed due to limitations in the manner in which events that occurred over multiple forecast zones are reported. Dollar figures reported for wind events in both SHELDUS and the National Climatic Data Center Storm Events database are total damages for all counties associated with an event. Specific Summit County losses are not available.

Notable events mentioned by the HMPC include the following:

- **June 2007**—A severe microburst in the area of Dillon Reservoir capsized a sailboat with four people onboard. A sheriff's deputy rescued the boaters; none were wearing floatation devices.
- **2002 (2003)**—There was a big wind storm on Dillon Reservoir.
- **1999 (2000)**—A microburst at Green Mountain Reservoir capsized a number of boats.
- **September 1986**—High winds at Dillon Reservoir broke up the marina, sinking six boats and damaging numerous others. Wind gusts of more than 70 mph were reported.

The HMPC also reported that a microburst occurred in the Eagle's Nest Wilderness Area within Summit County in the last few years.

Probability of Future Occurrence

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

There were 43 significant recorded high wind events in the past 53 years in Summit County, which equals one wind event every 1.2 years on average, or an 81 percent chance of occurrence in any given year.

Magnitude/Severity

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

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

3.2.14 Hazard Profiles Summary

This section summarizes the results of the hazard profiles and assigns a level of overall planning significance to each hazard of low, moderate, or high. Significance was determined based on the hazard profile, focusing on key criteria such as frequency and resulting damage, including deaths/injuries and property, crop, and economic damage. This assessment was used by the HMPC to prioritize those hazards of greatest significance to the planning area; thus enabling the County to focus resources where they are most needed. Those hazards that occur infrequently or have little or no impact on the planning area were determined to be of low significance. Those hazards determined to be of high and moderate significance were characterized as priority hazards that required further evaluation in Section 3.3 Vulnerability Assessment.

Table 3.10. Summary of Hazard Profiles

Hazard Type	Geographic Location*	Probability*	Magnitude*	Overall Vulnerability
Avalanche	Isolated	Highly Likely	Critical	High
Flood	Small	Likely	Critical	High
Severe Winter Weather	Large	Highly Likely	Critical	High
Wildfire	Medium	Highly Likely	Catastrophic	High
Drought	Large	Likely	Limited	Moderate
Dam Failure	Small	Unlikely	Catastrophic	Moderate
Hazardous Materials Release (Transportation)	Isolated	Likely	Catastrophic	Moderate
Landslide, Mudflow/Debris Flow, Rock Fall	Isolated	Occasional	Critical	Moderate
Lightning	Large	Likely	Critical	Moderate
Mountain Pine Beetle Infestation	Large	Highly Likely	Limited	Moderate
Earthquake	Large	Occasional	Limited	Low
Erosion/Deposition	Small	Likely	Limited	Low
Windstorm	Large	Likely	Limited	Low

Source: Summit County Hazard Mitigation Planning Committee, 2008
*See section 3.2 for definitions of these factors

The following tables summarize the results of the hazard profiles for incorporated communities that are participating jurisdictions in the hazard mitigation plan.

Table 3.11. Probability of Future Occurrence of Identified Hazards by Jurisdiction

Hazard Type	Summit County	Blue River	Breckenridge	Dillon	Frisco	Silverthorne
Avalanche	High Likely	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
Dam Failure	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
Drought	Likely	Occasional	Occasional	Likely	Likely	Likely
Earthquake	Occasional	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
Erosion/Deposition	Likely	Likely	Likely	Likely	Likely	Likely
Flood	Likely	Occasional	Likely	Unlikely	Likely	Likely
Hazardous Materials Release (Transportation)	Likely	Unlikely	Unlikely	Occasional	Occasional	Occasional
Landslide, Mudflow/Debris Flow, and Rock Fall	Occasional	Occasional	Occasional	Unlikely	Unlikely	Likely
Lightning	Likely	Likely	Likely	Likely	Likely	Likely
Mountain Pine Beetle Infestation	Highly Likely	Highly Likely	Highly Likely	High Likely	Highly Likely	Likely
Severe Winter Weather	Highly Likely	Highly Likely	Highly Likely	Highly Likely	Highly Likely	Highly Likely
Wildfire	Highly Likely	Likely	Likely	Occasional	Occasional	Likely
Windstorm	Likely	Likely	Likely	Likely	Likely	Likely

*See Section 3.2 for definitions of these factors

Table 3.12. Magnitude/Severity of Identified Hazards by Jurisdiction

Hazard Type	Summit County	Blue River	Breckenridge	Dillon	Frisco	Silverthorne
Avalanche	Critical	Limited	Limited	Negligible	Negligible	Negligible
Dam Failure	Catastrophic	Critical	Critical	Limited	Limited	Catastrophic
Drought	Limited	Limited	Limited	Limited	Limited	Limited
Earthquake	Limited	Limited	Limited	Limited	Limited	Limited
Erosion/Deposition	Limited	Critical	Limited	Limited	Limited	Limited
Flood	Critical	Limited	Critical	Limited	Limited	Critical
Hazardous Materials Release (Transportation)	Catastrophic	Limited	Critical	Critical	Critical	Critical
Landslide, Mudflow/Debris Flow, and Rock Fall	Critical	Limited	Limited	Limited	Limited	Limited
Lightning	Critical	Limited	Critical	Critical	Critical	Critical
Mountain Pine Beetle Infestation	Limited	Limited	Limited	Limited	Limited	Limited
Severe Winter Weather	Critical	Critical	Critical	Critical	Critical	Critical
Wildfire	Catastrophic	Critical	Catastrophic	Critical	Critical	Critical
Windstorm	Limited	Limited	Limited	Limited	Limited	Limited

*See Section 3.2 for definitions of these factors

Table 3.13. Planning Significance of Identified Hazards by Jurisdiction

Hazard Type	Summit County	Blue River	Breckenridge	Dillon	Frisco	Silverthorne
Avalanche	High	Low	Low	Low	Low	Low
Dam Failure	Moderate	Moderate	Moderate	Low	Low	High
Drought	Moderate	Low	Moderate	Low	Moderate	Moderate
Earthquake	Low	Low	Low	Low	Low	Low
Erosion/Deposition	Low	Moderate	Low	Moderate	Moderate	Low
Flood	High	Moderate	High	Low	Moderate	High
Hazardous Materials Release (Transportation)	Moderate	Low	Low	High	High	High
Landslide, Mudflow/Debris Flow, and Rock Fall	Moderate	Low	Low	Low	Low	Low
Lightning	Moderate	Low	Moderate	Moderate	Moderate	Moderate
Mountain Pine Beetle Infestation	Moderate	Moderate	Moderate	Moderate	High	Moderate
Severe Winter Weather	High	High	High	High	High	High
Wildfire	High	High	High	Moderate	High	High
Windstorm	Low	Low	Low	Low	Low	Low

3.3 Vulnerability Assessment

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

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

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

3.3.1 Methodology

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

The vulnerability assessment was conducted based on the best available data and the overall planning significance of the hazard. Data to support the vulnerability assessment was collected from the same sources identified in Section 3.1 Hazard Identification and Section 3.2 Hazard Profiles and from FEMA's HAZUS-MH MR3 loss estimation software.

The vulnerability assessment includes three sections:

- **Community Asset Inventory**—This section inventories assets exposed to hazards in Summit County, including the total exposure of people and property; critical facilities and infrastructure; natural, cultural, and historic resources; and economic assets.
- **Vulnerability by Hazard**—This section describes the County's overall vulnerability to each hazard; identifies existing and future structures, critical facilities, and infrastructure in identified hazard areas; and estimates potential losses to vulnerable structures, where data is available. Only hazards of moderate or high planning significance, or that have identified hazard areas are addressed in the vulnerability assessment.
- **Development and Land Use Trends**—The final section analyzes trends in population growth, housing demand, and land use patterns.

In addition, a capability assessment was conducted for each jurisdiction as part of the risk assessment process. A capability assessment identifies the existing programs, policies, and plans that mitigate or could be used to mitigate risk to disasters. This information can be found in the annex for each jurisdiction.

3.3.2 Community Asset Inventory

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

Total Exposure to Hazards

Table 3.14 shows the total population, number of structures, and assessed value of improvements to parcels by jurisdiction. Building counts and values (includes building contents) were taken from HAZUS-MH census block-level data, then aggregated by town. The census blocks nest into the city boundaries for the most part, but sometimes census block boundaries cross city boundaries. In these cases, the counts and values were attributed to that city (or unincorporated county) where the majority of the census block is located.

Land values have been purposely excluded because land remains following disasters, and subsequent market devaluations are frequently short term and difficult to quantify. Additionally, state and federal disaster assistance programs generally do not address loss of land or its associated value.

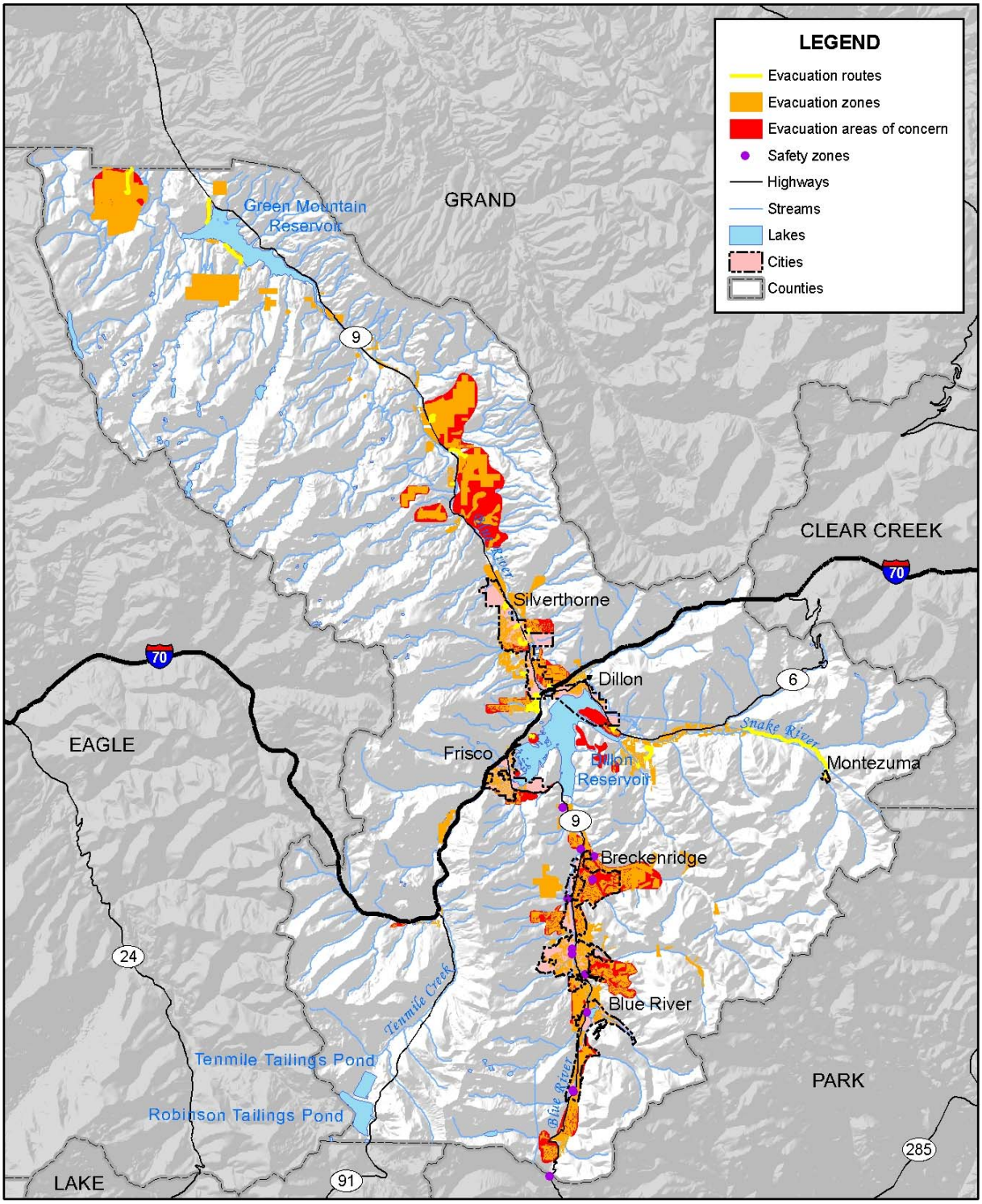
Table 3.14. Maximum Population and Building Exposure by Jurisdiction

Community	Population 2006	Number of Structures	Total Structure Value ($)*
Blue River	752	550	136,378,000
Breckenridge	3,439	2,262	1,020,891,000
Dillon	818	689	267,779,000
Frisco	2,742	2,051	706,857,000
Montezuma	49	84	8,229,000
Silverthorne	3,956	1,653	467,704,000
Unincorporated Areas	16,208	7,659	2,911,915,000
Total	**27,964**	**14,948**	**5,519,753,000**

Source: HAZUS-MH (MR 3) (structures), Colorado Division of Local Government State Demography Office, www.dola.colorado.gov/dlg/demog/pop_cnty.html
*Value represents “improved structure value” and includes contents

The Summit County Office of Emergency Management coordinates evacuation planning for jurisdictions in the County. Figure 3.22 shows evacuation routes and identified areas of concern.

Figure 3.22. Summit County Evacuation Routes and Areas of Concern



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Map compiled 9/2008; intended for planning purposes only.
Data Source: Summit County

Critical Facilities and Infrastructure

A critical facility may be defined as one that is essential in providing utility or direction either during the response to an emergency or during the recovery operation. Table 3.15 displays the inventory of critical facilities (based on available data) in Summit County as provided by the HMPC and Summit County GIS data. The locations of these facilities are shown with a floodplain map in Figure 3.24 in the flood section of 3.3.3 Vulnerability by Hazard. Specific information on facilities and their locations can be found in the jurisdictional annexes.

Table 3.15. Critical Facilities in Summit County

Facility Type	Unincorporated Areas	Blue River	Breckenridge	Dillon	Frisco	Silverthorne
Ambulance	2	-	-	1	-	-
Bridge	33	-	2	1	4	8
Dam	7	1	1	-	-	-
Emergency Operations	1					
EMS Transmitter	5	-	-	-	-	-
Fire Lookout	23	-	3	-	1	1
Fire Station	4	1	2	1	1	1
Government Building	8	-	6	2	2	3
Helicopter Pad/Staging	9	-	3	1	1	-
Incident Command Post	3	-	-	-	-	2
Medical Facility	1	-	1	-	-	-
School	4	-	2	-	1	1
Water/Wastewater	5	-	1	1	1	2
County Totals	**105**	**2**	**21**	**7**	**11**	**18**

Source: Summit County GIS Department

Other facilities in the County, such as locations that hold concerts, sporting events, and other events that attract large numbers of people, may also be at higher risk due to concentrations of people.

Natural, Historic, and Cultural Assets

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

- The community may decide that these types of resources warrant a greater degree of protection due to their unique and irreplaceable nature and contribution to the overall economy.

- If these resources are impacted by a disaster, knowing so ahead of time allows for more prudent care in the immediate aftermath, when the potential for additional impacts are higher.
- The rules for reconstruction, restoration, rehabilitation, and/or replacement are often different for these types of designated resources.
- Natural resources can have beneficial functions that reduce the impacts of natural hazards, such as wetlands and riparian habitat, which help absorb and attenuate floodwaters.

One particular asset that falls into all three categories is the Top of the Rockies National Scenic Byway. Administered by the Federal Highway Administration, national scenic byways are so designated to preserve and protect the nation's scenic but often less-traveled roads and promote tourism and economic development. Any disaster-related damage done to the Top of the Rockies (or damage that affects access) could have negative implications on tourism, and thus the economy, in Summit County.

Natural Resources

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

A number of natural resources exist in Summit County, including wetlands, endangered species, and imperiled plant communities.

Wetlands

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

According to the Wetlands FAQ on the Summit County website, between the 1780s and 1980s, over half of the wetlands in Colorado were lost due to human activities (e.g., filling and other degrading activities). In Summit County, wetland has loss resulted from historic gold mining and large construction projects such as Interstate 70 and Dillon and Green Mountain reservoirs. In more recent years, construction of single-family residences, as well as other types of development, has resulted in a cumulative and permanent wetland loss in the County.

Endangered Species

To further understand natural resources that may be particularly vulnerable to a hazard event, as well as those that need consideration when implementing mitigation activities, it is important to identify at-risk species (i.e., endangered species) in the planning area. An endangered species is any species of fish, plant life, or wildlife that is in danger of extinction throughout all or most of its range. A threatened species is a species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. Both endangered and threatened species are protected by law and any future hazard mitigation projects are subject to these laws. Candidate species are plants and animals that have been proposed as endangered or threatened but are not currently listed.

According to the U.S. Fish and Wildlife Service, as of February 2008, there were nine federal endangered, threatened, or candidate species in Summit County. These species are listed in Table 3.16 along with state listed species. State special concern is not a statutory category, but suggests a species may be in danger.

Table 3.16. Select List of Rare Species Found in Summit County

Common Name	Scientific Name	Type of Species	Status
Bald eagle	*Haliaeetus Leucocephalus*	Bird	State Threatened
Bonytail*	*Gila elegans*	Fish	Federal Endangered
Boreal toad	*Bufo boreas*	Amphibian	State Endangered
Canada lynx	*Lynx canadensis*	Mammal	Federal Threatened
Colorado pikeminnow*	*Ptychocheilus lucius*	Fish	Federal Endangered
Greater sandhill crane	*Grus Canadensis tabida*	Bird	State Special Concern
Humpback chub*	*Gila cypha*	Fish	Federal Endangered
Mexican spotted owl	*Strix occidentalis lucida*	Bird	Federal Threatened
Northern leopard frog	*Rana pipiens*	Amphibian	State Special Concern
Northern pocket gopher	*Thomomys talpoides*	Mammal	State Special Concern
Northern river otter	*Lutra Canadensis*	Mammal	State Threatened
Penland alpine fen mustard	*Eutrema penlandii*	Plant	Federal Threatened
Plains sharp-tailed grouse	*Tympanuchus phasianellus jamesii*	Bird	State Endangered
Razorback sucker*	*Xyrauchen texanus*	Fish	Federal Endangered
Sage grouse	*Centrocercus urophasianus*	Bird	State Special Concern
Southwestern willow flycatcher	*Empidonax traillii extimus*	Bird	State Endangered
Uncompahgre fritillary butterfly	*Boloria acrocnema*	Insect	Federal Endangered
Yellow-billed cuckoo	*Coccyzus americanus*	Bird	Federal Candidate

Source: Endangered, Threatened, Proposed and Candidate Species Colorado Counties (February 2008), U.S. Fish and Wildlife Service Mountain-Prairie Region, www.fws.gov/mountain-prairie/endspp/; Natural Diversity Information Source of the Colorado Division of Wildlife, http://ndis.nrel.colostate.edu/

* Water depletions in the Upper Colorado River and San Juan River Basins, may affect the species and/or critical habitat in downstream reaches in other states.

Note: State status information is from the NDIS, which does not track county occurrence of fish or insects at this time.

Imperiled Natural Plant Communities

According to the Colorado Natural Heritage Program, there are a number of natural plant communities in Summit County that have been identified as critically imperiled, imperiled, or imperiled/rare or uncommon. These communities are listed below.

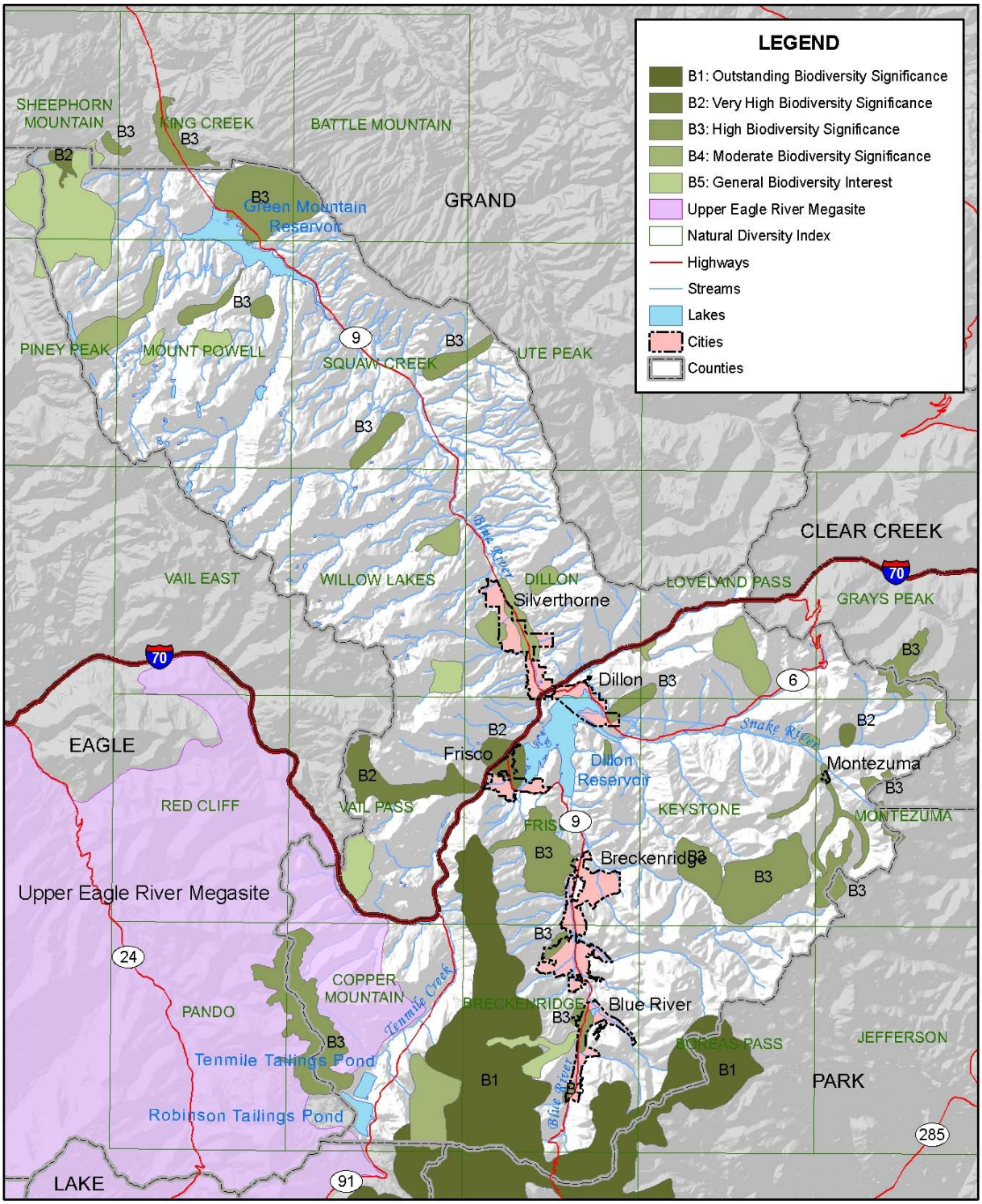
- Lower montane forests (critically imperiled)
- Montane floating/submergent wetland (critically imperiled)
- Western slope sagebrush shrublands (*Artemisia tridentata ssp. vaseyana*) (critically imperiled/imperiled)
- Clustered sedge wetland (imperiled)
- Lower montane woodlands (imperiled)
- Subalpine riparian willow carr (imperiled/rare or uncommon)
- Western slope sagebrush shrublands (*Artemisia cana ssp. viscidula*) (imperiled/rare or uncommon)

Ecologically Sensitive Areas

Figure 3.23 is a map of ecologically sensitive areas that displays the areas in Summit County where threatened and endangered species and imperiled natural plant communities are most likely to be found. The map shows statewide potential conservation areas identified by the Colorado Natural Heritage Program. These are best estimates of the primary areas required to support the long-term survival of targeted species or natural communities. Each conservation area is given a biodiversity rank of B1 (most significant) through B5 (general interest) based on observed occurrences in the area. Part of Frisco has a biodiversity rank of B2 (very high), and parts of Blue River, Breckenridge, and Dillon have biodiversity ranks of B3 (high).

The map also shows statewide network of conservation areas (NCA) identified by the Colorado Natural Heritage Program that are located in Summit County. An NCA may represent a landscape area that encompasses potential conservation areas that share similar species or natural communities and ecological processes. It may also represent a mostly intact, lightly fragmented landscape that supports wide-ranging species and large scale disturbances and include unoccupied or unsurveyed areas that demonstrate the connectivity of the landscape. The only currently designated NCA in Summit County is the Upper Eagle River Megasite, which includes part of Copper Mountain and the area to the west in Eagle and Lake Counties.

Figure 3.23. Summit County Ecologically Sensitive Areas



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Map compiled 9/2008; intended for planning purposes only.
Data Source: Summit County, CO Natural Heritage Program

Historical and Cultural Resources

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

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

Table 3.17 lists the properties and districts in Summit County that are on the Colorado State Register of Historic Properties. Those properties that are also on the National Register of Historic Places are indicated with an asterisk. In addition to these properties, several other structures have been designated by the County for their historic significance (e.g., the Rice Barns, Slate Creek Hall, and Old County Courthouse).

Table 3.17. Summit County Historic Properties/Districts in State and National Registers

Property Name	City	Location	Date Listed
Boreas Railroad Station Site*	Breckenridge	Boreas Pass Road, northwest of Como, Pike National Forest	10/28/1993
Breckenridge Historic District*	Breckenridge	Roughly bounded by Jefferson Avenue, Wellington Road, High, and Main Street	4/9/1980
Frisco Schoolhouse*	Frisco	120 Main Street	9/15/1983
Montezuma Schoolhouse*	Montezuma	5375 Webster Street	1/9/2007
Porcupine Peak Site* (prehistoric site)	Dillon	Address Restricted	8/1/1980
Slate Creek Bridge*	Slate Creek	County Road 1450, over Blue River	6/24/1985
Staley-Rouse House	Frisco	518 Main Street	5/31/2007
Wildhack's Grocery Store-Post Office*	Frisco	510 Main Street	5/16/1985

Sources: Directory of Colorado State Register Properties, www.coloradohistory-oahp.org/programareas/register/1503/; National Register Information System, www.nr.nps.gov/
*On both the Colorado State Register of Historic Properties and the National Register of Historic Places

It should be noted that as defined by the National Environmental Policy Act (NEPA), any property over 50 years of age is considered a historic resource and is potentially eligible for the National Register. Thus, in the event that the property is to be altered, or has been altered, as the result of a major federal action, the property must be evaluated under the guidelines set forth by NEPA. Structural mitigation projects are considered alterations for the purpose of this regulation.

Economic Assets

Economic assets at risk may include major employers or primary economic sectors, such as, agriculture, whose losses or inoperability would have severe impacts on the community and its ability to recover from disaster. After a disaster, economic vitality is the engine that drives recovery. Every community has a specific set of economic drivers, which are important to understand when planning ahead to reduce disaster impacts to the economy. When major employers are unable to return to normal operations, impacts ripple throughout the community. Table 3.18 lists the top employers in Summit County by number of employees.

Table 3.18. Top Employers in Summit County

Name	Address	City
1,000+ Employees		
Breckenridge Ski Resort	Summit County Road 3 # C	Breckenridge
Copper Mountain Resort	Ten Mile Circle	Frisco
Keystone Lodge	U.S. Highway 6	Keystone
Keystone Resort	U.S. Highway 6	Keystone
500-999 Employees		
Everist Materials Llc	Highway 9	Silverthorne
Keystone Resort	County Road 8	Keystone
100-499 Employees		
Arapahoe Basin Ski Area	U.S. Highway 6	Dillon
Beaver Run Resort & Conference	Village Road	Breckenridge
Breckenridge City Offices	Ski Hill Road # 3	Breckenridge
Breckenridge Lodging	S Park Avenue	Breckenridge
Breckenridge Medical Center	S Park Avenue	Breckenridge
Breckenridge Public Works	Airport Road	Breckenridge
Breckenridge Recreation Center	Airport Road	Breckenridge
City Market	N Park Avenue	Breckenridge
City Market	Dillon Ridge Road	Dillon
Colorado Mountain Express	Warren Avenue	Silverthorne
East West Resorts	S Main Street	Breckenridge
Great Divide Lodge	Village Road	Breckenridge
ResortQuest Breckenridge	S Main Street	Breckenridge
Summit County Government	N Park Avenue	Breckenridge
Silverthorne Town Hall	Center Circle	Silverthorne
St. Anthony Summit Medical Center	Peak One Drive	Frisco
Stan Miller Inc	Highway 9	Breckenridge
Summit High School	Highway 9	Frisco
Target	Blue River Parkway	Silverthorne

Name	Address	City
Village At Breckenridge	S Park Avenue	Breckenridge
Wal-Mart	N Summit Boulevard	Frisco
Wildernest Property Management	Wildernest Road	Silverthorne
Wildernest Real Estate	Wildernest Road	Silverthorne

Source: Colorado Department of Labor and Employment, http://lmigateway.coworkforce.com/

It is evident by the information presented in Table 3.18 that the County's largest employers are involved in the ski/tourism industry. A natural hazard, such as a drought, could severely impact the industry and the County's economy (including the large retailers that are also among the largest employers).

3.3.3 Vulnerability by Hazard

This section describes overall vulnerability and identifies structures and estimates potential losses to buildings, infrastructure, and critical facilities located in identified hazard areas. This assessment was limited to the hazards that were considered moderate or high in planning significance, based on HMPC input and the hazard profiles. Hazards ranked of low significance due to a lack of notable past damage or very low probabilities are not included in the vulnerability assessment. These include the following:

- Erosion and Deposition
- Windstorm

Mountain pine beetle infestation is also not discussed in this section because it does not directly cause damage to structures or critical facilities or infrastructure. Vulnerability for these hazards is discussed in qualitative terms in Section 3.2 Hazard Profiles. Although ranked of low planning significance, loss estimates for earthquake are included here because of the readily available HAZUS data from the State.

This assessment is also limited by the data available for the high or moderate ranked hazards. The methods of analysis vary by hazard type and data available. Many of the identified hazards, particularly weather related hazards, affect the entire planning area, and specific hazards areas cannot be mapped geographically. For these hazards, which include drought, lightning, and winter weather, vulnerability is mainly discussed in qualitative terms because data on potential losses to structures is not available. Geographic hazard areas can be mapped for the following identified hazards: avalanche; dam failure; earthquake; flood; landslide, mudflow/debris flow, and rock fall; and wildfire.

Avalanche

Summit County is highly vulnerable to avalanche-related injuries and fatalities due to the four major ski areas located in the County and the high recreational use of backcountry areas. Thousands of people are exposed to avalanche risk in Summit County every winter and spring.

Motorists along highways are also at risk of injury and death due to avalanches, which also cause road and highway closures. Road closures and the associated economic losses are another impact of avalanches. The County has multiple programs and partnerships in place to reduce avalanche risk, which are summarized in Annex A.

Existing Development

The County does not have any comprehensive information or mapping of avalanche hazard areas, so there is not data available to identify specific structures at risk or estimate potential losses to structures. The Colorado Avalanche Information Center has mapped zones on Loveland Pass. The HMPC identified the Ten Mile power transmission line as a potential vulnerable critical infrastructure, as well as U.S. Highway 6 over Loveland Pass, which is also a hazardous materials route. The Colorado Department of Transportation closes Loveland Pass when avalanche conditions are considered too severe.

Future Development

The Summit County Countywide Comprehensive Plan discourages building on slopes greater than 30 degrees, but there is no avalanche hazard identified or mapped. There are no guidelines related to utility lines in avalanche hazard areas.

Dam Failure

Although there is no specific evidence to indicate the likelihood of dam failure within the County, there are several high hazard dams located in Summit County. A dam failure could result in impacts greater than the 100-year flood event and could be catastrophic. Vulnerability to dam failure is highest in Silverthorne immediately downstream of Dillon Reservoir. A catastrophic dam failure would challenge local response capabilities and require evacuations below Dillon Dam to save lives. Impacts to life safety will depend on the warning time available and the resources to notify and evacuate the public. Major loss of life could result as well as potentially catastrophic effects to roads, bridges, and homes. Associated water quality and health concerns could also be an issue.

After the terrorist attacks of September 11, 2001, Bureau of Reclamation officials were put on high alert to guard the Green Mountain Reservoir Dam. For a period, the County's Sheriff's Office was under contract to patrol the area and posted guards there. As a result of the attacks, the Bureau has developed and readied an emergency response plan for different levels of security risks and awareness.

Existing Development

The Summit County Office of Emergency Management has copies of emergency action plans for all high and significant hazard dams in the County; and these are available upon request for inspection by FEMA and the Colorado Division of Emergency Management. Due to ongoing security concerns of the dam operators, the Office of Emergency Management asked that

inundation maps not be made part of this public planning process. Therefore, structures and potential loss estimates in these areas could not be calculated.

Future Development

Flooding due to a dam failure event is likely to exceed the special flood hazard areas regulated through local floodplain ordinances. The County and towns should consider the dam failure hazard when permitting development downstream of the five high hazard and two significant hazard dams. Low hazard dams could become significant or high hazard dams if development occurs below them. Catastrophic flooding due to a failure of Dillon Reservoir is beyond mitigation capabilities of local land use planning.

Drought

The majority of past disaster declarations are related to drought, which indicates the County's vulnerability to this hazard. Ongoing drought has left areas more prone to beetle kill and associated wildfires. Other past impacts of drought have included degradation of air quality due to dust, reduction of tourism and recreation activities, and damage to the ranching economy in the Lower Blue Basin. The economy of Summit County, which is based upon the ski industry and other outdoor recreation and tourism, is very vulnerable to drought conditions.

Existing Development

Drought normally does not impact structures and can be difficult to identify specific hazard areas. Data is not available to estimate potential losses to structures in identified hazard areas. Many of the towns use public education efforts to encourage water conservation during the summer months.

Future Development

As population grows, so do the water needs for household, commercial, industrial, recreation, and agricultural uses. Vulnerability to drought will increase with these growing demands on existing water supplies. Future water use planning in Colorado is complex and has to account for increasing population size as well as the potential impacts of climate change.

Most of the jurisdictions in Summit County encourage drought resistant landscaping in their master plans for new development. The County's land use code specifically addresses drought resistant landscaping.

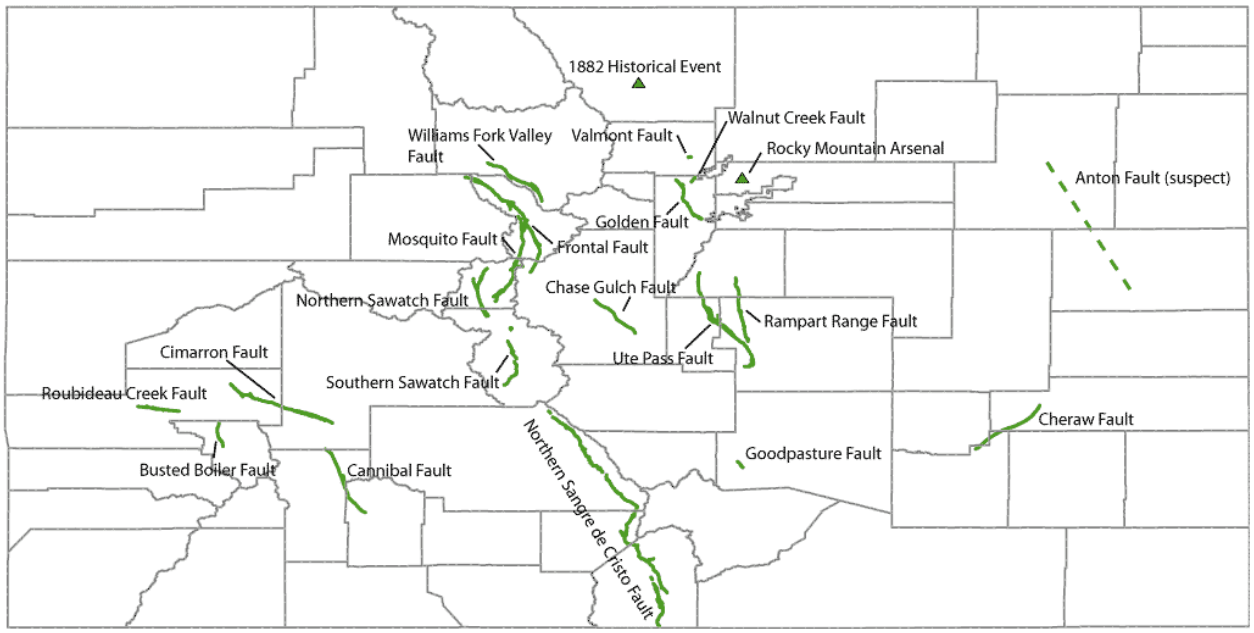
Earthquake

Past impacts due to earthquakes have been minimal and potential magnitude and severity is believed to be low, so the County's overall vulnerability to earthquake is low. However, data on Colorado's earthquake hazard is limited.

Existing Development

The Colorado Geological Survey (CGS) ran a series of deterministic scenarios for selected Colorado faults using HAZUS-MH to assess potential economic and social losses due to earthquake activity in Colorado. Deterministic analyses provide "what if" scenarios (e.g., determines what would happen if an earthquake of a certain magnitude occurred on a particular fault). The earthquake magnitudes used for each fault were the "maximum credible earthquake" as determined by the U.S. Geological Survey. The faults analyzed for Summit County were Chase Gulch, Frontal, Golden, Mosquito, Northern Sangre de Cristo, Northern Sawatch, Southern Sawatch, Ute Pass, and Williams Fork (see Figure 3.24). Table 3.19 summarizes the results for Summit County.

Figure 3.24. Faults Analyzed for Potential Losses, Statewide



Source: Earthquake Evaluation Report, www.dola.colorado.gov/dem/mitigation/earthquakerpt.pdf

Table 3.19. Potential Earthquake Losses in Summit County by Fault

Fault/Magnitude	Fatalities	Total Economic Loss ($)*	Loss Ratio (%)**
Chase Gulch			
M6.75	0	8.5 million	0.2
Frontal			
M7.0	29	895 million	20.1
M6.5	6	348 million	7.8
M6.0	1	90 million	2.0
M5.5	0	25.5 million	0.6
Golden			
M6.5	0	2.4 million	0.05

Fault/Magnitude	Fatalities	Total Economic Loss ($)*	Loss Ratio (%)**
Mosquito			
M7.0	18	660 million	14.9
M6.5	6	288 million	6.5
M6.0	0	77.2 million	1.7
M5.5	0	20.6 million	0.5
Northern Sangre de Cristo			
M7.5	0	2.5 million	0.05
Northern Sawatch			
M7.0	0	21 million	0.5
M6.5	0	8.6 million	0.2
Southern Sawatch			
M7.25	0	14 million	0.3
Ute Pass			
M7.0	0	1.8 million	0.04
Williams Fork			
M6.75	3	186.4 million	4.2
M6.0	0	39.7 million	0.9
M5.5	0	13 million	0.3

Source: Earthquake Evaluation Report, www.dola.colorado.gov/dem/mitigation/earthquakerpt.pdf
*Direct and indirect losses
**Percentage of the total building stock value damaged; the higher this ratio, the more difficult it is to restore a community to viability (loss ratios 10 percent or greater are considered by FEMA to be critical)

The results of the statewide analysis place Summit County fourth among Colorado counties in regard to potential losses (high monetary loss, casualties, and loss ratios). The greatest losses would likely result from an M7.0 earthquake or greater on the Frontal or Mosquito faults, which are predicted to cause many fatalities and millions of dollars in damage.

Much of the County's development has occurred more recently and building codes are in place, which reduce the risk of structural damage. Historic buildings constructed of unreinforced masonry are most vulnerable to seismic ground shaking. Downtown Breckenridge is one of the areas most vulnerable to a seismic event in Summit County due to the historic buildings and population center. The HMPC also discussed a "subgrade" water treatment plant in Breckenridge that may be vulnerable to seismic events. Other potential impacts of an earthquake in Summit County could include damage to infrastructure networks, such as water, power, communication, and transportation lines. Secondary impacts could include landslides or dam failure in a strong event.

Future Development

All jurisdictions within the County have adopted building codes. Building codes substantially reduce the costs of damage to future structures from earthquakes.

Flood

Flood hazards affect most of the communities in the County, will continue to occur in the future, and can be critical in their magnitude causing deaths and damaging property and infrastructure.

Existing Development

The best available data for flooding in Summit County was generated by HAZUS-MH MR3, FEMA's software program for estimating potential losses from disasters. In 2007, Summit County entered FEMA's map modernization program to develop digital flood insurance rate maps (DFIRMs) in partnership with state and federal agencies. The DFIRMs were not available at the time of this planning process. HAZUS was used to generate a 1 percent annual flood, or base flood, event for major rivers and creeks in the County (those with a minimum drainage area of 10 square miles). The software produces a flood polygon and flood-depth grid that represents the base flood. While not as accurate as official flood maps, such as DFIRMs, these floodplain boundaries are for use in GIS-based loss estimation.

HAZUS provides reports on the number of buildings impacted, building repair costs, and the associated loss of building contents and business inventory. Building damage can cause additional losses to a community as a whole by restricting the building's ability to function properly. Income loss data accounts for business interruption and rental income losses as well as the resources associated with damage repair and job and housing losses. These losses are calculated by HAZUS using a methodology based on the building damage estimates. Flood damage is directly related to the depth of flooding. For example, a two-foot flood generally results in about 20 percent damage to the structure (which translates to 20 percent of the structure's replacement value).

After running the HAZUS analysis for the 100-year flood event, the building inventory loss estimates (which are linked to census block geography) were sorted by incorporated communities in Summit County and the unincorporated County to illustrate how the potential for loss varies across the planning area. Table 3.20 shows estimated potential building losses by jurisdiction.

Table 3.20. HAZUS Estimated Flood Losses by Jurisdiction

Jurisdiction	Cost Building Damage ($)	Cost Contents Damage ($)	Inventory Loss ($)	Relocation Loss ($)	Capital Related Loss ($)	Wages Loss ($)	Rental Income Loss ($)	Total Loss ($)
Blue River	1,958,000	1,323,000	19,000	4,000	0	3,000	1,000	3,308,000
Breckenridge	9,876,000	17,655,000	590,000	31,000	107,000	560,000	31,000	28,850,000
Dillon	0	0	0	0	0	0	0	0
Frisco	3,128,000	2,958,000	44,000	11,000	12,000	104,000	3,000	6,260,000
Montezuma	52,000	45,000	3,000	0	0	0	0	100,000
Silverthorne	5,131,000	7,233,000	338,000	21,000	20,000	208,000	9,000	12,960,000
Unincorporated Areas	19,266,000	14,239,000	124,000	39,000	23,000	34,000	26,000	33,751,000
Total County	**39,411,000**	**43,453,000**	**1,118,000**	**106,000**	**162,000**	**909,000**	**70,000**	**85,229,000**

Source: HAZUS-MH MR3 (2007)

Based on this analysis, the greatest losses from a 100-year flood would occur in unincorporated Summit County (roughly $33.8 million). This is closely followed by Breckenridge, which has approximately $28.9 million at risk, more than double any other town's potential losses. Countywide, losses could exceed $85 million. Dillon is not expected to suffer any losses from a 100-year flood.

Note: Default HAZUS-MH data was used to develop the loss estimates. Thus, the potential losses derived from HAZUS-MH, the best available data, may contain some inaccuracies. The building valuations used in HAZUS-MH MR3 are based on RSMeans 2006 and commercial data is based on Dun & Bradstreet 2006. There could be errors and inadequacies associated with the hydrologic and hydraulic modeling of the HAZUS-MH model. The damaged building counts generated by HAZUS-MH are susceptible to rounding errors and are likely the weakest output of the model due to the use of census blocks for analysis.

HAZUS also estimates the population displaced and sheltering needs during a 100-year flood event using U.S. Census data and flood depths. This analysis is shown in Table 3.21. Based on this information, a 100-year flood event in Summit County has the most potential to displace people in unincorporated areas and Silverthorne.

Table 3.21. HAZUS Estimated Population Displacement and Short-Term Sheltering Needs

Jurisdiction	Displaced Population	Short-Term Sheltering Requirements
Blue River	54	13
Breckenridge	166	78
Dillon	0	0
Frisco	119	32
Montezuma	3	0
Silverthorne	311	226
Unincorporated Areas	371	174
Total County	**1,024**	**523**

Source: HAZUS-MH MR3 (2007)

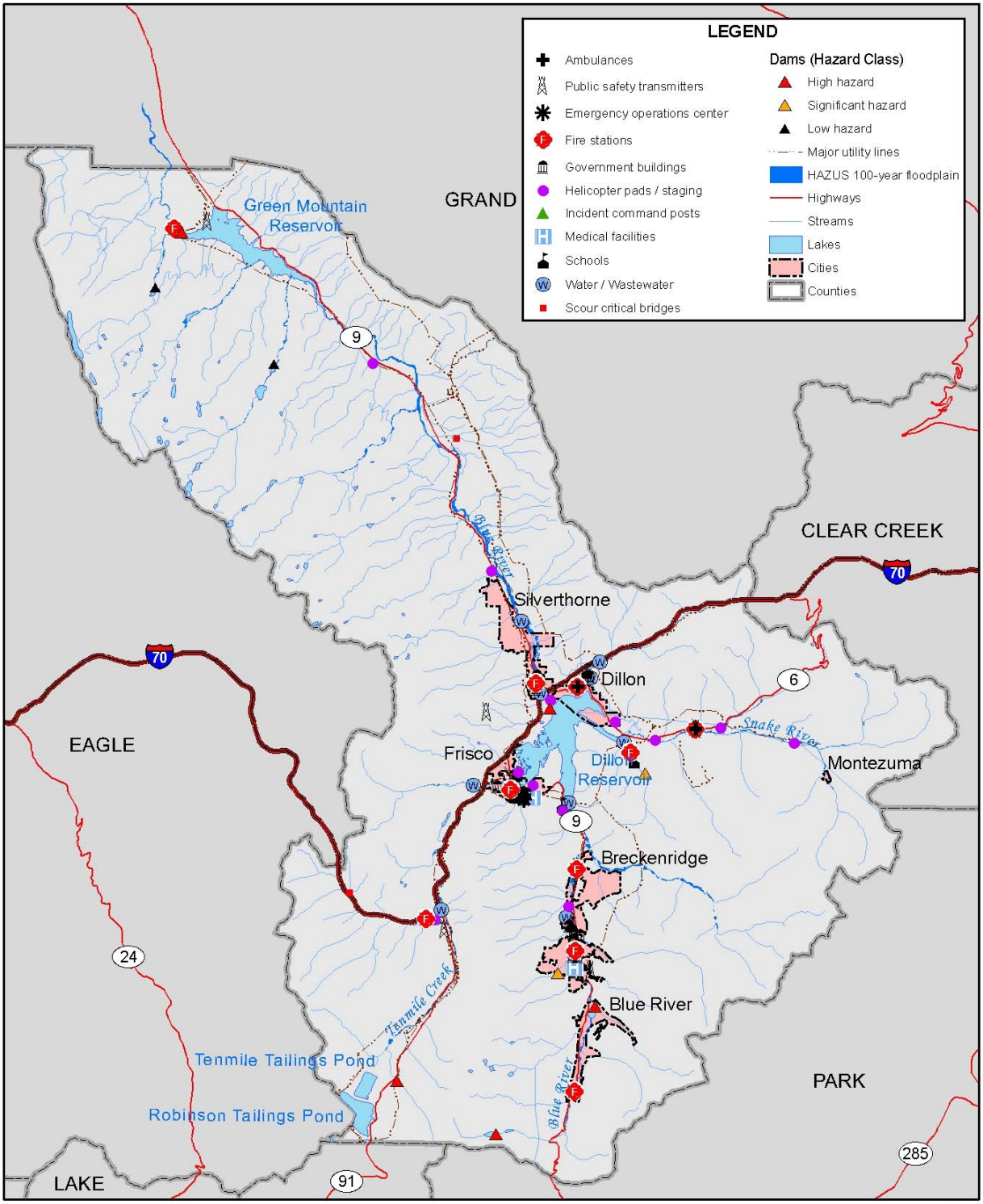
Table 3.22 and Figure 3.25 show critical facilities located in the HAZUS 100-year floodplain. Critical facilities data was obtained from the Summit County GIS Department. Because the floodplain is very narrow in Summit County, the map is difficult to read at this scale. Maps showing the location of critical facilities in the floodplain for each participating jurisdiction can be found in their annex to the plan.

Table 3.22. Critical Facilities in HAZUS 100-Year Floodplain

Jurisdiction/Facility Type	Flood Depth (feet)
Breckenridge	
Red, White, and Blue Fire Station	1.9
Upper Blue Elementary School	no data
Silverthorne	
Silverthorne Dillon Joint Sewer Authority	n/a
Incident Command Post	2.2
Silverthorne Town Hall	3.2
County North Branch Library	4.4
Silverthorne Dillon Joint Sewer Authority	3.2
Unincorporated Areas	
Breckenridge Sanitation District	2.7

Source: Summit County GIS Department and HAZUS-MH MR3 (2007)

Figure 3.25. HAZUS 100-Year Floodplain and Critical Facilities in Summit County



0 5 10 Miles

N

Map compiled 9/2008; intended for planning purposes only.
Data Source: Summit County, HAZUS-MH MR3

National Flood Insurance Program

Table 3.23 provides detailed information on National Flood Insurance Program (NFIP) policies in participating jurisdictions in Summit County.

Table 3.23. Community Participation in the NFIP and Community Rating System

Jurisdiction	Date Joined	Effective FIRM Date	Policies in Force	Insurance in Force ($)	Number of Claims	Claims Totals ($)	Community Rating System Rating
Blue River	-	not mapped	-	-	-	-	-
Breckenridge	06/04/1980	2001	19	$5,700,500	1	$28,060	N/A
Dillon	-	not mapped	-	-	-	-	-
Frisco	05/15/1980	1994	108	$21,206,500	2	$921	8
Silverthorne	05/01/1980	2001	69	$10,840,000	0	0	9
Summit County*	12/16/1980	2001	147	$28,501,700	7	$8,623	N/A

Source: National Flood Insurance Program
*Unincorporated areas

NFIP insurance data indicates that as of December 31, 2007, there were 147 flood insurance policies in force in the County (unincorporated areas) with $28,501,700 of coverage. Of the 147 policies, 140 were residential and 7 were nonresidential. 69 of the policies were in A or AE zones and 3 were in D zones (the remaining 75 were in B, C, and X zones).

There have been seven historical claims for flood losses totaling $8,623; all were for residential properties. Two were in AE zones; five were in B, C, or X zones; and three were pre-FIRM structures.

There were no repetitive losses in Summit County at the time of this plan's development. More detailed information for each jurisdiction can be found in the annexes.

Future Development

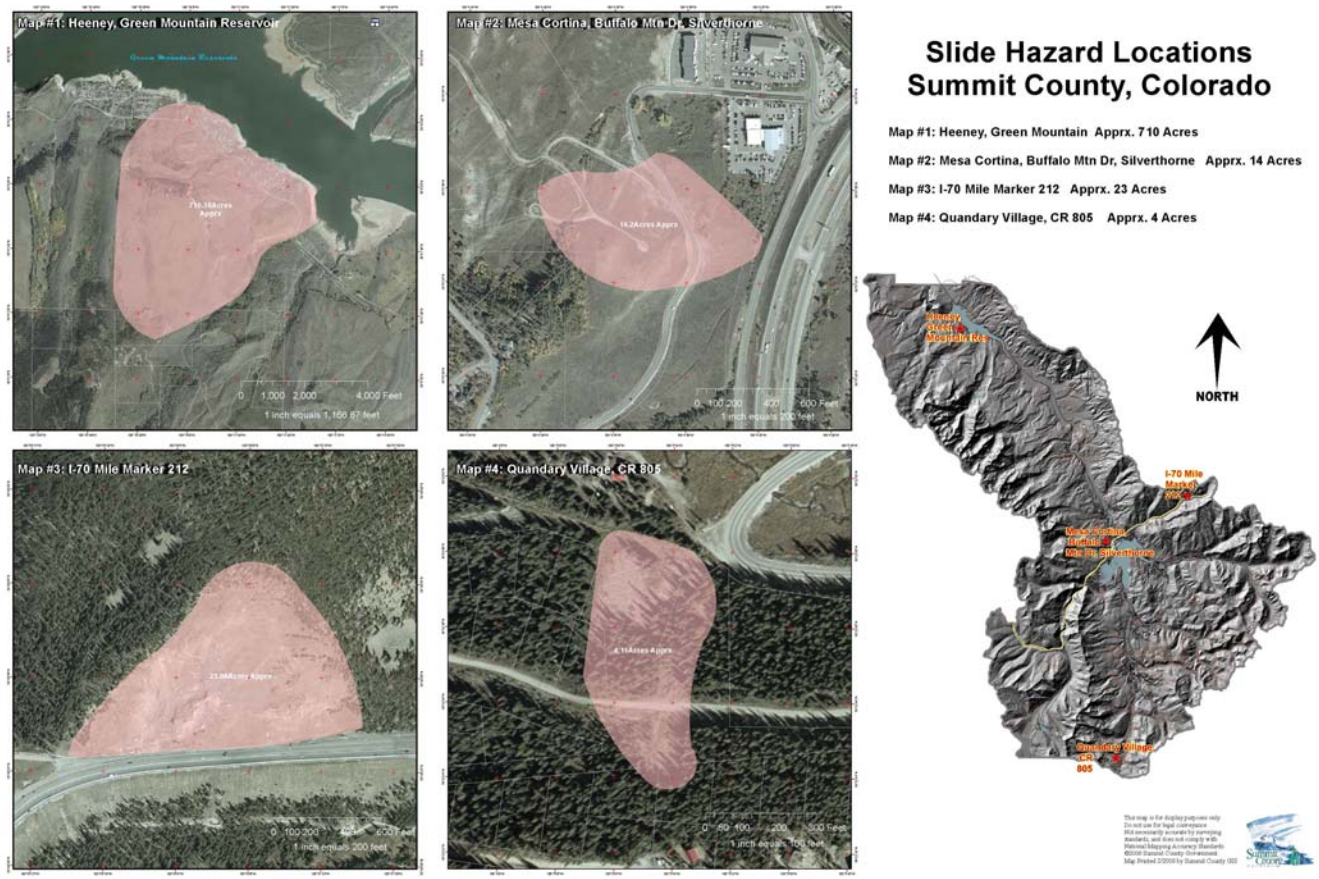
The risk of flooding to future development should be minimized by the floodplain management programs of the County and its municipalities, if properly enforced. Risk could be further reduced by strengthening floodplain ordinances and floodplain management programs beyond minimum NFIP requirements.

Landslide, Mudflow/Debris Fall, Rock Fall

In Summit County, vulnerability to landslides primarily occurs along roadways, where the hazard could cause deaths or injuries. Road closures due to landslide events also affect the County economically. An example is the area on Interstate 70 near mile marker 212 illustrated in Figure 3.25. Landslides in neighboring counties along major highways that carry traffic into

Summit County also impact the County. Structures and people in them are also at risk to landslide in Summit County. The primary areas of mapped vulnerability to landslide are shown in Figure 3.26.

Figure 3.26. Landslide Hazards in Summit County



Source: Summit County

Existing Development

Potential losses for these four landslide areas were estimated using Summit County GIS and assessor's data and were examined in terms of values and critical facilities at risk. For the purposes of this analysis, they will be referred to as I-70 Mile Marker 212, Heeney, Mesa Cortina, and Quandary Village.

GIS was used to create a centroid, or point, representing the center of each parcel polygon, which was overlayed on the landslide hazard polygons. The assessor's land and improved values for each parcel are linked to the parcel centroids. For the purposes of this analysis, if the parcel's centroid intersects the landslide hazard polygon, that parcel is assumed to be at risk to the landslide. Values were summed and sorted by landslide hazard zone.

Based on this analysis, the landslide hazard at Heeney poses the largest threat to Summit County. That landslide polygon intersects 88 parcels (residential development) that have a total property value of $13.3 million ($6.9 million in land value and $6.4 million in improved value). The Quandary Village landslide hazard intersects 6 parcels that have a total land value of $238,649 (but no improved value). The other two landslide hazard zones do not intersect parcels that have associated values.

There is only one critical facility in a landslide threat zone. It is a fire lookout in Silverthorne, which is located in the Mesa Cortina slide hazard location on U.S. Forest Service land.

Future Development

The severity of landslide problems is directly related to the extent of human activity in hazard areas. Adverse effects can be mitigated by early recognition and avoiding incompatible land uses in these areas or by corrective engineering. The mountainous topography of the County presents considerable constraints to development, most commonly in the form of steep sloped areas. These areas (defined as having a grade change of 30 percent or more) are vulnerable to disturbance and can become unstable.

Landslide hazard areas are not well mapped in Summit County. Improving mapping and information on landslide hazards and incorporating this information into the development review process could prevent siting of structures and infrastructure in identified hazard areas. Summit County and the towns of Breckenridge, Dillon, Frisco, and Silverthorne have policies in their master plans and/or development codes requiring mitigation through engineering for construction on slopes of a certain steepness and prohibiting development on slopes over 30 percent.

The Summit County Building Department reviews development applications in the Heeney area and explains hazards present to all applicants. Applicants are required to sign a document similar to a liability waiver and meet strict engineering standards if they choose to build in the known landslide hazard area.

Lightning

Damaging lightning events are likely to occur and can be critical if a fatality occurs. Outdoor recreationists and others outside at high altitude during summer months are vulnerable to lightning. The HMPC is also concerned about the impacts lightning can have on the County's power grid and information technology network. Failure of these systems would have cascading effects that would disrupt other critical infrastructure in the County, such as water treatment facilities. Damage to communications infrastructure has the potential to cause widespread impacts.

Lightning can occur anywhere in Summit County, and it is not possible to identify specific hazard area. Data was not available to identify specific structures at risk or estimate potential losses to these structures.

Severe Winter Weather

Existing Development

In the alpine environment of Summit County, severe winter weather occurs several times every season. This hazard has been critical in its magnitude and severity in the past, most recently during the event in December 2007. Vulnerability is high along roadways and mountain passes, particularly on Interstate 70 and U.S. 6, where severe winter weather conditions may cause traffic related deaths and injuries and increase avalanche risk. Road closures due to winter weather conditions also restrict or prevent the movement of people and goods and services (including food and gas), which can be crippling during the high tourism season and create the need for emergency sheltering for travelers. The County is more vulnerable to the impacts of natural hazards during the winter months due to the increased volume of people living, working, and visiting here.

It is impossible to identify specific winter weather hazard areas within Summit County, and data was not available to identify specific structures at risk or estimate potential losses to these structures.

Future Development

Future residential or commercial buildings built to code should be able to withstand snow loads from severe winter storms. Population growth in the County and growth in visitors will increase problems with road, business, and school closures and increase the need for snow removal and emergency services related to severe winter weather events.

Wildfire

Existing Development

Potential losses to wildfire were estimated using a countywide wildfire risk GIS layer (created for the Summit County Community Wildfire Protection Plan) and assessor's data from Summit County. Potential losses were examined in terms of acreage, property value, and critical facilities at risk. For all analyses, the threat levels were classified as low, medium, high, and extreme and were based on fuel hazards, risk of wildfire occurrence, essential infrastructure at risk, community values at risk, and local preparedness and firefighting capability.

Using GIS, the assessor's land value and improved value data and the County's parcel layer were combined and overlayed on the wildfire layer to determine property values at risk in each wildfire threat zone by town and fire protection district.

The original assessor's database had 34,285 records. Using Microsoft Access, records with duplicate PPIs (the unique ID that is the common link between the assessor data and the parcel data) were pulled out and their values were summed. They were then returned to the database so that each record in the database had a unique PPI, and all values were accounted for. The resulting assessor's database used for this analysis had 19,017 records. The original parcel layer

had 21,529 records. Again, duplicate PPIs were merged together (duplicates had either been cut by a road, river, or other feature into two or more parcels or were stacked on top of each other). The resulting parcel layer used for this analysis had 19,033 records.

There were 490 records (total land value: $71 million; total improved value: $134 million) in the assessor's database that did not have corresponding PPIs in the parcel layer. There were 15 parcels in the parcel layer that did not have corresponding PPIs in the assessor's database. So, a total of 505 records did not link between the two databases. This might be due to a difference in the timing between the data releases (e.g., there may have been annexes and changes to the parcel layer that had not been accounted for in the assessor's data). The final dataset used for this analysis had 18,529 records, with a total land value of $3.8 billion, a total improved value of $9.5 billion, and a total combined value of $13.4 billion.

GIS was used to create a centroid, or point, representing the center of each parcel polygon, which was overlayed on the wildfire layer. For the purposes of this analysis, the wildfire threat zone that intersected the centroid was assigned as the threat zone for the entire parcel. Values were summed by wildfire threat zone and then sorted by town and fire protection district. The results are shown in Table 3.24.

Table 3.24. Property Values in Wildfire Threat Zones by Jurisdiction

Jurisdiction/ Threat Zone	Land Value ($)	Improved Value ($)	Total Value ($)
Blue River			
Low	101,179,867	154,422,265	255,602,132
Medium	60,543,564	106,855,191	167,398,755
High	494,321	914,102	1,408,423
Extreme	-	-	-
Totals	**162,217,752**	**262,191,558**	**424,409,310**
Breckenridge			
Low	446,064,897	955,123,201	1,401,188,098
Medium	537,489,201	1,661,023,586	2,198,512,787
High	39,708,297	84,830,589	124,538,886
Extreme	-	-	-
Totals	**1,023,262,395**	**2,700,977,376**	**3,724,239,771**
Dillon			
Low	55,771,258	286,834,117	342,605,375
Medium	31,725,433	106,804,848	138,530,281
High	-	-	-
Extreme	-	-	-
Totals	**87,496,691**	**393,638,965**	**481,135,656**
Frisco			
Low	73,253,033	166,942,901	240,195,934
Medium	239,765,830	854,853,086	1,094,618,916
High	21,130,652	36,200,688	57,331,340
Extreme	-	-	-

Jurisdiction/ Threat Zone	Land Value ($)	Improved Value ($)	Total Value ($)
Totals	**334,149,515**	**1,057,996,675**	**1,392,146,190**
Montezuma			
Low	4,251,989	3,580,532	7,832,521
Medium	4,452,538	3,478,340	7,930,878
High	1,599,450	153,869	1,753,319
Extreme	-	-	-
Totals	**10,303,977**	**7,212,741**	**17,516,718**
Silverthorne			
Low	248,852,421	382,800,151	631,652,572
Medium	146,900,694	301,559,038	448,459,732
High	1,554,530	1,202,273	2,756,803
Extreme	-	-	-
Totals	**397,307,645**	**685,561,462**	**1,082,869,107**
Unincorporated Summit County			
Low	238,810,023	1,316,465,391	1,555,275,414
Medium	1,130,634,304	2,466,066,706	3,596,701,010
High	436,957,769	616,122,971	1,053,080,740
Extreme	13,202,416	16,946,380	30,148,796
No Data	176,106	1,456,852	1,632,958
Totals	**1,819,780,618**	**4,417,058,300**	**6,236,838,918**
Copper Mountain Fire Protection District			
Low	25,041,298	335,369,778	360,411,076
Medium	54,726,618	162,031,784	216,758,402
High	1,620,889	738,465	2,359,354
Extreme	-	-	0
No Data	12,015	0	12,015
Totals	**81,400,820**	**498,140,027**	**579,540,847**
Lake Dillon Fire Protection District			
Low	499,765,545	1,649,372,776	2,149,138,321
Medium	1,059,925,341	2,922,759,899	3,982,685,240
High	210,299,297	332,477,680	542,776,977
Extreme	2,466,604	2,663,375	5,129,979
No Data	112,351	0	112,351
Totals	**1,772,569,138**	**4,907,273,730**	**6,679,842,868**
Lower Blue Fire Protection District			
Low	10,646,088	20,281,492	30,927,580
Medium	12,335,613	13,014,909	25,350,522
High	2,227,100	1,590,391	3,817,491
Extreme	-	-	0
No Data	20,783	1,456,852	1,477,635
Totals	**25,229,584**	**36,343,644**	**61,573,228**
Red White and Blue Fire Protection District			
Low	632,730,557	1,261,144,512	1,893,875,069
Medium	1,024,523,992	2,402,834,203	3,427,358,195
High	287,297,733	404,617,956	691,915,689
Extreme	10,735,812	14,283,005	25,018,817

Jurisdiction/ Threat Zone	Land Value ($)	Improved Value ($)	Total Value ($)
No Data	30,957	0	30,957
Totals	**1,955,319,051**	**4,082,879,676**	**6,038,198,727**
Countywide			
Low	1,168,183,488	3,266,168,558	4,434,352,046
Medium	2,151,511,564	5,500,640,795	7,652,152,359
High	501,445,019	739,424,492	1,240,869,511
Extreme	13,202,416	16,946,380	30,148,796
No Data	176,106	1,456,852	1,632,958
County Totals	**3,834,518,593**	**9,524,637,077**	**13,359,155,670**

Source: Summit County

Based on this analysis, unincorporated Summit County has the highest total property value at risk to wildfire, with roughly $4.7 billion in medium to extreme wildfire threat zones. Breckenridge is the town most at risk to wildfire, with approximately $2.3 billion in medium and high wildfire threat zones. Frisco is second most at risk, with approximately $1.1 billion in medium and high wildfire threat zones. All of the property values in the extreme wildfire threat zone are in unincorporated areas of the County (the .5 acre in Breckenridge shown in Table 3.9 is not accounted for here due to differences in methodologies).

Among the fire protection districts, the Red, White, and Blue Fire Protection District has the highest total property value at risk to wildfire, with more than $25 million in the extreme wildfire threat zone alone (all of which is located in unincorporated areas). Total property values in medium to extreme wildfire threat zones in the District approximates $4.1 billion. While the total property values in the extreme wildfire threat zone in the Lake Dillon Fire Protection District are lower than the Red, White, and Blue's (approximately $5.1 million), its total property values are higher in the three zones combined (medium, high, and extreme): $4.5 billion. The other two districts do not have any values in the extreme wildfire threat zone.

Overall, the County has $8.9 billion in property values in medium to extreme wildfire threat zones.

Table 3.25 on the following page lists critical facilities identified in high or extreme wildfire threat areas. There are 23 critical facilities located in high wildfire threat areas; these are located in Breckenridge, Frisco, and unincorporated areas of the County. No facilities were identified in extreme threat areas; all were in high threat areas.

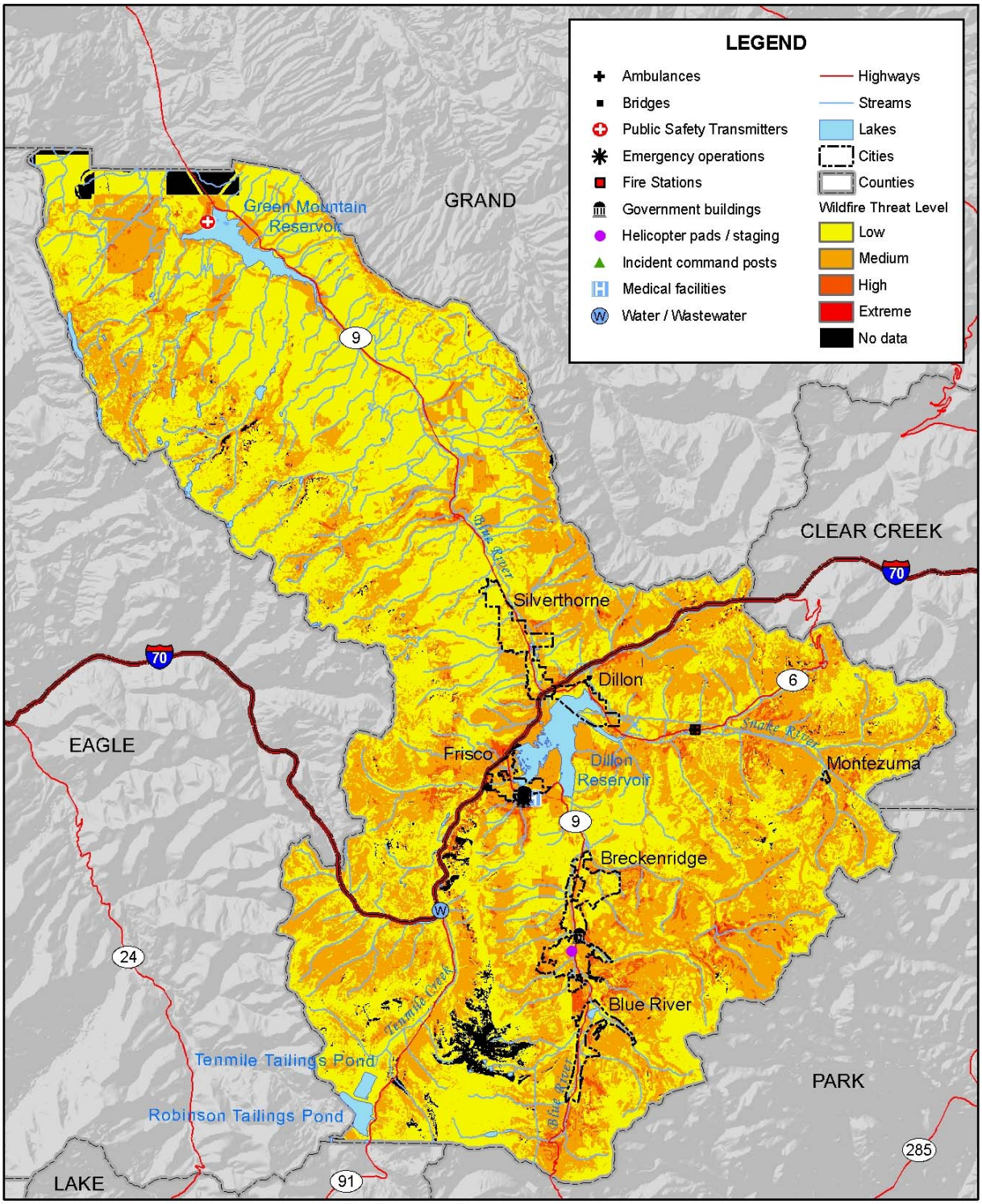
Table 3.25. Critical Facilities in High or Extreme Wildfire Threat Areas by Jurisdiction

Jurisdiction/ Facility Type
Breckenridge Helicopter Pad/Staging
Snake River Fire/Ambulance
County Buildings EMS Ambulance
Emergency Operations
Heeney CR 30 Public Safety Transmitter
Summit County Ambulance
Summit County Ambulance 2
Summit County Commons
Summit County Animal Control
Summit County Road & Bridge Shop
Summit Stage & Fleet Maintenance
Summit County Communications Center
Incident Command Post
Medical Facility
Copper Mountain Consolidated Sanitation District

Source: Summit County GIS Department

Figure 3.27 on the following page shows the locations of these facilities.

Figure 3.27. Wildfire Threat and Critical Facilities in Summit County



amec

0 5 10 Miles

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Map compiled 9/2008; intended for planning purposes only.
Data Source: Summit County, HAZUS-MH MR3

Future Development

Summit County's population has more than tripled over the last 25 years. Much of this growth was in the wildland-urban interface, which has increased the risk that wildfire presents to lives, property, and community resources. Existing and future development in many areas of the County are vulnerable to wildfire. Summit County and the towns of Breckenridge and Silverthorne have wildfire mitigation regulations in place for new development. There is also a community wildfire protection plan, a wildfire mitigation officer, and other education and mitigation initiatives in place in the County.

3.3.4 Development and Land Use Trends

As part of the planning process, the HMPC looked at changes in growth and development and land use trends and examined these changes in the context of hazard-prone areas, and how the changes in growth and development affect loss estimates and vulnerability. Information from the Summit County Countywide Comprehensive Plan and website, the Colorado Department of Local Affairs Demography Section, and the U.S. Census Bureau form the basis of this discussion.

Current Status and Past Development

According to the Summit County Planning Department, the 2007 estimated population of Summit County was 28,296. This is an increase of 20.2 percent from the 2000 U.S. Census population of 23,548. Based on this information, between 2000 and 2007, Summit County ranked 9th in percent of growth and 16th in numerical growth among Colorado's 64 counties, and, in 2007, Summit County was the 19th largest county in Colorado based on population. Tables 3.26-3.29 illustrate past growth in Summit County in terms of population, housing units, and density (2006 data is used because subcounty estimates are not available for 2007).

Table 3.26. Summit County Population Growth 1970-2007

Time Frame/Years	Percent Change (%)	# Change	Estimated Ending Population
1970-1980*	+232.0	+6,183	8,848
1980-1990	+45.6	+4,033	12,881
1990-2000	+82.8	+10,667	23,548
2000-2007	+20.2	+4,748	28,296

Source: Summit County Planning Department, www.co.summit.co.us/Planning/demographics.html
*Summit County was the fastest growing county in the nation

Table 3.27. Population Growth for Jurisdictions in Summit County, 2000-2006

Jurisdiction	2000	2006*	Percent Change (%)	# Change	Percent of County (%)	Percent of Total Growth (%)
Blue River	685	752	+9.8	+67	2.7	1.5
Breckenridge	2,408	3,439	+42.8	+1,031	12.3	23.3
Dillon	802	818	+2.0	+16	2.9	0.4
Frisco	2,443	2,742	+12.2	+299	9.8	6.8
Montezuma	42	49	+16.7	+7	0.2	0.2
Silverthorne	3,196	3,956	+23.8	+760	14.1	17.2
Unincorporated Areas	13,972	16,208	+16.0	+2,236	58.0	50.6
Total County	**23,548**	**27,964**	**+18.8**	**+4,416**	**100.0**	**100.0**

Source: Colorado Department of Local Affairs Demography Section, www.dola.colorado.gov/dlg/demog/. *Estimate

Table 3.28. Growth in Housing Units for Jurisdictions in Summit County, 2000-2006

Jurisdiction	2000	2006*	Percent Change (%)	# Change	Percent of County (%)	Percent of Total Growth (%)
Blue River	563	619	+9.9	+56	2.0	0.8
Breckenridge	4,270	6,292	+47.4	+2,022	20.1	28.2
Dillon	1,280	1,344	+5.0	+64	4.3	0.9
Frisco	2,727	3,431	+25.8	+704	10.9	9.8
Montezuma	35	42	+20.0	+7	0.1	0.1
Silverthorne	1,582	2,077	+31.3	+495	6.6	6.9
Unincorporated Areas	13,744	17,574	+27.9	+3,830	56.0	53.4
Total County	**24,201**	**31,379**	**+29.7**	**+7,178**	**100.0**	**100.0**

Source: Colorado Department of Local Affairs Demography Section, www.dola.colorado.gov/dlg/demog/. *Estimate

Table 3.29. Population and Housing Unit Density for Jurisdictions in Summit County, 2000-2006

Jurisdiction	Area in Square Miles	2000 Population Density	2006 Population Density	2000 Housing Density*	2006 Housing Unit Density*
Blue River	2.2	314.22	344.95	258.26	283.94
Breckenridge	5.0	486.46	694.75	862.63	1,271.11
Dillon	1.5	524.18	534.64	836.60	878.43
Frisco	1.7	1,480.61	1,661.82	1,652.73	2,079.39
Montezuma	0.1	525.00	612.50	437.50	525.00
Silverthorne	3.2	1,008.20	1,247.95	499.05	655.21
Unincorporated Areas	594.6	23.50	27.26	23.11	29.56
Total County	**608.2**	**38.72**	**45.98**	**39.79**	**51.60**

Sources: Colorado Department of Local Affairs Demography Section, www.dola.colorado.gov/dlg/demog/, U.S. Census Bureau, www.census.gov/. *Estimate

According to the Countywide Comprehensive Plan, peak seasonal population may swell to nearly 150,000 people. Monthly average population fluctuation indexes indicate that March has the highest seasonal population with 147.4 percent of average occupation; May has the lowest with 54.1 percent of average. The plan also notes that there are more housing units than residents (this is due to the dynamics of the County's resort community, there is still a need for additional housing).

Current Status and Past Development Summary

- 16,208 individuals, or 58 percent of Summit County's residents, live in unincorporated portions of the County.
- Population growth between 2000 and 2006 was greatest in Breckenridge (42.8 percent) and Silverthorne (23.8 percent).
- All areas of the County experienced growth, but Dillon (2 percent) and Blue River (9.8 percent) experienced the least.
- Growth in housing units tracked closely with the population growth.
- More than half of the total countywide population and housing unit growth occurred in unincorporated areas.
- Housing unit growth surpassed population growth in all areas of the County.
- With 1,661.82 people per square mile, Frisco has the highest population density in the County followed by Silverthorne (1,247.95).
- With 2,079.39 housing units per square mile, Frisco also has the highest housing unit density in the County followed by Breckenridge (1,271.11).

Land Use

In Summit County in 2007, about 74 percent of the residentially zoned land was already built, which left approximately 26 percent still to be built. About 25 percent of the County's total residential capacity was absorbed between 1993 and 2002. At that same rate of growth, the County would consume another 25 percent of its capacity by 2011 and be at residential build-out by 2013. In the last couple years, development activity throughout the County has slowed down. This slowdown has been largely tied to an overall nationwide economic slowdown. If these trends continue, the timeframe until ultimate build-out is reached will be prolonged. However, even under a slower growth scenario, it is very likely that build-out will be reached within the next 15 years. Ultimate build-out may be less than expected because of a number of factors, including constraints to development (e.g., steep slopes or other environmental factors), future conservation easements, and the conversion of private properties to open space. Table 3.30 breaks down the County's residential build-out by basin.

Table 3.30. Summary of Residential Build-out Analysis of Properties in Summit County by Basin, July 2007

	Absolute Build-Out (%)[1]	Realistic Build-Out (%)[2]
Lower Blue Basin		
Unincorporated Area	57.3	72.7
Town of Silverthorne	62.4	62.4
Total	**58.9**	**69.0**
Snake River Basin		
Unincorporated Area	71.6	71.6
Town of Dillon	70.9	70.9
Town of Montezuma	53.1	53.1
Total	**71.3**	**71.3**
Ten Mile Basin		
Unincorporated Area	69.8	73.2
Town of Frisco	89.4	89.4
Total	**80.7**	**82.4**
Upper Blue Basin		
Unincorporated Areas	57.8	69.2
Town of Blue River	78.8	78.8
Town of Breckenridge	75.4	77.5
Total	**68.7**	**74.7**
Countywide Totals[3]		
Unincorporated Areas	64.1	71.5
Incorporated Areas	75.7	76.7
Total County[4]	**69.0**	**73.8**

Source: Summit County Planning Department, July 1, 2007, www.co.summit.co.us/Planning/build-out.html

[1]Absolute Build-out is the sum of total units built to date, remaining units to be built, and additional units that could be created through subdivision. Absolute build-out represents "ultimate build-out," or the total number of units that could potentially be built if every property were subdivided and developed to the maximum density allowed under current zoning regulations. Absolute build-out does not factor in site constraints that could preclude realization of the full development potential allowed under existing zoning regulations.

[2]Realistic build-out is a more likely picture of the build-out that may occur. Factors that affect realistic build-out include, but are not limited to the following: constrained property sizes in areas such as Heeney; development constraints such as wetlands and steep slopes; access constraints; unrealized subdivision potential on rural agricultural properties (due to property owners' desires, future conservation easements, open space purchases, etc.); and constrained development due to water rights issues.

[3]Build-out for the unincorporated portions of the County, and the Towns of Blue River and Montezuma has been calculated by the Summit County Planning Department, and build-out for the remaining four towns in the County (Breckenridge, Frisco, Dillon, and Silverthorne) was obtained from the respective planning departments.

[4]Commercial build-out for the County has not been included in this analysis. The County Planning Department is in the process of completing a commercial build-out analysis. At it is estimated that commercial build-out in unincorporated portions of the County is approximately 62 percent.

There are six major locations of urban growth in the County: Breckenridge, Frisco, Dillon, Silverthorne, Keystone, and Copper Mountain. It is anticipated that future higher density and higher intensity development will continue to be focused in these locations. The White River National Forest, managed by the U.S. Forest Service occupies over 80 percent of the County's total land area.

Future Development

As indicated in the previous section, Summit County has grown substantially over the last four decades. Although growth is projected to continue through 2035, the growth rates experienced during the 1970s, 80s, and 90s are not expected to continue. Table 3.31 shows the population projections for the County as a whole through 2035.

Table 3.31. Population Projections for Summit County, 2010-2035

	2010	2015	2020	2025	2030	2035
Population	31,498	35,888	40,646	45,425	49,866	53,840
Percent Change (%)		13.9	13.3	11.8	9.8	8.0

Sources: Colorado Department of Local Affairs Demography Section, www.dola.colorado.gov/dlg/demog/

The Town of Silverthorne has the greatest potential for commercial growth followed by Frisco and Dillon. Resort growth and redevelopment is projected to occur in Keystone in the Mountain House base area neighborhood. This area will likely see several hundred new condominium units constructed with underground parking and approximately 50,000 square feet of commercial space within the span of the next 10 years. Development along any of the river corridors, especially the Blue and Snake rivers, are subject to risk from seasonal flooding in the spring when the snow pack is above average.

The Interstate 70 corridor and U.S. 6 over Loveland Pass will continue to experience increased traffic with the greatest risks associated with snow and rock/mudslides in areas prone to such activity. U.S. 6 will likely continue to serve as a hazardous materials commercial truck route for the foreseeable future. Major accidents or significant snow events can result in the closure of vital highways and roads such as Interstate 70, U.S. 6, Colorado Highway 9, and the Dillon Dam Road, stranding several thousand motorists during seasonal and weekend peak travel periods in the County. Future growth will further exacerbate both the congestion and need to establish an adequate number of pre-designated evacuation centers.

3.4 Risk Assessment Summary

The Summit County Risk Assessment revealed a number of problem areas to be addressed in the mitigation strategy. These key findings are summarized in the following list.

Avalanche

- The most hazard-related deaths in Summit County are due to avalanches (58 between 1859-2006)
- There were 12 avalanches involving deaths or injuries between 1997-2006
- In the past, avalanches have closed roads and highways and damaged power transmission lines

Dam Failure

- Five high hazard (probable loss of life if failure) dams are located in Summit County
- The largest water storage is in Dillon and Green Mountain reservoirs, where failures could result in catastrophic flooding
- Silverthorne is the area with the largest population at risk to a dam failure
- New development in dam inundation areas increases risk and may cause dam hazard rankings to change

Drought

- Multi-year droughts occur every 10 years on average in Summit County
- Drought can affect both water quantity and quality
- The tourism and recreation economy is particularly vulnerable to drought
- Drought increases risk to other hazards, such as erosion and deposition, mountain pine beetle infestation, and wildfire

Erosion and Deposition

- Sanding along Interstate 70 and Highway 6 causes deposition problems and impacts water quality, particularly in Straight Creek and North Fork of the Snake River
- Drought has caused large dust problems near reservoirs

Flood

- The most people and property (40 percent of total loss) at risk to flooding are located in unincorporated areas of the County followed by Silverthorne, Breckenridge, and Frisco
- Most of the critical facilities identified in the 100-year floodplain have been mitigated
- $66,248,700 in flood insurance in force (343 policies) in Summit County

Hazardous Materials Release (Transportation)

- There were 40 transportation-related hazardous materials incidents reported between 1990-2007; these mainly related to gasoline and diesel fuel spills resulting from an accident
- Interstate 70 between the Eisenhower tunnel and Silverthorne is a primary concern when Loveland Pass is closed and hazardous materials vehicles are escorted through the tunnel
- Other areas of concern are Highway 9 near Green Mountain reservoir and Highway 6 near Dillon, Keystone, and Arapahoe Basin ski area
- Streams and reservoirs are also vulnerable to contamination

Landslide, Mudflow/Debris Flow, Rock Fall

- A landslide/rock fall hazard area includes all of Heeney and the adjacent developed shore area for about 1.5 miles; $6.4 million in improved property value is located in this hazard area

- A slump on Interstate 70 west of the Eisenhower tunnel could create significant impacts, such as closing the highway and affecting the watershed
- Quandary Village (approximately 4 acres) and Mesa Cortina in Silverthorne (approximately 14 acres) are other identified landslide hazard areas

Lightning

- Lightning-caused deaths and injuries have occurred in Summit County in the past
- Outdoor recreationists at high altitude during summer months are very vulnerable to lightning
- Lightning can damage power grid and information technology and communications networks

Mountain Pine Beetle Infestation

- The mountain pine beetle hazard is widespread and predicted to grow
- The infestation is likely to significantly affect forest ecosystems, the economy, and wildfire risk

Severe Winter Weather

- There is high vulnerability to severe winter weather along highways and mountain passes
- Increased population exposed to hazards and emergencies during high tourist seasons
- The severe winter weather hazard has been critical in magnitude and severity in the past, most recently in December 2007, when road closures caused the need for emergency sheltering of travelers

Wildfire

- 42 percent of Summit County acreage is at medium to extreme risk to wildfire
- Countywide there is an estimated $739 million in property value in high wildfire risk areas; $14 million in extreme wildfire risk areas
- Critical roads, including Interstate 70, Highway 6, and Highway 9, are also vulnerable to wildfire
- 16 critical facilities are identified in high wildfire risk areas

Multi-Hazard

- Past emergency declarations have been for drought and severe winter weather; state declaration for flood
- Hazard events that cause road closures, such as landslides, avalanches, and winter storms, affect the economy of Summit County by restricting access of visitors, workers, and goods and services
- Unique vulnerabilities of resort economy
- Need improved coordination between local governments and with state and federal agencies

4 MITIGATION STRATEGY

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

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

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

4.1 Goals and Objectives

The HMPC developed goals and objectives to provide direction for reducing hazard-related losses in Summit County. These were based upon the results of the risk assessment and a review of goals and objectives from other state and local plans, specifically, the Colorado State Multi-Hazard Mitigation Plan, 2007, Summit County Countywide Comprehensive Plan, and Summit County Community Wildfire Protection Plan. This review was to ensure that this plan's mitigation strategy was integrated with existing plans and policies.

Through a brainstorming process at its second meeting, the HMPC identified a variety of possible goals and then came to a consensus on four main ones. Following the development of goals, the HMPC identified specific objectives to achieve each goal. Goals and objectives are listed below, but are not prioritized:

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

- Minimize the vulnerability of existing and new development to hazards
- Increase education and awareness of hazards and risk reduction measures
- Improve comprehensive wildfire planning, funding, and mitigation
- Strengthen floodplain management programs

Goal 2: Protect critical facilities and infrastructure

- Enhance assessment of multi-hazard risk to critical facilities and infrastructure
- Prioritize mitigation projects based on the enhanced assessment and identify funding sources
- Reduce hazard related closures of transportation routes

Goal 3: Minimize economic losses

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

Goal 4: Implement the mitigation actions identified in the plan

- Improve communication and coordination between communities and state and federal agencies
- Engage collaborative partners, including community organizations, businesses, and others
- Integrate mitigation activities into existing and new community plans and policies
- Monitor, evaluate, and update the mitigation plan

4.2 Identification and Analysis of Mitigation Actions

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

A representative from each participating jurisdiction was present at the third meeting of the HMPC to identify and analyze potential mitigation actions. Each hazard identified in Section 3.1 was evaluated. Only those hazards with an overall vulnerability ranking of moderate or high were determined to be a priority hazard and were considered further in the development of hazard-specific mitigation measures. The following are Summit County's priority hazards:

- Avalanche
- Dam Failure
- Drought
- Flood
- Hazardous Materials Release
- Mountain Pine Beetle Infestation
- Landslide, Mudflow/Debris Flow, Rock Fall
- Lightning
- Severe Winter Weather
- Wildfire

The HMPC eliminated other hazards from further consideration in the development of mitigation actions because the risk of a hazard event in the County is unlikely, the vulnerability of the County to the hazard is low, or capabilities are already in place to mitigate its negative impacts.

It is important to note that many of the final mitigation actions are multi-hazard actions designed to reduce potential losses from all types of hazard events.

To identify and analyze potential mitigation actions to achieve the mitigation goals, AMEC provided the HMPC with a packet of materials at its third meeting with information on types of mitigation actions, key issues from Chapter 3 Risk Assessment, and a worksheet of the plan's goals and objectives.

The group discussed different types of mitigation actions. They were provided with the following list of categories of mitigation actions, which originated from the National Flood Insurance Program's Community Rating System, as well as definitions and examples for each category:

- **Prevention**: Administrative or regulatory actions or processes that influence the way land and buildings are developed and built.
- **Property protection**: Actions that involve the modification of existing buildings or structures to protect them from a hazard or remove them from the hazard area.
- **Structural**: Actions that involve the construction of structures to reduce the impact of a hazard.
- **Natural resource protection**: Actions that, in addition to minimizing hazard losses, also preserve or restore the functions of natural systems.
- **Emergency services**: Actions that protect people and property during and immediately after a disaster or hazard event.
- **Public education and awareness**: Actions to inform and educate citizens, elected officials, and property owners about the hazards and potential ways to mitigate them.

Next, the HMPC discussed the key issues for each priority hazard that emerged from the Risk Assessment and brainstormed potential mitigation alternatives to address these. To facilitate the brainstorming process, the HMPC used a worksheet with the plan's previously identified goals and objectives. For each of the four goals, each HMPC member identified at least one mitigation action that would work toward achieving the goal. Each action was written on one index card, posted on the wall of the meeting room, and organized by the goal it represents.

Next, the HMPC re-sorted these index cards by the 10 priority hazards and a multi-hazard category. They discussed a list of potential mitigation alternatives for each of these hazards, which had been prepared by AMEC. This list is included in Appendix C. Based upon the key issues identified in the risk assessment, including the existing capabilities of jurisdictions, and the overall political, technical, and financial feasibility of the potential actions, the HMPC came to consensus on mitigation actions for each hazard. New actions were written on index cards and added to those already on the wall organized by hazard. Certain hazards were best addressed through multi-hazard actions.

4.3 Implementation of Mitigation Actions

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

To prioritize the mitigation actions, the HMPC discussed the STAPLEE prioritization criteria recommended by FEMA. STAPLEE is a tool used to assess the costs and benefits and overall feasibility of mitigation actions. STAPLEE stands for the following:

- **Social:** Will the action be acceptable to the community? Could it have an unfair effect on a particular segment of the population?
- **Technical:** Is the action technically feasible? Are there secondary impacts? Does it offer a long-term solution?
- **Administrative:** Are there adequate staffing, funding, and maintenance capabilities to implement the project?
- **Political:** Will there be adequate political and public support for the project?
- **Legal:** Does the jurisdiction have the legal authority to implement the action?
- **Economic:** Is the action cost-beneficial? Is there funding available? Will the action contribute to the local economy?
- **Environmental:** Will there be negative environmental consequences from the action? Does it comply with environmental regulations? Is it consistent with community environmental goals?

At its third meeting, the HMPC used STAPLEE to determine which of the identified actions were most likely to be implemented and effective. Each member used STAPLEE to identify his or her top four mitigation actions and then voted for these actions by sticking a colored dot on the index card on which the action was written. The number of dots next to each action was totaled.

These mitigation actions were also voted on using the same process by the attendees at the Natural Hazards Planning Open House that evening. The actions were listed on posters taped to the wall. Again, the dots for each mitigation action were totaled. Based upon the number of dots or votes they received at both meetings, the mitigation actions were assigned a priority of high, medium, or low. See Appendix C for the votes given to each identified mitigation action.

This process of identification and analysis of mitigation alternatives allowed the HMPC to come to consensus and to prioritize recommended mitigation actions. Emphasis was placed on the importance of a benefit-cost analysis in determining project priority; however, this was not a quantitative analysis. The Disaster Mitigation Act regulations state that benefit-cost review is the primary method by which mitigation projects should be prioritized. Recognizing the federal

regulatory requirement to prioritize by benefit-cost, and the need for any publicly funded project to be cost-effective, the HMPC decided to pursue implementation according to when and where damage occurs, available funding, political will, jurisdictional priority, and priorities identified in the Colorado Natural Hazards Mitigation Plan. Cost-effectiveness will be considered in additional detail when seeking FEMA mitigation grant funding for eligible projects identified in this plan.

The mitigation actions developed by the HMPC are summarized in Table 4.1. The HMPC came to consensus on which departments and persons are responsible for completing an implementation worksheet for the County for each identified mitigation action. The worksheets document background information, ideas for implementation, lead agency, partners, potential funding, cost estimates, benefits, and timeline for each identified action.

Following this HMPC meeting, the representative from each participating jurisdiction coordinated a meeting with his or her jurisdictional planning team to discuss mitigation actions. Using the STAPLEE criteria, the jurisdictional planning teams chose from the mitigation actions those that they wanted to implement in their jurisdiction. They also identified new actions specific to the risks in their jurisdiction. Appropriate team members were assigned to complete implementation worksheets for each identified action.

Summit County and the towns of Breckenridge, Dillon, Frisco, and Silverthorne all have significant regulatory, personnel, technical, and financial resources and capabilities. The communities have been very proactive about mitigating risk to natural hazards when the need is identified and guiding new development away from hazard areas. As a result, there are few structural mitigation projects that need to be addressed in these jurisdictions. The mitigation strategy instead focuses on improving communication and coordination within the County and between its jurisdictions to improve efficiency and effectiveness of existing mitigation activities. Many actions are also aimed at additional proactive planning efforts and integrating existing plans to further enhance local capabilities.

The County's highest priority hazard in the mitigation strategy is wildfire. The County and jurisdictions continue to contribute their own resources to education, planning, land use and building regulations, defensible space, and fuel reduction. However, the vulnerability is high and even greater resources are required to implement needed loss reduction measures.

Table 4.1 summarizes all of the prioritized mitigation actions and indicates which jurisdictions plan to implement them; it also provides information on the hazards and plan goals addressed. The mitigation action implementation worksheets for multi-jurisdictional actions follow the matrix. The implementation worksheets for each jurisdiction are included in the jurisdiction's annex to the plan.

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Table 4.1. Mitigation Action Matrix

Jurisdiction-Number	Action	Priority	Goals Addressed	Hazards Addressed
Multi-Jurisdictional—1	Coordinate biannual reviews of the Summit County Multi-Hazard Mitigation Plan to monitor, evaluate, and update the plan.	High	Goal 4	Multi-Hazard
Multi-Jurisdictional—2	Continue public involvement in mitigation activities	High	Goals 1,4	Multi-Hazard
Multi-Jurisdictional—3	Improve coordination of local emergency sheltering plans	High	Goal 1,4	Multi-Hazard, Severe Winter Weather
Multi-Jurisdictional—4	Complete a comprehensive inventory and vulnerability analysis of critical infrastructure and coordinate multi-jurisdictional continuity of operations/continuity of governance (COOP/COOG) planning	High	Goal 2,3	Multi-Hazard
Multi-Jurisdictional—5	Consolidate fragmented meetings into one public safety meeting and/or stimulate interest in local emergency planning committee (LEPC)	High	Goal 4	Multi-Hazard
Multi-Jurisdictional—6	Coordinate wildland-urban interface policies and programs for improved consistency between the towns and the County	High	Goal 1,4	Wildfire
Multi-Jurisdictional—7	Coordinate County emergency planning with Regulated Entities Emergency Planning and hazard vulnerability assessments (HVA)	Medium	Goal 2	Multi-Hazard
Summit County—1	Coordinate vulnerable populations plans	High	Goal 1	Multi-Hazard
Summit County—2	Support and participate in the Summit County Wildfire Council	High	Goal 1,4	Wildfire
Summit County—3	Integrate wildfire mitigation strategies identified in the Summit County Community Wildfire Protection Plan (CWPP) into the multi-hazard mitigation plan	High	Goal 1,4	Wildfire
Summit County—4	Work with the Summit County Forest Health Group (formerly referred to as Mountain Pine Beetle Task Force) to strengthen public and stakeholder educational efforts	High	Goal 1,4	Wildfire
Summit County—5	Continue to enhance mapping of hazard and vulnerability analysis for wildland-urban interface areas of Summit County	High	Goal 1	Wildfire
Summit County—6	Identify and prioritize fuel reduction projects around critical facilities and infrastructure in wildfire hazard areas	High	Goal 2,3	Wildfire
Summit County—7	Review and strengthen floodplain regulations when adopting new digital flood insurance rate maps (DFIRMs)	High	Goal 1	Flood

Jurisdiction-Number	Action	Priority	Goals Addressed	Hazards Addressed
Summit County—8	Identify and map geologic hazard zones and incorporate into master planning	Medium	Goal 1,2	Avalanche, Landslide, Mudflow/Debris Flow, Rock Fall
Summit County—9	Incorporate information from the multi-hazard mitigation plan into community master plans	Medium	Goal 4	Multi-Hazard
Summit County—10	Develop protection plan for roadside ditches to reduce erosion and flooding	Medium	Goal 2	Erosion/ Deposition, Flood
Summit County—11	Enhance flood protection of the Snake River's collection system to prevent potential sanitary sewer overflows or inundation of critical facilities.	Low	Goal 2	Flood
Summit County—12	Remove the North Fork River Estates lift station and replace it with a gravity sewer line system.	Low	Goal 2	Flood
Summit County—13	Improve education and information on the National Flood Insurance Program (NFIP) and flood hazard areas in Summit County.	Low	Goal 1	Flood
Summit County—14	Consider joining the Community Rating System (CRS)	Low	Goal 1,3	Flood
Blue River—1	Replace collapsing culverts and rebuild bridge over the Blue River on Blue River Road.	High		Flood
Blue River-—2	Continue homeowner defensible space program begun in 2007	Medium	Goal 1	Wildfire
Blue River—3	Regrade Spruce Creek Road to allow safe automobile passage to homes and national forest trails	Low	Goal 1,2	Erosion/ Deposition, Flood
Breckenridge—1	Inspect metal culverts to determine risk of failure	High	Goal 1,2	Flood
Breckenridge—2	Install erosion traps	High	Goal 1,2	Erosion/ Deposition, Flood
Breckenridge—3	Promote defensible space and removal of beetle-infested trees	High	Goal 1,2	Wildfire
Breckenridge—4	Educate public about winter preparedness kits	High	Goal 1	Severe Winter Weather
Breckenridge—5	Update and enhance evacuation plan	Low	Goal 1	Multi-Hazard

Jurisdiction-Number	Action	Priority	Goals Addressed	Hazards Addressed
Breckenridge—6	Inventory and map locations of hazardous materials	Low	Goal 1	Hazardous Materials Release
Breckenridge—7	Locate portable wayfinding signage around Town during emergency events	Low	Goal 1	Multi-Hazard
Dillon—1	Develop a Hazard Mitigation Planning Committee to guide policy and implementation	Low	Goal 4	Multi-Hazard
Dillon—2	Improve education on risk and preparedness and mitigation measures	Low	Goal 1	Multi-Hazard
Frisco—1	Continue to implement mountain pine beetle plan to mitigate wildfire hazard	High	Goal 1,3	Mountain Pine Beetle, Wildfire
Frisco—2	Improve information on website about natural hazard risk and mitigation	Low	Goal 1	Multi-Hazard
Silverthorne—1	Pursue implementation of special improvement districts as a mechanism to fund the undergrounding of existing overhead utility lines	High	Goal 1,2,3	Multi-Hazard
Silverthorne—2	Continue to implement mountain pine beetle program and enforce ordinance	High	Goal 1,3	Mountain Pine Beetle, Wildfire
Silverthorne—3	Revise language of Silverthorne flood damage prevention ordinance to improve clarity and ease of use	Medium	Goal 1	Flood
Silverthorne—4	Insure emergency power for wastewater treatment plant during extended power outage	Medium	Goal 2	Multi-Hazard
Silverthorne—5	Insure continued water distribution during extended power outage	Medium	Goal 2	Multi-Hazard
Silverthorne—6	Develop action plan for responding to an explosive gas event at the head works of the Silverthorne/Dillon Joint Sewer Authority	Low	Goal 2	Not profiled
Buffalo Mountain Metropolitan District—1	Reduce the risk of wildfire in the Wildernest subdivision by assisting property owners with the creation of defensible spaces around residential buildings	High	Goal 1	Wildfire
Buffalo Mountain Metropolitan District—2	Enhance the ability to ensure continuity of water and sewer service during emergencies by converting paper as-built infrastructure drawings to digital format	Medium	Goal 2	Multi-Hazard
Buffalo Mountain Metropolitan District—3	Obtain backup power for water pumping stations	Low	Goal 2	Multi-Hazard
Lake Dillon Fire Protection District—1	Maintain and enhance wildfire mitigation program	High	Goal 1,3	Wildfire
Lake Dillon Fire Protection District—2	Install emergency generators in three fire stations	Medium	Goal 1,2,3	Multi-Hazard

Jurisdiction-Number	Action	Priority	Goals Addressed	Hazards Addressed
Red, White, and Blue Fire Protection District—1	Create public education program encouraging wildfire defensible space	High	Goal 1	Wildfire
Red, White, and Blue Fire Protection District—2	Promote household winter preparedness kits	High	Goal 1	Severe Winter Weather
Red, White, and Blue Fire Protection District—3	Provide backup power to fire stations to protect continuity of services	Medium	Goal 2	Multi-Hazard
Red, White, and Blue Fire Protection District—4	Conduct periodic community evacuation drills	Medium	Goal 1	Multi-Hazard
Red, White, and Blue Fire Protection District—5	Inventory and map locations of hazardous materials	Low	Goal 1	Hazardous Materials Release

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

Jurisdiction: Multi-Jurisdictional

Action Title: Coordinate biannual reviews of the Summit County Multi-Hazard Mitigation Plan to monitor, evaluate, and update the plan.

Priority: High

Issue/Background: The Hazard Mitigation Planning Committee formed to develop the Summit County Multi-Hazard Mitigation Plan needs to continue to exist and be comprised of a broad base of stakeholders. Holding biannual meetings will help keep the plan action-oriented and will assist in a more effective five-year update process. This action will also implement the process for monitoring, evaluating, and updating the plan described in Chapter 5 Plan Implementation and Maintenance.

Ideas for Implementation: The Summit County Emergency Manager will coordinate these meetings. The Committee will need to establish a meeting schedule and framework for continuity. These concepts will be presented to the group by email with a meeting date planned for the future. The first meeting is estimated to occur in December 2008 or January 2009. Meeting agendas will incorporate the process described in Chapter 5 Plan Implementation and Maintenance.

This committee also may be coordinated or integrated with the public safety committee described in Mitigation Action Multi-Jurisdictional—5

Responsible Agency: Summit County Office of Emergency Management

Partners: All partner agencies and entities identified and participating in the Hazard Mitigation Planning Committee.

Potential Funding: Summit County and jurisdictions

Cost Estimate: Staff time

Benefits: (Losses Avoided)

- Helps build relationships and understanding of the important issues involved in mitigation planning.
- Improves communication and coordination within County
- Keeps plan current and accurate

Timeline: Three months to implement initial organization meeting - estimate December 2008. Ongoing once every six months.

Mitigation Action: Multi-Jurisdictional—2 Public Involvement

Jurisdiction: Multi-Jurisdictional

Action Title: Continue public involvement in mitigation activities

Priority: High

Ideas for Implementation: The Summit County Office of Emergency Management will prepare and conduct a series of presentations focused upon coordination and improvement of mitigation activities.

The next step will be using local media sources to announce progress on the mitigation plan and ideas for future activities. An education announcement will be filed on the Local Access Channel and broadcast to the local audience to educate about the plan. This project will also involve developing and expanding educational materials related to hazards in Summit County and household preparedness measures. These materials may include fact sheets, public service announcements, and presentations to specific groups. Severe winter weather, water conservation, and wildfire are priority hazards that the materials will address.

Responsible Agency: Summit County Office of Emergency Management

Partners: All participating local governments and special districts and local media sources.

Potential Funding: Summit County and jurisdictions

Cost Estimate: Staff time

Benefits: (Losses Avoided)

- This outreach will be a necessary component of the local adoptions of the multi-hazard mitigation plans. The work will build relationships and understanding of the important issues involved in mitigation planning.
- Implements mitigation plan
- Improves communication and coordination
- Increases public education and awareness

Timeline: Three months to implement and obtain adoptions by local governments and special districts, estimate December 2008. Then, ongoing.

Mitigation Action: Multi-Jurisdictional—3 Emergency Sheltering Plans

Jurisdiction:	Multi-Jurisdictional
Action Title:	Improve coordination of local emergency sheltering plans
Priority:	High
Ideas for Implementation:	The Office of Emergency Management will begin a process under Emergency Support Function-6 (ESF-6) Mass Care and Sheltering to identify the role and responsibilities of each local government and American Red Cross with regards to emergency sheltering. The improvement plan from a mass sheltering action on December 31, 2007, identified many of these issues, which we will work to address.
Responsible Agency:	Summit County Office of Emergency Management
Partners:	Local governments in Summit County and the American Red Cross.
Potential Funding:	Summit County and jurisdictions
Cost Estimate:	Staff time
Benefits: (Losses Avoided)	This work is necessary to avoid confusion and duplication of efforts during emergency sheltering operations. • Improves communication and coordination • Protects public health and safety
Timeline:	Three months to implement initial organization meeting - estimate December 2008. Estimated completion of Sheltering Annex being is June 2009.

Mitigation Action: Multi-Jurisdictional—4 Critical Infrastructure Inventory and Planning

Jurisdiction: Multi-Jurisdictional

Action Title: Complete a comprehensive inventory and vulnerability analysis of critical infrastructure and coordinate multi-jurisdictional continuity of operations/continuity of governance (COOP/COOG) planning

Priority: High

Issue/Background: The Summit County Office of Emergency Management has been engaged in a COOP/COG planning process, which should be completed for the County government by December 2008. The plan identified certain critical infrastructure, but a complete comprehensive inventory and Hazard Vulnerability Analysis (HVA) needs to be completed.

Ideas for Implementation: The County will work with local governments and special districts to encourage their investment and implementation of similar work for their organizations and critical infrastructure. The Summit County government is invested in the importance of this planning.

Responsible Agency: Summit County Office of Emergency Management

Partners: All local governments and special districts

Potential Funding: Summit County and jurisdictions

Cost Estimate: Staff time

Benefits: (Losses Avoided)

- Protect critical facilities and infrastructure
- Prevent loss of services
- Protect human health and safety

Timeline: Nine months to implement initial organization meeting - estimate June 2009.

Mitigation Action: Multi-Jurisdictional—5 Public Safety Meetings

Jurisdiction:	Multi-Jurisdictional
Action Title:	Consolidate fragmented meetings into one public safety meeting and/or stimulate interest in local emergency planning committee (LEPC)
Priority:	High
Issue/Background:	The Summit County public safety agencies could benefit from a coordinated meeting where functions of public safety would meet. This could eliminate many fragmented meetings and reduce demands on participants to schedule another meeting.
Ideas for Implementation:	The Summit County Office of Emergency Management will consult with leadership of public safety agencies and discuss the opportunity to consolidate the many fragmented public safety meetings currently being held in Summit County. As an alternative, the same stakeholders will be approached about stimulating interest in the LEPC which exists mostly in name at a County government level.
Responsible Agency:	Summit County Office of Emergency Management
Partners:	All local governments and special districts
Potential Funding:	Summit County and jurisdictions
Cost Estimate:	Staff time
Benefits: (Losses Avoided)	• Improve communication and coordination
Timeline:	Twelve months to implement after initial organizational meeting - estimate September 2009.

Mitigation Action: Multi-Jurisdictional—6 Wildfire Policy Coordination

Jurisdiction: Multi-Jurisdictional

Action Title: Coordinate wildland-urban interface policies and programs for improved consistency between the towns and the County.

Priority: High

Issue/Background: The mixture of government boundaries and land ownership in Summit County results in a variety of wildfire mitigation programs and policies. We believe there are many valid initiatives and efforts underway and stakeholders and citizens would benefit from further improvements in coordination.

Ideas for Implementation: The Summit County Wildfire Council will begin to address this action at bimonthly meetings and may bring together a focused workgroup to identify the projects completed, in progress, and still in the planning process. We also understand the value of coordinating with the U.S. Forest Service in this effort. The coordinated effort by governments would demonstrate to the public the serious nature of these efforts.

Responsible Agency: Summit County Wildfire Council

Partners: Summit County; Towns of Breckenridge, Dillon, Frisco, and Silverthorne; Lake Dillon and Red, White, and Blue Fire Protection Districts; U.S. Forest Service; Colorado State Forest Service

Potential Funding: Summit County and jurisdictions

Cost Estimate: Staff time

Benefits: (Losses Avoided)

- Improve communication and coordination
- Prevent duplication of efforts
- Reduce future losses due to wildfire
- Protect public health and safety

Timeline: The HMPC will review this effort by March 2009.

Mitigation Action: Multi-Jurisdictional—7 Emergency Planning Coordination

Jurisdiction:	Multi-Jurisdictional
Action Title:	Coordinate County emergency planning with Regulated Entities Emergency Planning and hazard vulnerability assessments (HVA).
Priority:	Medium
Issue/Background:	The emergency response and planning for a regulated facility could be improved by a coordinated process for planning and assessment.
Ideas for Implementation:	The Summit County Office of Emergency Management (OEM) will coordinate with public safety agencies and regulated facilities, such as dam owners, regarding their emergency planning, exercising, and hazard vulnerability assessments. OEM with encourage a collaborative partnership between emergency planners, public safety agencies, and facility owners to address and evaluate emergency management activities.
Responsible Agency:	Summit County Office of Emergency Management
Partners:	All local governments and special districts
Potential Funding:	Summit County and jurisdictions
Cost Estimate:	Staff time
Benefits: (Losses Avoided)	• Improve communication and coordination • Protect critical facilities and infrastructure • Protect public health and safety
Timeline:	Twelve months to implement after initial organizational meeting - estimate September 2009.

5 PLAN IMPLEMENTATION AND MAINTENANCE

This chapter provides an overview of the overall strategy for plan implementation and maintenance and outlines the method and schedule for monitoring, updating, and evaluating the plan. The chapter also discusses incorporating the plan into existing planning mechanisms and how to address continued public involvement.

5.1 Implementation

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

An important implementation mechanism that is highly effective and low-cost is incorporation of the hazard mitigation plan recommendations and their underlying principles into other plans and mechanisms, such as comprehensive planning, capital improvement budgeting, economic development goals and incentives, and other regional plans. Mitigation is most successful when it is incorporated in the day-to-day functions and priorities of government and in land use and development planning. This integration can be accomplished through identifying multi-objective, win-win programs and projects and through the routine actions of monitoring agendas, attending meetings, sending memos, and promoting safe, sustainable communities.

Simultaneous to these efforts, it is important to maintain a constant monitoring of funding opportunities that can be leveraged to implement some of the more costly recommended actions. This will include creating and maintaining a bank of ideas on how to meet local match or participation requirements. When funding does become available, the participating jurisdictions will be in a position to capitalize on the opportunity. Funding opportunities to be monitored include special pre- and post-disaster funds, special district budgeted funds, state and federal earmarked funds, and other grant programs, including those that can serve or support multi-objective applications. Additional mitigation strategies include consistent and ongoing enforcement of existing rules and regulations and vigilant review of countywide programs for opportunities for better coordination.

5.2 Monitoring, Evaluating, and Updating the Plan

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

5.2.1 Hazard Mitigation Planning Committee

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

- Meet biannually and after a disaster event to monitor and evaluate the implementation of the plan;
- Act as a forum for hazard mitigation issues;
- Disseminate hazard mitigation ideas and activities to all participants;
- Pursue the implementation of high priority, low- or no-cost recommended actions;
- Maintain vigilant monitoring of multi-objective, cost-share, and other funding opportunities to help the community implement the plan's recommended actions for which no current funding exists;
- Monitor and assist in implementation and update of this plan;
- Keep the concept of mitigation in the forefront of community decision making by identifying plan recommendations when other community goals, plans, and activities overlap, influence, or directly affect increased community vulnerability to disasters;
- Report on plan progress and recommended changes to the Summit County Board of County Commissioners and governing bodies of participating jurisdictions; and
- Inform and solicit input from the public.

The HMPC is an advisory body and will not have any powers over County, City, Town, or District staff. Its primary duty is to see the plan successfully carried out and to report to the community governing boards and the public on the status of plan implementation and mitigation opportunities. Other duties include reviewing and promoting mitigation proposals, hearing stakeholder concerns about hazard mitigation, passing concerns on to appropriate entities, and posting relevant information on the County website.

The HMPC agrees to meet biannually to review the plan. This action is described in Mitigation Action Multi-Jurisdictional—1. The HMPC also may be coordinated or integrated with an overall Public Safety Committee formed to consolidate various emergency management related groups currently meeting within the County. See Mitigation Action Multi-Jurisdictional—5.

5.2.2 Plan Maintenance Schedule

The HMPC agrees to meet biannually and after a hazard event to monitor progress and update the mitigation strategy. The Summit County emergency manager is responsible for initiating these plan reviews. In conjunction with the other participating jurisdictions, a five-year written update of the plan will be submitted to the Colorado Division of Emergency Management and FEMA Region VIII, unless disaster or other circumstances (e.g., changing regulations) require a change to this schedule.

5.2.3 Plan Maintenance Process

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

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

Updates to this plan will:

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

To best evaluate any changes in vulnerability as a result of plan implementation, the participating jurisdictions will follow the following process:

- A representative from the responsible office identified in each mitigation action will be responsible for tracking and reporting on an annual basis to the jurisdictional lead on action status and provide input on whether the action as implemented meets the defined objectives and is likely to be successful in reducing vulnerabilities.
- If the action does not meet identified objectives, the jurisdictional lead will determine what additional measures may be implemented, and an assigned individual will be responsible for defining action scope, implementing the action, monitoring success of the action, and making any required modifications to the plan.

Changes will be made to the plan to accommodate for actions that have failed or are not considered feasible after a review of their consistency with established criteria, timeframe,

community priorities, and/or funding resources. Actions that were not ranked high but were identified as potential mitigation activities will be reviewed as well during the monitoring and update of this plan to determine feasibility of future implementation. Updating of the plan will be by written changes and submissions, as the Summit County Office of Emergency Management deems appropriate and necessary, and as approved by the Summit County Board of Commissioners and the governing boards of the other participating jurisdictions.

5.3 Incorporation into Existing Planning Mechanisms

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

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

- Summit County Countywide Comprehensive Plan and four watershed basin master plans
- Summit County Emergency Operations Plan
- Summit County Community Wildfire Protection Plan
- General or master plans of participating jurisdictions
- Ordinances of participating jurisdictions
- Capital improvement plans and budgets
- Other community plans within the County, such as water conservation plans, stormwater management plans, and parks and recreation plans
- Other plans and policies outlined in the capability assessments in the jurisdictional annexes

The County documented its intention to incorporate information from the multi-hazard mitigation plan into community master plans in mitigation action Summit County—9 and its intention to improve integration with the Community Wildfire Protection Plan and the multi-hazard mitigation plan in mitigation action Summit County—3 in the mitigation strategy.

Efforts should be made to monitor the progress of mitigation actions implemented through these other planning mechanisms and, where appropriate, their priority actions should be incorporated into updates of this hazard mitigation plan.

5.4 Continued Public Involvement

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

The update process provides an opportunity to publicize success stories from the plan's implementation and seek additional public comment. Information will be posted in the *Summit Daily News* and on the County website following the annual review of the mitigation plan. A public hearing(s) to receive public comment on plan maintenance and updating will be held during the update period. When the HMPC reconvenes for the update, they will coordinate with all stakeholders participating in the planning process, including those who joined the HMPC after the initial effort, to update and revise the plan. Public notice will be posted and public participation will be invited, at a minimum, through available website postings and press releases to the local media outlets, primarily newspapers. Continued public involvement is documented in the mitigation strategy in the action Multi-Jurisdictional—2: Continue public involvement in mitigation activities.

ANNEX A: UNINCORPORATED SUMMIT COUNTY

Jurisdictional annexes provide specific information unique to each jurisdiction participating in the hazard mitigation plan. For unincorporated Summit County, countywide information related to sections A.1 Community Profile, A.2 Hazard Identification and Profiles, and A.3 Vulnerability Assessment is addressed previously in the main plan. The location of this information is referenced below. The remainder of this annex focuses on the Capability Assessment and Mitigation Strategy unique to the County government.

A.1 Community Profile

Community profile information and the base map for Summit County are provided in Section 1.5 Planning Area Profile.

A.2 Hazard Identification and Profiles

Countywide hazard identification and profiles information can be found in Section 3.1 Hazard Identification and Section 3.2 Hazard Profiles.

A.3 Vulnerability Assessment

The vulnerability assessment analyzes the population, property, and other assets at risk to hazards ranked of moderate or high significance and estimates potential losses where data is available. Facilities owned by the County are inventoried in Table A.1. Other countywide vulnerability information is covered in Section 3.3 Vulnerability Assessment in the main plan.

Table A.1. Unincorporated Summit County—Critical Facilities and Community Assets

Name of Asset	Address	Replacement Value ($)	Hazard Concerns
Breckenridge Area			
Courthouse	208 E. Lincoln	2,684,337	
Courthouse Addition	208 E. Lincoln	687,156	
Justice Facility	501 Park Drive	13,202,471	
District Attorney's Offices	1760 Airport Road Unit A	594,776	
Library	504 Airport Road	803,505	
Ambulance Building	0143 CR 450	238,185	
Sheriff Storage Barn	0192 CR 450	66,843	
Building and Grounds Shop	105 N. French Street	47,737	
Building and Grounds Office	106 N. Ridge Street	345,784	
Road and Bridge Maintenance Shop	0192 CR 450	252,569	
Tyrollean Radio Site	Barney Ford Hill	23,683	

Name of Asset	Address	Replacement Value ($)	Hazard Concerns
High School Radio Site	0059 CR 1	2,783	
Copper Mountain Area			
Copper Mountain Radio Site	SE of 3371 Hwy 91, Parcel 3	29,621	
Dillon Area			
Snake River Wastewater Treatment Plant	4344 Swan Mountain Road	21,411,693	
Snake River Wastewater Treatment	0297 Summit County Road 120	1,277,528	
South AWT	4344 Swan Mountain Road	82,498	
Snake River Wastewater Treatment Plant Digestor	0297 Summit County Road 120	219,475	
Wastewater Treatment Plant	4344 Swan Mountain Road	2,104,672	
Sewage Lift Station	4533 Swan Mountain Road	48,333	
Material Recovery Facility	683 Landfill Road	2,878,001	
Water Storage Tank	642 Landfill Road	713,246	
Landfill Maintenance Garage	725 Landfill Road	1,849,981	
Frisco Area			
Ambulance Search and Rescue	128 CR 1004	401,887	Wildfire
Road and Bridge Building Department	128 CR 1004	383,009	WIldfire
Road and Bridge Main Shops	128 CR 1004	847,155	Wildfire
Storage	187 CR 1004	264,840	Wildfire
Sand Storage	218 CR 1004	74,006	Wildfire
Bus Garage	0222 SCR 1004	754,469	Wildfire
Library/Administration	0037 CR 1004	14,082,777	Wildfire
Emergency Services Facility	0227 CR 1003	2,348,292	Wildfire
Transfer Center	1010 Meadow Drive	626,000	
Animal Shelter, Classroom, Office	0191 CR 1004	1,702,308	Wildfire
Community and Senior Center	0151 CR 1004 Peak 1 Boulevard	3,661,946	Wildfire
Summit County Medical Offices	360 Peak One Drive	6,856,461	Wildfire
Summit County Offices (2nd Floor)	360 Peak One Drive	870,000	Wildfire
Heeney Area			
Summit County Barn	1294 CR 30	80,864	
Temporary Fire Department Parking Garage	6631 CR 30	80,046	
Heeney Radio Site	CR 30 at Willows Campground	24,827	
Keystone Area			
County Maintenance Building	1252 Keystone Ranch Road	96,276	
Landfill Maintenance/Storage Building	Landfill Road	13,356	
Snake River Radio Site	22393 Highway 6	939	
Silverthorne Area			
Search and Dive Rescue	222 Adams	79,830	
North Branch Library	651 Center Circle	3,197,017	
Wildernest Radio Site	Ryan Gulch Road at Wildernest	93,894	

Source: Summit County Office of Emergency Management

A.4 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. The capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation outreach and partnerships, and other mitigation efforts.

Regulatory Mitigation Capabilities

Table A.2 lists planning and land management tools typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in Summit County.

Table A.2. Summit County—Regulatory Mitigation Capabilities

Regulatory Tool (Ordinances, Codes, Plans)	Yes/No	Comments
Master Plan	Yes	2003
Zoning Ordinance	Yes	Summit County Development Regulations
Subdivision Ordinance	Yes	Summit County Development Regulations
Growth Management Ordinance	Yes	Summit County Development Regulations
Floodplain Ordinance	Yes	Floodplain Overlay District
Other Special Purpose Ordinance (Stormwater, Steep Slope, Wildfire)	Yes	Chapter 44 Fire Mitigation Standards for New Development Development Code Chapters 6 and 7 include erosion control and revegetation requirements
Building Code	Yes	Version: 2006 International Building Code
Erosion or Sediment Control Program	Yes	
Stormwater Management Program	Yes	All large scale development is required to have drainage designed to handle the 25-year storm event. Detention must be provided that will release water at the 25-year historic rate.
Site Plan Review Requirements	Yes	
Capital Improvements Plan	No	
Economic Development Plan	No	
Local Emergency Operations Plan	Yes	In process of updating to National Response Framework
Other Special Plans	Yes	Summit County Community Wildfire Protection Plan
Flood Insurance Study or Other Engineering Study for Streams	Yes	FEMA Flood Insurance Study, August 9, 2001
Elevation Certificates	Yes	

Summit County Planning developed the matrix in Table A.3 listing their hazard mitigation measures. More detailed information on mitigation related plans and policies follows the matrix.

Figure A.3 Development Constraints, County Concerns, and Mitigation Measures

Type of Constraint	County Concerns	Mitigation
Flood Fringe	Flood hazards to structures; Public health, safety, and welfare	A. Compliance with County Floodplain Regulations (See Section 4100)
Floodway	Flood hazards to structures; Public health, safety, and welfare	A. Compliance with County Floodplain Regulations (See Section 4100)
Geologic Hazard Areas	Avalanche paths; Landslide areas; Rock falls; Debris flows; Mudflows; Unstable slopes or soils; Seismic effects; Ground subsidence radioactivity	A. Avoiding placing any structures on areas subject to geologic hazards
		B. Submitting geotechnical report identifying hazards and recommending methods of construction to alleviate hazards; designing structures in accordance with recommendations contained in geotechnical report (See Chapter 6)
		C. Providing grading and foundation plans prepared by a registered professional engineer (See Chapter 6)
		D. Complying with recommendations of the State Geologic Survey (See Chapter 8)
		E. Modifying land uses so that structures are minimized or eliminated
		F. Clustering development to avoid hazard areas
Slopes Exceeding 30 Percent	Amount of site disturbance; Visual scarring; Slope stability; Soil erosion; Release of phosphorus; Wildfire potential (See also wildfire as constraint)	A. Avoiding placing such items as parking lots which require large, flat-surfaced areas on steep slopes
		B. Modifying land uses so site disturbance is minimized
		C. Proposing smaller scale rather than larger scale development in order to minimize the amount of site disturbance
		D. Designing structures so they are stepped or otherwise fit with the terrain
		E. Minimizing the extent of roads
		F. Clustering development to avoid steep slopes
		G. Providing financial commitment to, and implementation of, a revegetation program (Required by Chapter 5, 7 and Section 3600)
Wetlands	Degradation of natural environment; Loss of wildlife habitat; Loss of cleansing action of wetlands; Disruption of natural corridors; Loss of amenity in project	A. Proposing land uses which are not disruptive to wetlands
		B. Clustering development to avoid wetlands areas
		C. Complying with 404 permit procedures
		D. Replacing wetlands on an acre for acre basis within same ecosystem
		E. Replacing wetlands on a 2 for 1 basis outside ecosystem but within county
		F. Contributing sufficient funds to convert existing private wetlands in the unincorporated area to public domain on a 2 for 1 basis

Type of Constraint	County Concerns	Mitigation
Wildfire	Fire hazard to structures; Public health, safety, welfare	A. Submitting forest management plan approved by Colorado State Forest Service, and implementing measures needed to mitigate or eliminate hazard (required for areas of moderate or severe hazard by Chapter 8)
		B. Providing multiple points of access
		C. Using fire retardant roof covering materials in accordance with the building code
		D. Installing fire sprinkler system

Source: Summit County Planning Department

Countywide Comprehensive Plan, 2003

The Summit County Countywide Comprehensive Plan serves as the County's policy guidance and directs decisions that affect the physical and socioeconomic development of the County. The plan's overall vision is to "preserve and enhance our vibrant, attractive, and prosperous mountain community where people choose to live, work, recreate, and visit." Goals and policies related to hazard mitigation include the following:

Environment Element

- Goal A: Protect and preserve environmentally sensitive areas.
  - Policy/Action 6: The County should work cooperatively with homeowner groups and the state and federal forest services to promote healthy and naturally diverse forests while reducing wildfire hazards.
- Goals B-F: Wetland preservation and enhancement.
- Goal H: Protect and enhance the quality and quantity of water resources in the County.
  - Policy/Action 1: Reduce water consumption and manage water resources in a more sustainable manner.
  - Policy/Action 2: Development and other land use activities (e.g., highway operations and industrial activities) should avoid water quality impacts from erosion and sedimentation and should not result in degradation of water quality as measured by Colorado's Antidegradation Policy.
  - Policy/Action 8: Ensure that new development does not disturb surface or subsurface hydrologic flows to the extent that recharge of nearby wetlands and streams are adversely affected.
  - Policy/Action 14: Support projects that restore stream channels and natural conditions, provide erosion control, and improve fish and wildlife habitat.

Land Use Element

- Goal D: Guide the appropriate development of land through the County's master plans and development regulations.

- Policy/Action 4.1: To the extent practicable, retain trees and forested areas while providing protection of the resources listed above and while allowing for forest management practices necessary for forest health and wildfire prevention.

Design and Visual Resources Element

- Goal E. Avoid or minimize development impacts on steep hillsides and ridgelines.
  - Policy/Action 1: Development on ridgelines and steep slopes should be avoided wherever possible. Where no feasible alternative exists, buildings on ridgelines and slopes should be located and designed so that the existing visual dominance of the natural landform, vegetation and topography is maintained.
  - Policy/Action 2: Minimize the need for grading, earth moving, vegetation removal, and site disturbance related to development on sloped areas.
  - Policy/Action 3: Grading or earth moving to create a flat building pad on a slope should be discouraged; instead, buildings should be stepped to fit with the natural terrain.

Watershed Basin Master Plans

Each of the County's four watershed basins, Upper Blue, Snake River, Ten Mile, and Lower Blue, has a basin master plan that provides further specific direction on land use decisions within the basin. Within each basin, there may be a subbasin plan to address unique circumstances on a neighborhood or regional scale.

Summit County Development Code

The Summit County Development Code is the legal framework outlining policies for development projects within the County's jurisdiction. It is organized under 16 chapters and various subsections. Code ordinances related to hazard mitigation are described below:

Zoning Regulations

3202 Rezoning Policies

Summit County has established policies that apply whenever a zoning amendment (rezoning) is proposed in the unincorporated area of the County. These Rezoning Policies are intended to ensure that land with development constraints is avoided in accordance with the policies contained herein, and that development contemplates and is designed in a manner consistent with the terrain and natural features of the site and is compatible with existing development in the vicinity.

- **3202.02 Development Constraints:** An applicant requesting a zoning amendment that may impact land with development constraints shall provide a surveyed existing conditions plan depicting all of the following constraints, unless the Planning Department waives mapping such environmental constraints:
  - 1. Slopes of greater than 30 percent.

- 2. Areas subject to geologic hazards including avalanches, landslides, rock falls, mud flows, unstable slopes or soils, seismic effects, ground subsidence or radioactivity.
- 3. Any regulatory floodway or flood fringe area as depicted on the County's Floodplain Overlay District.

- **3202.06 Wildfire Hazard Areas:** Rezoning Policies for wildfire hazard areas state that in determining appropriate densities for a particular property, the Board of County Commissioners will take into account: 1) the wildfire hazard; 2) the potential impact to the public health, safety and welfare; 3) wildfire mitigation measures as required and/or allowed by the County; and 4) the proximity of the proposed development site to existing fire stations and the corresponding response zone. Development projects seeking a zoning amendment shall ensure that wildfire hazard areas do not pose an undue risk to the public health, safety and welfare. As a part of a zoning amendment application, the County may require:
  - A. The submittal of a forest management plan approved by the Colorado State Forest Service that includes proposed mitigation for any wildfire hazard area.
  - B. Provisions for multiple points of access.
  - C. Installation of fire suppression systems.
  - D. Other measures as deemed necessary to reduce the wildfire hazard.

3303.02 Floodplain Overlay District

The Floodplain Overlay District designates maps and regulates development in the floodplain. The purpose of the Floodplain Overlay District is the following:

- A. To reduce the hazard of floods to life and property through:
  - 1. Prohibiting certain uses that are hazardous to life or property in time of flood from locating in the floodplain;
  - 2. Restricting the development of certain uses in the floodplain that are hazardous to public health in time of flood;
  - 3. Restricting the development of certain uses in the floodplain which are especially susceptible to flood damage, so as to alleviate hardship and eliminate demands for public expenditures for relief and protection; and,
  - 4. Requiring permitted floodplain uses, including but not limited to public facilities that serve such uses, to be protected against floods by requiring floodproofing and general flood protection at the time of initial construction.
- B. To protect those who may occupy areas of the floodplain through:
  - 1. Regulating the manner in which structures and developments designed for human occupancy may be constructed and developed so as to minimize danger to human life within such structures;
  - 2. Regulating the method of constructing water supply and sanitation systems so as to prevent disease, contamination and unsanitary conditions resulting from inundation in time of flood;

  - 3. Regulating the location and method of constructing streets and bridges so as to prevent damage in time of flood; and,
  - 4. Requiring the provisions of this section and maps delineating floodplain areas be made available to the public so as to protect individuals from purchasing floodplain lands for purposes that are not suitable.
- C. To protect the public from the burden of avoidable financial expenditures for flood control and relief by regulating uses within floodplain areas so as to produce a method of construction and pattern of development which will minimize the probability of damage to property and loss of life or injury to the occupants of flood hazard areas.
- D. To protect and enhance the storage capacity of floodplains and to assure retention of sufficient floodway area to convey flood flows, which can reasonably be expected to occur by:
  - 1. Regulating filling, dumping, dredging, and alteration of drainage channels;
  - 2. Prohibiting excessive encroachments; and,
  - 3. Encouraging uses such as agriculture, recreation, and parking in floodplains.

Subdivision Regulations

Section 8100 Design Criteria and Required Improvements includes separate sections on Drainage, Fire Protection, and Soil Suitability criteria and requirements in new subdivisions.

Fire Hazard Mitigation Requirements for New Construction

Chapter 44 of the Summit County Building Code establishes minimum design and construction standards for the protection of life and property from fire within the wildland-urban interface. These provisions are meant to aid in the prevention and suppression of fires and lessen the hazards to structures from wildland fires as well as the hazards to wildlands from structure fires. New homes and remodels in an area rated as moderate or high fire hazard risk in unincorporated Summit County must go through a wildfire mitigation inspection process.

Summit County Community Wildfire Protection Plan, 2006

The purpose of the Summit County Community Wildfire Protection Plan is to establish a focused set of goals, policies, and implementation strategies specific to wildfire prevention and mitigation. The plan is a joint effort of the County, fire districts, State and Federal Forest Service, towns, the Northwest Colorado Council of Governments, and others. The document is organized into nine sections that include maps of focus areas for reducing wildfire risk and mitigation and implementation strategies. Appendix C details property specific implementation measures that support the goals of the overall document. The plan will be continuously updated.

Wildfire Evacuation Plan, 2007

The Summit County Wildfire Evacuation Plan was created to establish a set of policies and protocol in response to wildfire occurrence. A guiding principle of the plan is that the decision to

evacuate properties should be left at the discretion of County residents themselves whenever possible. The plan outlines the official County wildfire notification system and provides specific evacuation guidelines for families in the event of a wildfire that threatens homes.

Summit County Public Health Emergency Operations Plan, 2008

This plan was developed for the Summit County Public Health Department to promote a system to save lives, protect public health and the environment, alleviate damage and hardship, and to reduce vulnerability within Summit County. It provides guidance on overall emergency preparedness and concept of operations, roles, and responsibilities; Summit County Public Health Department emergency response organization; plan implementation process; and administrative, training, and exercising requirements.

Administrative/Technical Mitigation Capabilities

Table A.4 identifies the personnel responsible for activities related to mitigation and loss prevention in Summit County.

Table A.4. Summit County—Administrative and Technical Mitigation Capabilities

Personnel Resources	Yes/No	Department/Position	Comments
Planner/Engineer with Knowledge of Land Development/Land Management Practices	Yes	Planning Department Engineering Department	
Engineer/Professional Trained in Construction Practices Related to Buildings and/or Infrastructure	Yes	Engineering, Building, Inspection Departments	
Planner/Engineer/Scientist with an Understanding of Natural Hazards	Yes	Engineering Department	
Personnel Skilled in GIS	Yes	GIS Department	
Full-Time Building Official	Yes	Building Inspection Department	
Floodplain Manager	Yes	Engineering Department/County Engineer	
Emergency Manager	Yes	Sheriff's Office/Emergency Manager	Full-time
Grant Writer	No	Several departments have staff that write grants as part of their work, including Transit Summit Stage, Public Health, and Youth and Family Services	
Other Personnel	Yes	Fire Mitigation Specialist	
Warning Systems/Services	Yes	Summit County Communications Center	Reverse 911, Emergency Alert System, NOAA All-Hazards Radio, local radio, citizen text messaging system (acquiring)

Fiscal Mitigation Capabilities

Table A.5 identifies financial tools or resources that Summit County could potentially use to help fund mitigation activities.

Table A.5. Summit County—Fiscal Mitigation Capabilities

Financial Resources	Accessible/ Eligible to Use
Community Development Block Grants	Yes
Capital Improvements Project Funding	Yes
Authority to Levy Taxes for Specific Purposes	Yes
Fees for Water, Sewer, Gas, or Electric Services	No
Impact Fees for New Development	Yes
Incur Debt through General Obligation Bonds	Yes
Incur Debt through Special Tax Bonds	Yes
Incur Debt through Private Activities	No
Withhold Spending in Hazard Prone Areas	Yes

Mitigation Outreach and Partnerships

Summit County is involved in the following mitigation related outreach programs and partnerships:

- Each spring, the governments of Summit County, Breckenridge, Dillon, Frisco, and Silverthorne distribute a packet of information to inform the communities about how to prepare for possible high water in May and/or June resulting from snowmelt.
- Wildfire mitigation work is a cooperative effort of the Summit County Government and the four local fire districts: Lake Dillon Fire Protection District, Red, White, and Blue Fire Protection District, Snake River Fire Protection District, and Copper Mountain Fire Protection District. The county has an appointed Wildfire Council, has adopted a Community Wildfire Protection Plan (CWPP), and for the past three years the Board of County Commissioners has dedicated funding for wildfire risk reduction projects.
- The County operates an avalanche information line during avalanche season and works with the Colorado Avalanche Information Center.
- The County promotes fire education programs for the public and in schools.
- The Environmental Health Department regularly educates the public on disease prevention, including West Nile Virus and food safety.

Past Mitigation Efforts

Past mitigation efforts have focused on wildland-urban interface areas. The County has funded the following wildfire mitigation projects since 2006:

- Supplied $50,000 as seed money to stimulate and encourage fuel reduction efforts on private lands valued at over $200,000.
- Allocated $20,000 toward a forester position in cooperation with the state and federal forest services.
- Actively managed four of its open space properties to mitigate the impacts of mountain pine beetle infestation and improve forest health. Properties managed include Blue Danube, Iron Springs, Mesa Cortina/Wildernest Buffer, and Mesa Cortina Trailhead.
- Cut and removed 2,130 trees from County lands.
- Sprayed 8,730 trees on County lands and on important public rights of way.

A.5 Goals and Objectives

Summit County adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 4 Mitigation Strategy.

A.6 Mitigation Actions

The planning team for the unincorporated areas of the County identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible agency, potential funding, estimated cost, and timeline also are included.

As part of its mitigation strategy, Summit County will continue participation in and compliance with the National Flood Insurance Program. Specific activities that the County will undertake to continue compliance include the following:

- Improving education and outreach efforts about flood insurance and floodplain management programs (see Mitigation Action Summit County–13).
- Reviewing flood damage prevention ordinances and identifying opportunities to strengthen requirements and enforcement (see Mitigation Action Summit County–7).
- Working with FEMA and the Colorado Water Conservation Board in the review and adoption of new digital flood insurance rate maps (see Mitigation Action Multi-Jurisdictional-7).
- Considering joining the Community Rating System after adopting the new DFIRMs and updating the floodplain ordinance (see Mitigation Action Summit County-14).

Mitigation Action: Summit County—1 Vulnerable Populations

Jurisdiction: Summit County

Action Title: Coordinate vulnerable populations plans.

Priority: High

Issue/Background: Summit County needs to improve planning for vulnerable populations during natural disasters and other emergency events. This work also needs to be done to fulfill national mandates to identify and support vulnerable populations during emergency events. It will help to improve coordination and prevent duplication of efforts and confusion.

Ideas for Implementation: The Summit County Office of Emergency Management will begin a process under Emergency Support Functions 6 and 8, Mass Care and Public Health, to identify the role and responsibility of County government departments with regards to support for vulnerable populations. The work will involve creating a collaborative of the multiple partners and stakeholders that each know and serve a portion of this population. This work needs to be a support annex to the Summit County Emergency Operations Plan. Initial work in this area would identify immediate contact information so that an emergency could be handled tomorrow if necessary. The work could be improved to include a local registry and GIS mapping.

Responsible Agency: Summit County Office of Emergency Management

Partners: All Summit County departments and other entities currently serving or servicing this population as well as state and regional organizations

Potential Funding: Summit County and jurisdictions

Cost Estimate: Staff time

Benefits: (Losses Avoided)

- Protect public health and safety
- Reduce community impacts of disaster and emergencies

Timeline: Twelve months to implement after initial organization meeting - estimate September 2009.

Mitigation Action: Summit County—2 Summit County Wildfire Council

Jurisdiction: Summit County

Action Title: Support and participate in the Summit County Wildfire Council.

Priority: High

Issue/Background: The Summit County Government has participated in the Summit County Wildfire Council from its inception. We have committed staff time and resources in the completion and updating of the plan and GIS products. We have supported the Council from the Board of County Commissioners by providing grant opportunities and project prioritization.

Ideas for Implementation: The Council's responsibilities will need to extend for many years to come and will require part-time or full-time staff assignment. We may look for funding to support the hiring of a coordinator for this action item as it is critical to the continued success of this project. The Summit County Board of County Commissioners has allocated $200,000 in the 2008 budget for fuel reduction projects and grants countywide and is anticipating funding these projects in 2009 in the amount of $170,000.

Responsible Agency: Summit County Manager's Office

Partners: Summit County Government; Towns of Breckenridge, Dillon, Frisco, and Silverthorne; Lake Dillon and Red, White, and Blue Fire Protection Districts; Summit County Wildfire Council; U.S. Forest Service; and Colorado State Forest Service

Potential Funding: Summit County

Cost Estimate: $45,000

Benefits: (Losses Avoided)

- Improve communication and coordination
- Protect public health and safety
- Reduce wildfire risk through fuel reduction projects

Timeline: Work within the next three months to determine if this project can be supported in the 2009 budget.

Mitigation Action: Summit County—3 Integration with Community Wildfire Protection Plan

Jurisdiction:	Summit County
Action Title:	Integrate wildfire mitigation strategies identified in the Summit County Community Wildfire Protection Plan (CWPP) into the multi-hazard mitigation plan.
Priority:	High
Issue/Background:	Summit County recognizes that the CWPP is a subset of the broader multi-hazard mitigation planning effort. The HMPC is comprised of many of the same stakeholders as the group who developed and updated the CWPP.
Ideas for Implementation:	The HMPC will work to maintain and further integrate the wildfire mitigation strategies between the two plans so they complement one another, lead to coordinated efforts, and help to better position the County for future wildfire grant funding.
Responsible Agency:	Summit County Office of Emergency Management
Partners:	Summit County Government; Towns of Breckenridge, Dillon, Frisco, and Silverthorne; Lake Dillon and Red, White, and Blue Fire Protection Districts; Summit County Wildfire Council; U.S. Forest Service; and Colorado State Forest Service
Potential Funding:	Summit County
Cost Estimate:	Staff time
Benefits: (Losses Avoided)	• Improve communication and coordination • Reduce losses related to wildland-urban interface fires • Protect public health and safety
Timeline:	This is a continuous process through the life span of these planning efforts. The degree of successful integration will be visited by the HMPC in March 2009 prior to the work season for these projects in the summer of 2009.

Mitigation Action: Summit County—4 Summit County Forest Health Group

Jurisdiction: Summit County

Action Title: Work with the Summit County Forest Health Group (formerly referred to as Mountain Pine Beetle Task Force) to strengthen public and stakeholder educational efforts.

Priority: High

Issue/Background: The Summit County Forest Health Group has grown from a grassroots effort of business, citizens, and government to create a forum to discuss and understand the mountain pine beetle infestation and its impacts on communities in Summit County. The forum has a substantial following and plays a vital role in public and political education of these important issues. Education on mitigation activities that individuals can undertake is critical in a community that has a high number of vacation and second homeowners. The importance of education on local programs, defensible space, and funding opportunities is necessary to sustain focused attention by the public and government on this issue and its future ramifications.

Ideas for Implementation: Summit County will continue to participate in and coordinate with the efforts of the Forest Health Group with a focus on improving public education. The importance of public education is critical to successful mountain pine beetle program implementation. The momentum established behind pubic and political education has grown to result in state and federal legislative attention and funding.

Responsible Agency: Summit Fire Protection Authority

Partners: Summit County Government; Towns of Breckenridge, Dillon, Frisco, and Silverthorne; Lake Dillon and Red, White, and Blue Fire Protection Districts; Summit County Wildfire Council; U.S. Forest Service; and Colorado State Forest Service

Potential Funding: Summit County

Cost Estimate: Staff time

Benefits: (Losses Avoided)

- Slow spread of mountain pine beetle infestation
- Reduce losses related to wildland-urban interface fires
- Provide public education about mitigation activities

Timeline: This is an ongoing process that will be periodically visited by the HMPC. In March 2009, this action will be reviewed prior to the start of the summer construction season in 2009.

Mitigation Action: Summit County—5 Vulnerability in Wildland-Urban Interface

Jurisdiction: Summit County

Action Title: Continue to enhance mapping of hazard and vulnerability analysis for wildland-urban interface areas of Summit County.

Priority: High

Issue/Background: The Summit County Government GIS department has created digital mapping of the focus areas of highest concern for wildfire mitigation and fuel reduction efforts. Five categories were used to establish and identify the focus areas and these were established in our first Community Wildfire Protection Plan and are updated annually. This information is used to specifically identify areas which receive our highest priority of work on the ground. We are sensitive to the importance of identifying the areas of highest vulnerability, which may be due to developed land use, critical infrastructure, or natural resources of high value.

Ideas for Implementation: Data and mapping related to the wildland-urban interface fire hazard and vulnerability will be continually enhanced with the annual reviews of the Community Wildfire Protection Plan and will be integrated into the multi-hazard mitigation plan, when appropriate, and at each five-year update.

Responsible Agency: Summit County GIS Department

Partners: Summit County Government; Towns of Breckenridge, Dillon, Frisco, and Silverthorne; and Lake Dillon and Red, White, and Blue Fire Protection Districts; Summit County Wildfire Council

Potential Funding: GIS Department work time

Cost Estimate: 20-40 hours staff time

Benefits: (Losses Avoided)

- Slow spread of mountain pine beetle infestation
- Reduce losses related to wildland-urban interface fires
- Provide public education about mitigation activities

Timeline: This will be an ongoing effort that will be reviewed annually along with other Community Wildfire Protection Plan and hazard mitigation plan reviews by the HMPC.

Mitigation Action: Summit County—6 Wildfire Mitigation for Critical Facilities and Infrastructure

Jurisdiction:	Summit County
Action Title:	Identify and prioritize fuel reduction projects around critical facilities and infrastructure in wildfire hazard areas.
Priority:	High
Issue/Background:	Areas of high wildfire risk are located throughout the County. Damage to critical facilities and infrastructure during wildfire events can greatly increase community losses and economic impacts.
Ideas for Implementation:	Summit County will work to continue identification and prioritization of critical facilities and infrastructure located in wildfire hazard areas. This action will include mapping of these facilities and comparison with the previously identified wildfire vulnerability focus areas.
Responsible Agency:	Summit County Manager's Office, Office of Emergency Management, and GIS Department
Partners:	Summit County Government; Towns of Breckenridge, Dillon, Frisco, and Silverthorne; and Lake Dillon and Red, White, and Blue Fire Protection Districts; Summit County Wildfire Council
Potential Funding:	The Summit County Board of County Commissioners has allocated $200,000 in the 2008 budget for fuel reduction projects and grants countywide and anticipates funding these projects in 2009 in the amount of $170,000.
Cost Estimate:	Project costs are not yet known
Benefits: (Losses Avoided)	• Prevent loss of lifeline utility services • Protect critical facilities and infrastructure • Reduce losses related to wildland-urban interface fires
Timeline:	This action is underway and will be evaluated by the HMPC and reviewed in March 2009 prior to the summer work season of 2009.

Mitigation Action: Summit County—7 DFIRM Adoption

Jurisdiction:	Summit County
Action Title:	Review and strengthen floodplain regulations when adopting new digital flood insurance rate maps (DFIRMs).
Priority:	High
Issue/Background:	Summit County began the FEMA map modernization process in fall 2007 and preliminary DFIRMs are expected in fall 2008. The scheduled effective DFIRM date is fall 2009.
Ideas for Implementation:	Once the new DFIRMs are reviewed, approved, and effective, Summit County will work with FEMA on changes needed to make the Summit County floodplain regulations compatible and in compliance with NFIP requirements and will adopt new maps.
Responsible Agency:	Summit County Engineering Department
Partners:	Colorado Water Conservation Board, FEMA
Potential Funding:	Summit County
Cost Estimate:	Staff time
Benefits: (Losses Avoided)	• Reduce risk of property damage due to flood
Timeline:	When new DFIRMs are adopted – estimated fall 2009

Mitigation Action: Summit County—8 Geologic Hazard Zones

Jurisdiction: Summit County

Action Title: Identify and map geologic hazard zones and incorporate into master planning.

Priority: Medium

Issue/Background: The County needs better mapping and analysis of geologic hazard areas to improve land use planning for these areas.

Ideas for Implementation:

- Identify geologic hazard risk categories and determine those most likely to affect developed areas of Summit County; prioritize mapping/planning efforts based on this analysis.
- Explore availability of updated geologic mapping from publicly available sources (U.S. Geological Survey; U.S. Forest Service, Colorado Geological Survey) and determine suitability for master plan level overlay.
- If necessary, develop requirements and develop new geologic hazard mapping to support master plan development.
- Determine strategies for incorporating geologic hazard overlays into Summit County Master Plan.

Responsible Agency: Summit County Information Systems (GIS); Summit County Planning Department; Summit County Building Inspection Department

Partners: U.S. Geological Survey; Colorado Geological Survey; Colorado Department of Transportation; Municipal and Special District Governments

Potential Funding: Colorado Department of Local Affairs, FEMA Hazard Mitigation Grant Program and Pre-Disaster Mitigation Program

Cost Estimate: In 2002, Summit County requested $50,000 in grant funding from the Colorado Department of Local Affairs. It is not known whether any work has been done since that time that may reduce the project scope. It is expected that project costs may be in the $75,000-$100,000 range.

Benefits: (Losses Avoided)

- Reduce geologic hazard risk to new development

Timeline: Dependent upon funding cycles – within next 5 years.

Mitigation Action: Summit County—9 Incorporation into Master Plans

Jurisdiction: Summit County

Action Title: Incorporate information from the multi-hazard mitigation plan into community master plans.

Priority: Medium

Issue/Background: This action will help implement the plan's overall mitigation strategy and fulfill the requirement for incorporating the plan into existing planning mechanisms described in Chapter 5 Plan Implementation and Maintenance.

Ideas for Implementation: During the updates for each of the five master plans in Summit County, the mitigation plan will be reviewed and incorporated into appropriate sections. Each of the master plans is updated every three to five years. This may involve a review of the mitigation plan's risk assessment to incorporate appropriate data and analysis and a review of common goals and objectives between the plans.

This action will be incorporated into staff work plans.

Responsible Agency: Summit County Planning Department

Partners: Summit County Office of Emergency Management

Potential Funding: Summit County

Cost Estimate: Staff time

Benefits: (Losses Avoided)

- Incorporation of mitigation plan into existing planning mechanisms
- Improve coordination and communication

Timeline: Dependent upon funding cycles

Mitigation Action: Summit County—10 Roadside Ditch Erosion

Jurisdiction:	Summit County
Action Title:	Develop protection plan for roadside ditches to reduce erosion and flooding.
Priority:	Medium
Ideas for Implementation:	Where practical, divert roadside drainage to natural drainage ways to minimize flow in the roadside ditches and reduce the loss of road and shoulder materials.
Responsible Agency:	Summit County Road and Bridge Department
Partners:	
Potential Funding:	Summit County
Cost Estimate:	Unknown but will be part of the annual maintenance budget
Benefits: (Losses Avoided)	• Reduce damage due to erosion and flooding • Maintain safe roads
Timeline:	An ongoing maintenance issue

Mitigation Action: Summit County—11 Snake River Wastewater Treatment Plant Flood Protection

Jurisdiction:	Summit County
Action Title:	Enhance flood protection of the Snake River's collection system to prevent potential sanitary sewer overflows or inundation of critical facilities.
Priority:	Low
Issue/Background:	Manhole lids, specifically those with large lifting holes, in low lying areas are more prone to flooding and water inflow through these holes. This can cause sanitary sewer overflows and damage critical facilities.
Ideas for Implementation:	Replace these with manhole lids with no such openings or holes.
Responsible Agency:	Summit County, Snake River Wastewater Treatment Plant
Partners:	
Potential Funding:	Summit County
Cost Estimate:	$1,000 total. Replacement cost for each manhole lid is approximately $100 times 10 manhole lids.
Benefits: (Losses Avoided)	Reduce the potential for sanitary sewer overflows into the watershed and reduce the chance of impacting critical facilities and avoiding any type of emergency bypass.
Timeline:	Complete in 2008.

Mitigation Action: Summit County—12 North Fork River Estates Lift Station

Jurisdiction:	Summit County
Action Title:	Remove the North Fork River Estates lift station and replace it with a gravity sewer line system.
Priority:	Low
Issue/Background:	The Snake River Wastewater Treatment Plant is working towards the elimination of many of its lift stations to reduce the chances of sanitary sewer overflows at these locations.
Ideas for Implementation:	Replace the lift station with a gravity fed sewer line.
Responsible Agency:	Summit County, Snake River Wastewater Treatment Plant
Partners:	North Fork River Estates
Potential Funding:	Snake River Sewer Fund, FEMA Hazard Mitigation Grant Program
Cost Estimate:	$225,000 to remove the existing lift station and to upgrade to an all gravity sewer system.
Benefits: (Losses Avoided)	• Reduce damages due to flooding • Reduce potential sanitary sewer overflows into the North Fork of the Snake River, thus avoiding stream degradation and other environmental concerns.
Timeline:	Remove lift station and install new gravity lines prior to the winter of 2010.

Mitigation Action: Summit County—13 NFIP Public Information

Jurisdiction:	Summit County
Action Title:	Improve education and information on the National Flood Insurance Program (NFIP) and flood hazard areas in Summit County.
Priority:	Low
Issue/Background:	The Summit County website currently does not provide specific information on floodplain areas and special regulations in the County or the National Flood Insurance Program.
Ideas for Implementation:	Expand the Engineering Department website to include links to the new digital flood insurance rate maps (DFIRMs); local, state, and federal contacts; links to floodproofing methods; and minimum requirements for building in a floodplain.
Responsible Agency:	Summit County Engineering
Partners:	Summit County Information Services and GIS departments
Potential Funding:	Summit County
Cost Estimate:	Staff time
Benefits: (Losses Avoided)	Improve public awareness of flood risks and mitigation measures. Better public information reduces phone calls and improves the questions that need answers.
Timeline:	After the DFIRMs become available, but by 2011

Mitigation Action: Summit County—14 Community Rating System

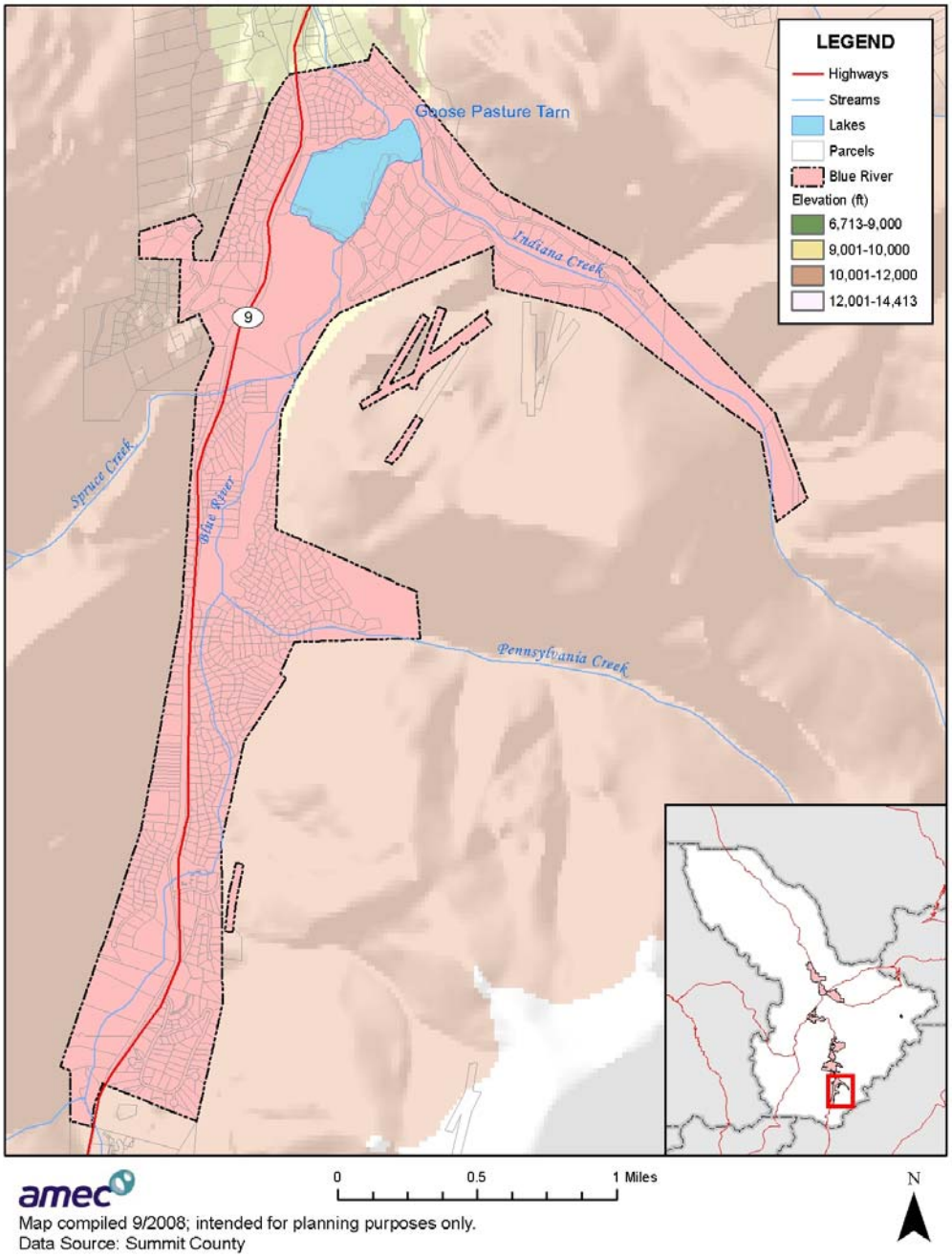
Jurisdiction:	Summit County
Action Title:	Consider joining the Community Rating System (CRS).
Priority:	Low
Issue/Background	Summit County already has several policies in place that go beyond minimum National Flood Insurance Program requirements. By getting points for these activities through the CRS, the County could reduce flood insurance premiums for policyholders in unincorporated areas.
Ideas for Implementation:	Review the requirements to be in CRS and do a cost benefit analysis to determine if it is worth the effort.
Responsible Agency:	Summit County Engineering Department
Partners:	Summit County Office of Emergency Management, FEMA
Potential Funding:	Summit County
Cost Estimate:	Staff time
Benefits: (Losses Avoided)	Reduced flood insurance premiums for policyholders in unincorporated areas of the County
Timeline:	After DFIRMs are effective, estimated 2010.

ANNEX B: TOWN OF BLUE RIVER

B.1 Community Profile

Figure B.1 shows a map of the Town of Blue River and its location within Summit County.

Figure B.1. Map of Blue River



Geography

According to the U.S. Census Bureau, the Town of Blue River has a total area of 2.3 square miles. It is located along the Blue River approximately four miles south of the Town of Breckenridge at an elevation of 10,020 feet above sea level. Indiana Creek, Spruce Creek, and Pennsylvania Creeks are all tributaries that flow into the Blue River within Town.

Population

The estimated 2006 population of Blue River was 752. Select U.S. Census 2000 demographic and social characteristics for Blue River are shown in Table B.1.

Table B.1. Blue River—Demographic and Social Characteristics

Characteristic	
Gender/Age	
Male (%)	55
Female (%)	45
Under 5 Years (%)	5.3
65 Years and Over (%)	2.6
Race/Ethnicity (one race)	
White (%)	98.4
Hispanic or Latino (Of Any Race) (%)	2.0
Other	
Average Household Size	2.56
High School Graduate or Higher (%)	98.3

Source: U.S. Census Bureau, 2000, www.census.gov/

Economy

The Town of Blue River is a residential community with little industry or commercial business. According to the 2000 U.S. Census, the industries that employed the highest percentages of Blue River's labor force were arts, entertainment, recreation, accommodation, and food services (26.4%); retail trade (14.2%); construction (13.7%); finance, insurance, real estate, and rental and leasing (13.7%); and professional, scientific, management, administrative, and waste management services (12.1%). Select economic characteristics for Blue River from the 2000 U.S. Census are shown in Table B.2.

Table B.2. Blue River—Economic Characteristics

Characteristic	
Families below Poverty Level, 1999	4
Individuals below Poverty Level, 1999	45
Median Home Value	$337,000
Median Household Income, 1999	$61,964
Per Capita Income, 1999	$28,411
Population in Labor Force	382

Source: U.S. Census Bureau (2000), www.census.gov/

B.2 Hazard Identification and Profiles

Blue River's planning team identified the hazards that affect the community and summarized their geographic location, probability of future occurrence, potential magnitude or severity, and planning significance specific to the Town (see Table B.3). In the context of the countywide planning area, there are no hazards that are unique to Blue River.

Table B.3. Blue River—Hazard Summary

Hazard Type	Geographic Extent*	Probability*	Magnitude*	Hazard Rating
Avalanche	Isolated	Unlikely	Limited	Low
Dam Failure	Small	Unlikely	Critical	Moderate
Drought	Large	Occasional	Limited	Low
Earthquake	Large	Unlikely	Limited	Low
Erosion/Deposition	Small	Likely	Critical	Moderate
Flood	Small	Occasional	Limited	Moderate
Hazardous Materials Release (Transportation)	Isolated	Unlikely	Limited	Low
Landslide, Mudflow/Debris Flow, and Rock Fall	Small	Occasional	Limited	Low
Lightning	Large	Likely	Limited	Low
Mountain Pine Beetle Infestation	Small	Highly Likely	Limited	Moderate
Severe Winter Weather	Large	Highly Likely	Critical	High
Wildfire	Large	Likely	Critical	High
Windstorm	Large	Likely	Limited	Low

*See Section 3.2 for definitions of these factors

Information on past events for each hazard can be found in Section 3.2 Hazard Profiles of the main plan.

B.3 Vulnerability Assessment

The intent of this section is to assess Blue River's vulnerability separate from that of the planning area as a whole, which has already been assessed in Section 3.3 Vulnerability

Assessment in the main plan. This vulnerability assessment analyzes the population, property, and other assets at risk to hazards ranked of moderate or high significance that may vary from other parts of the planning area. For more information about how hazards affect the County as a whole, see Chapter 3 Risk Assessment in the main plan.

Community Asset Inventory

Table B.4 shows the total population, number of structures, and assessed value of improvements to parcels in Blue River. Land values have been purposely excluded because land remains following disasters, and subsequent market devaluations are frequently short-term and difficult to quantify. Additionally, state and federal disaster assistance programs generally do not address loss of land or its associated value.

Table B.4. Blue River—Maximum Population and Building Exposure

2006 Population Estimate	Number of Structures	Structure Value ($)*
752	550	136,378,000

Sources: HAZUS-MH MR 3 (2007) (structures); Colorado Division of Local Government State Demography Office, www.dola.colorado.gov/dlg/demog/pop_cnty.html
*Value represents "improved structure value" and includes contents

Blue River's planning team identified no community assets. The locations of critical facilities in Blue River identified by Summit County GIS are illustrated in Figure B.2.

Vulnerability by Hazard

This section analyzes existing and future structures and other assets at risk to hazards ranked of medium or high significance that vary from the risks facing the entire planning area and estimates potential losses. These hazards include dam failure; flood; and wildfire.

Dam Failure

Existing Development

The Goose Pasture Tarn is located on the Blue River on the north end of Town and has a maximum storage capacity of approximately 2,000 cubic feet. There is no data available to indicate any likelihood of failure, nor is there an inundation map available. Therefore, structures and potential loss estimates in these areas could not be calculated. There are parcels located within the Town of Blue River downstream of the dam. The dam does have a high hazard ranking indicating that loss of life is likely to result from its failure. An emergency action plan has been completed.

Future Development

A dam failure would likely result in impacts greater than the 100-year flood event modeled by HAZUS in the analysis below. The Town should consider the dam failure hazard when permitting development downstream of the dam.

Flood

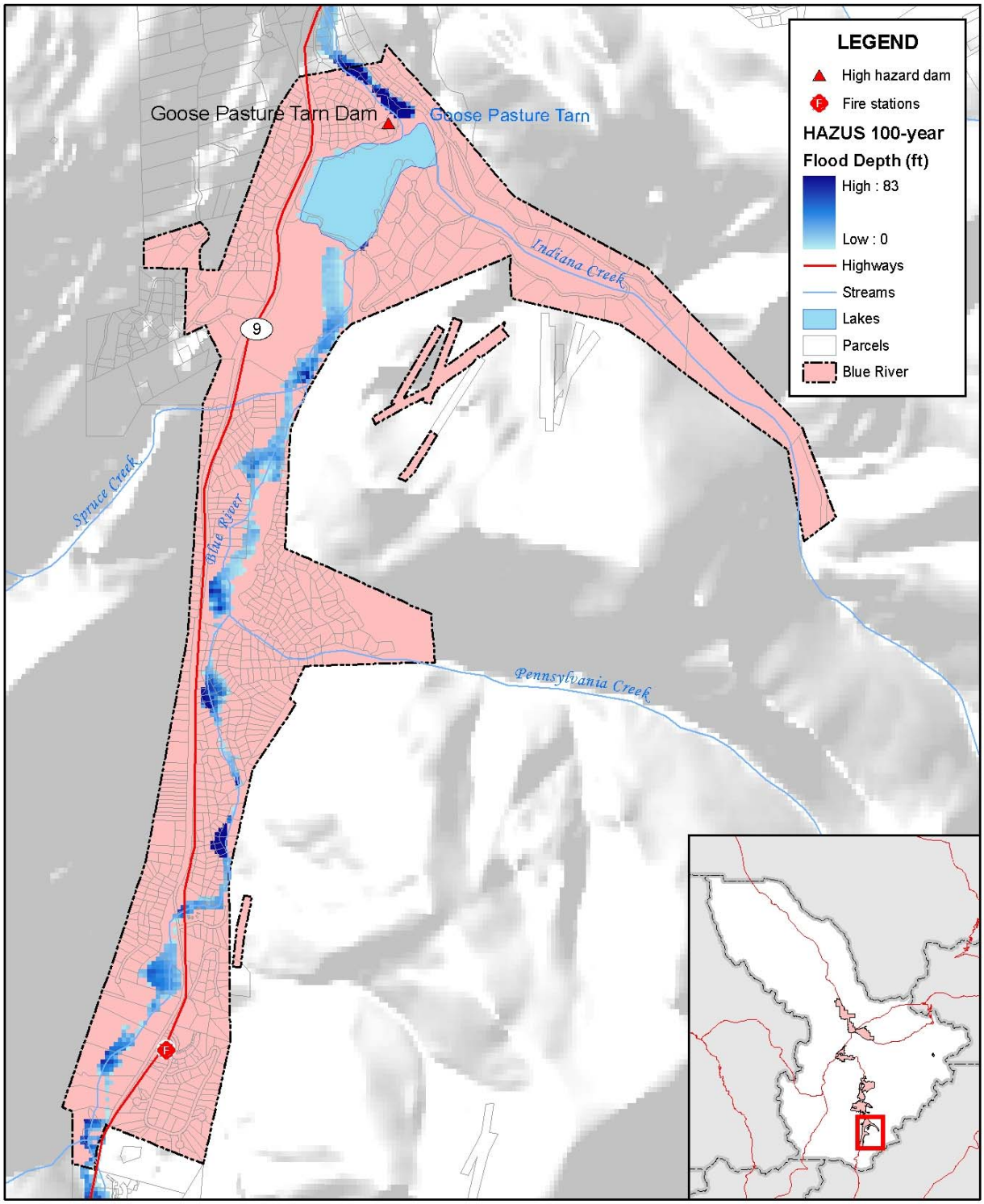
Existing Development

The Goose Pasture Tarn reduces the peak discharge of the Blue River due to rainfall but the effect is only marginal for runoff due to snowmelt, which is normally the major cause of peak flows. Other reservoirs provide only incidental flood protection (FEMA, 2001).

The Town does not have a flood insurance rate map. HAZUS-MH MR3, FEMA's loss estimation software, was used to generate a one percent annual flood, or 100-year flood, event in the Town of Blue River. The software produces a flood polygon and flood-depth grid that represents the 100-year flood. While not as accurate as official flood maps, such as digital flood insurance rate maps, these floodplain boundaries are for use in GIS-based loss estimation.

Figure B.2 shows the HAZUS-generated 100-year floodplain.

Figure B.2. HAZUS 100-Year Floodplain and Critical Facilities in Blue River



Map compiled 9/2008; intended for planning purposes only.
Data Source: Summit County, HAZUS-MH MR3

HAZUS estimates the number of persons displaced, persons requiring sheltering, buildings impacted, building repair costs, and the associated loss of building contents and business inventory as a result of a 100-year flood event in Blue River. The software estimates 54 people would be displaced and 13 would require short-term sheltering.

Building related losses are calculated by HAZUS using a methodology based on the building damage estimates. Flood damage is directly related to the depth of flooding. For example, a two-foot flood generally results in about 20 percent damage to the structure (which translates to 20 percent of the structure's replacement value). HAZUS uses depth damage curves to estimate building losses as the flood depth varies across the inundation area. More information on the methodology for this loss estimation can be found in the Section 3.3 Vulnerability Assessment in the main plan.

Building related losses are shown in Table B.5, which indicates a total loss of over $3 million. More information on the methodology for this loss estimation can be found in the Section 3.3 Vulnerability Assessment in the main plan.

There are no critical facilities located in the floodplain.

Table B.5. HAZUS 100-Year Flood Estimated Building Losses

Building Damage Cost ($)	Contents Damage Cost ($)	Inventory Loss ($)	Relocation Loss ($)	Capital Related Loss ($)	Wages Loss ($)	Rental Income Loss ($)	Total Loss ($)
1,958,000	1,323,000	19,000	4,000	0	3,000	1,000	3,308,000

Source: HAZUS-MH MR3 (2007)

National Flood Insurance Program

The Town of Blue River has not been mapped by FEMA and is not a participant in the National Flood Insurance Program.

Future Development

Blue River does not have a floodplain ordinance. The building regulations do allow the Town to require that new construction meet certain drainage requirements at its discretion.

Wildfire

Existing Development

A wildfire threat ranking was developed for the Summit County Community Wildfire Protection Plan by the County, fire protection districts, and U.S. Forest Service. It is based on fuel hazards, risk of wildfire occurrence, essential infrastructure at risk, community values at risk, and local preparedness and firefighting capability and classifies the wildfire threat as low, medium, high, and extreme. The wildfire threat GIS layer was used to determine the number of acres in each wildfire threat zone and map the wildfire threat in Blue River (see Table B.6 and Figure B.3).

Table B.6. Blue River—Acreage in Wildfire Threat Zones

Low		Medium		High		Extreme		
Acres	%Total	Acres	%Total	Acres	%Total	Acres	%Total	Total Acres
805	56%	632	44%	9	1%		0%	1,445

Source: Summit County

Based on the methodology described for wildfire in Section 3.3.3 Vulnerability by Hazard, the property values in Blue River were separated into wildfire threat zones. The breakdown of property values by wildfire threat zone is shown in Table B.7.

Table B.7. Blue River—Property Values in Wildfire Threat Zones

Threat Zone	Land Value ($)	Improved Value ($)	Total Value ($)
Low	101,179,867	154,422,265	255,602,132
Medium	60,543,564	106,855,191	167,398,755
High	494,321	914,102	1,408,423
Extreme	-	-	-
Totals	**162,217,752**	**262,191,558**	**424,409,310**

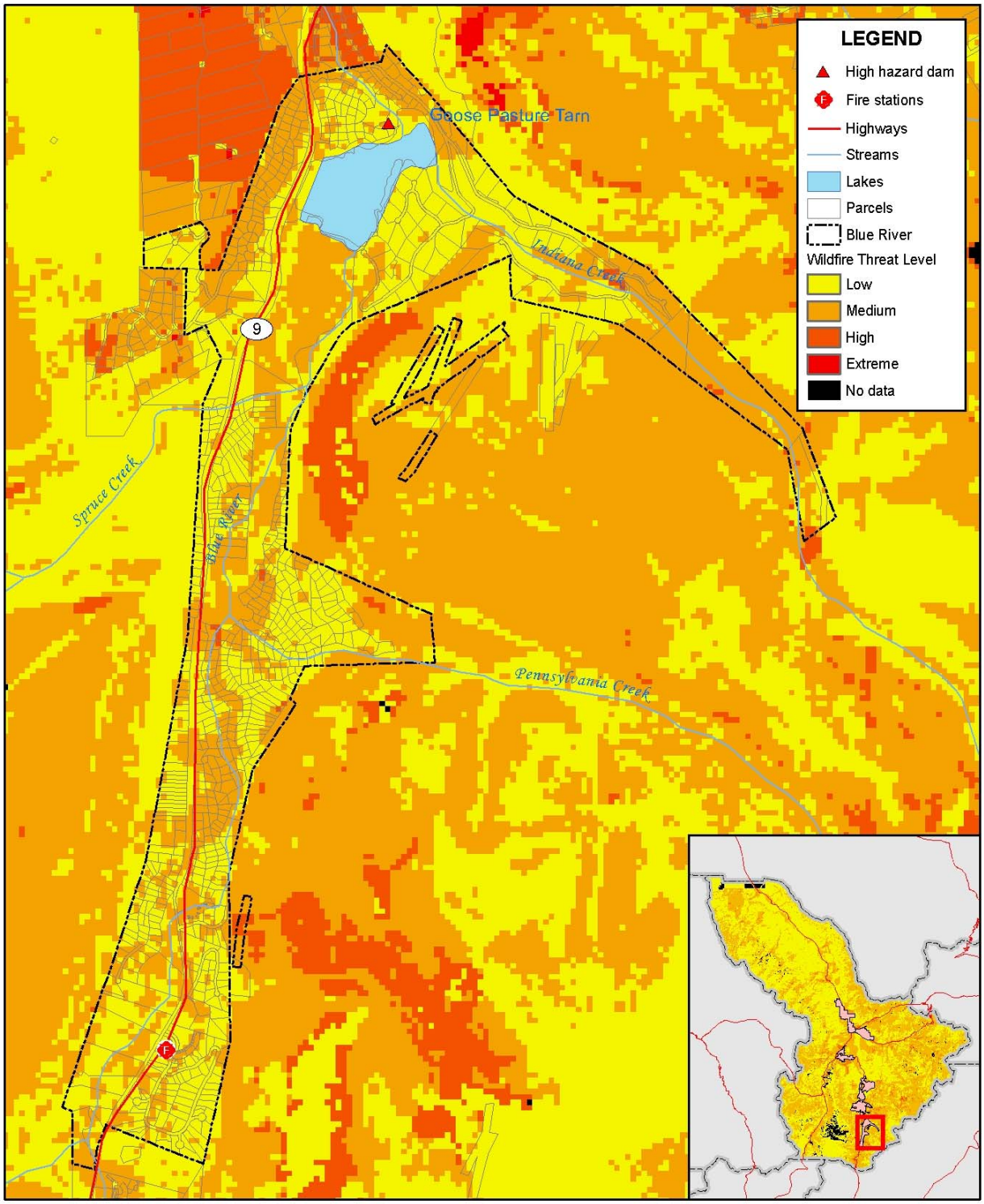
Source: Summit County.
Note: The total values in this table conflict with values in Table C.4 Maximum Population and Building Exposure, because those value were generated using HAZUS and these are generated from the Summit County Assessor's Data.

There are no critical facilities located in high or extreme wildfire threat areas in Blue River.

Future Development

New construction in Blue River must meet defensible space regulations, which is included in the Town's code.

Figure B.3. Wildfire Threat and Critical Facilities in Blue River



amec

Map compiled 9/2008; intended for planning purposes only.
Data Source: Summit County, HAZUS-MH MR3

Growth and Development Trends

Table B.8 illustrates how Blue River has grown in terms of population and number of housing units between 2000 and 2006.

Table B.8. Blue River—Change in Population and Housing Units, 2000-2006

2000 Population	2006 Population Estimate	Estimated Percent Change 2000-2006	2000 # of Housing Units	2006 Estimated # of Housing Units	Estimated Percent Change 2000-2006
685	752	+9.8	563	619	+9.9

Source: Colorado Division of Local Government State Demography Office, www.dola.colorado.gov/dlg/demog/

B.4 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. The capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, and mitigation outreach and partnerships.

Regulatory Mitigation Capabilities

Table B.9 lists planning and land management tools typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in Blue River.

Table B.9. Blue River—Regulatory Mitigation Capabilities

Regulatory Tool (Ordinances, Codes, Plans)	Yes/No	Comments
Master Plan	No	
Zoning Ordinance	Yes	
Subdivision Ordinance	No	
Growth Management Ordinance	No	County has transferable density rights system
Floodplain Ordinance	No	
Other Special Purpose Ordinance	Yes	Wildfire mitigation standards
Building Code	Yes	Version: Uniform Building Code
Fire Department ISO Rating	Yes	Rating: 9
Erosion or Sediment Control Program	Yes	
Stormwater Management Program	No	
Site Plan Review Requirements	Yes	
Capital Improvements Plan	No	
Economic Development Plan	No	
Local Emergency Operations Plan	No	Incorporated in Summit County Emergency Operations Plan
Other Special Plans	No	
Flood Insurance Study or Other Engineering Study for Streams	No	

Town of Blue River Ordinances

Chapter 7 Health, Sanitation, and Animals

The purpose of Division II Forest Management of Article V Trees is to preserve the rural mountain character of the Town by minimizing the removal of live trees while protecting the life and property of the residents of the Town by establishing minimum wildfire mitigation standards. These include defensible space regulations for new construction.

Chapter 18 Building Regulations

Prior to the issuance of a certificate of occupancy, any person who builds or erects any structure must contact the Town by calling or writing the building inspector to obtain approval for issuance of the certificate of occupancy. Approvals of the septic/sewer authority, the fire protection district, the Architectural Review Board, and homeowners' association may be required. Approval may, at the Town's sole discretion, require completion of the following improvements:

- Installation of culverts
- Grading or regrading any disturbed or damaged roads or driveways or other areas necessary for proper drainage
- All runoff created by or redirected by the construction, erection and landscaping of the structure on the property shall be treated, contained, and controlled so that there are no increases in runoff or other drainage consequences resulting from said construction, erection, and landscaping

Administrative/Technical Mitigation Capabilities

Table B.10 identifies the personnel responsible for activities related to mitigation and loss prevention in Blue River.

Table B.10. Blue River—Administrative and Technical Mitigation Capabilities

Personnel Resources	Yes/No	Department/Position	Comments
Planner/Engineer with Knowledge of Land Development/Land Management Practices	No		
Engineer/Professional Trained in Construction Practices Related to Buildings and/or Infrastructure	Yes	Building Inspector	This is not a town employee but a contract position.
Planner/Engineer/Scientist with an Understanding of Natural Hazards	No		
Personnel Skilled in GIS	No		
Full Time Building Official	Yes	Building Inspector	This is not a town employee but a contract position.
Floodplain Manager	No		
Emergency Manager	No		Summit County Emergency Manager
Grant Writer	No		
Other Personnel	Yes	Town Clerk	
Warning Systems/Services	Yes		Reverse 911

Fiscal Mitigation Capabilities

Table B.11 identifies financial tools or resources that Blue River could potentially use to help fund mitigation activities.

Table B.11. Blue River—Fiscal Mitigation Capabilities

Financial Resources	Accessible/Eligible to Use (Yes/No)
Community Development Block Grants	No
Capital Improvements Project Funding	No
Authority to Levy Taxes for Specific Purposes	No
Fees for Water, Sewer, Gas, or Electric Services	No
Impact Fees for New Development	No
Incur Debt through General Obligation Bonds	No
Incur Debt through Special Tax Bonds	No
Incur Debt through Private Activities	No
Withhold Spending in Hazard Prone Areas	No

Mitigation Outreach and Partnerships

In 2007 and 2008, Blue River partnered with the Red, White, and Blue Fire Protection District to implement defensible space projects for property owners to reduce wildfire risk. The Town plans to continue this program in the future.

B.5 Mitigation Goals and Objectives

Blue River adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 4 Mitigation Strategy.

B.6 Mitigation Actions

The planning team for Blue River identified and prioritized the following mitigation actions based on the risk assessment. Background information on how each action will be implemented and administered, such as ideas for implementation, responsible agency, potential funding, estimated cost, and timeline also are included.

Mitigation Action: Blue River—1 Culvert and Bridge Replacement

Jurisdiction:	Town of Blue River
Action Title:	Replace collapsing culverts and rebuild bridge over the Blue River on Blue River Road.
Priority:	High
Responsible Agency:	Town of Blue River.
Partners:	Summit County
Potential Funding:	Town of Blue River, FEMA Hazard Mitigation Grant Program and Pre-Disaster Mitigation Grant Program
Cost Estimate:	$300,000
Benefits: **(Losses Avoided)**	• Protect public health and safety • Reduce damage due to flooding • Prevent bridge collapse • Improve evacuation routes
Timeline:	Next five years

Mitigation Action: Blue River—2 Defensible Space Program

Jurisdiction:	Town of Blue River
Action Title:	Continue homeowner defensible space program begun in 2007
Priority:	Medium
Background/Issue:	Mountain pine beetle has killed many trees in town increasing the wildfire danger. As we are told by the fire district, it is not if, but when a wildfire will break out. The Town of Blue River has embarked on a defensible space program to help with fire mitigation. We have had the program in place for 2007 and 2008. We also now have hydrants in the Town.
Ideas for Implementation:	Encourage homeowners and property owners to clear a 30-foot defensible space around their homes through education and rebates. Seek funding to continue this program each year.
Responsible Agency:	Town of Blue River.
Partners:	Red, White, and Blue Fire Protection District
Potential Funding:	Town of Blue River, grant from Red, White, and Blue Fire Protection District, FEMA Hazard Mitigation Grant Program and Pre-Disaster Mitigation Grant Program
Cost Estimate:	We have budgeted (the Town) $15,000 with a matching grant from Red, White and Blue Fire Protection District for $15,000.
Benefits: (Losses Avoided)	• Help residents' take responsibility for mitigation of their homes • Reduce potential loss of life and structures
Timeline:	Ongoing. Every year as budget permits.

Mitigation Action: Blue River—3 Regrade Spruce Creek Road

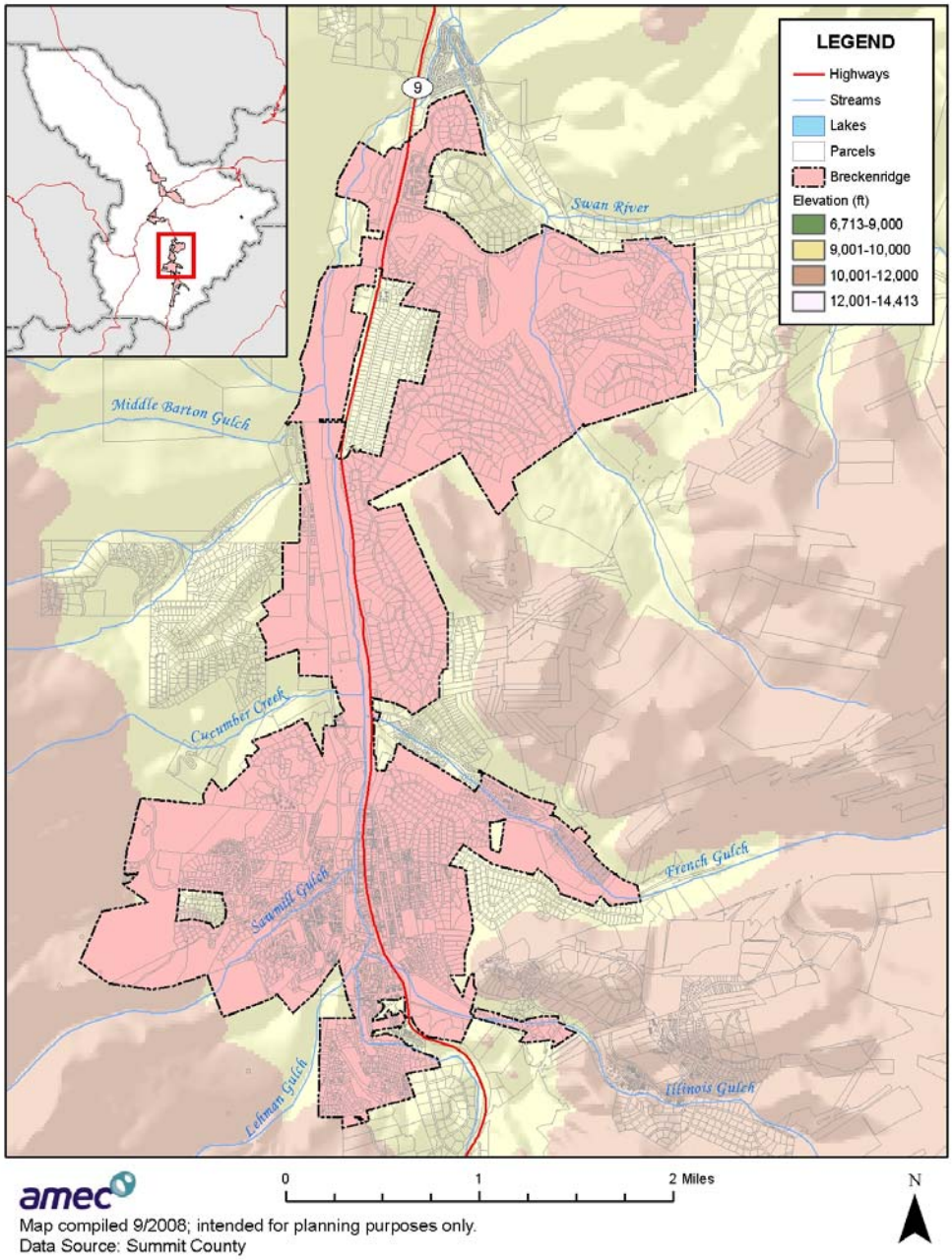
Jurisdiction:	Town of Blue River
Action Title:	Re-grade Spruce Creek Road to allow safe automobile passage to homes and national forest trails
Priority:	Low
Background/Issue:	The current road is being washed away. Complete re-engineering is required to bring it up to a safe standard. This is a major thoroughfare into the National Forest and is heavily used. If the Town deems it unsafe and we cannot get it repaired we will have to close the road for safety reasons.
Ideas for Implementation:	We have approached the county for assistance since our Town road connects with the County and on to the National Forest.
Responsible Agency:	Town of Blue River.
Partners:	Summit County
Potential Funding:	
Cost Estimate:	It has been estimated at $1,000,000 to reconstruct the road.
Benefits: (Losses Avoided)	• Ensure safety of road for residents and visitors to the national forest. • Avoid closing the road.
Timeline:	Establish agreement with County and begin when the Town has the funds.

ANNEX C: TOWN OF BRECKENRIDGE

C.1 Community Profile

Figure C.1 shows a map of the Town of Breckenridge and its location within Summit County.

Figure C.1. Map of Breckenridge



Geography

The Town of Breckenridge encompasses approximately 3,700 acres of land, ranging in elevation from 9,017 to 14,265 feet and including a portion of the Continental Divide. The Blue River flows northerly through Breckenridge along the valley floor. It has a steep narrow channel with a slope of approximately 108 feet per mile from the Goose Pasture Tarn to the Dillon Reservoir and an average width of about 30 feet. Breckenridge is surrounded by three mountain ranges: the Ten Mile Range to the west, Bald Mountain and the Front Range on the east, and Hoosier Pass and the Mosquito Range on the south. Annual precipitation exceeds 30 inches in the higher elevations and includes over 300 inches of annual snowfall.

Population

The population of Breckenridge fluctuates throughout the year because of the resort nature of the community. Thus, the population of Breckenridge has two important components: permanent and peak. The permanent population is the number of people who reside in the town on a year-round basis and was estimated at 3,439 in 2006. Peak population is the total number of people who are in the town at one time, including residents, second homeowners, day visitors, along with an assumed 100 percent occupancy of all lodging units. Peak population in 2006 was estimated at 37,893. According to the Town's master plan, the months with the largest peak populations are December through March, with a summer spike in July.

Data collected through employer surveys indicated that there were about 3,700 winter seasonal employees and 2,400 summer seasonal employees in 2006. However, this segment of the population is not well-documented or understood.

Select U.S. Census 2000 demographic and social characteristics for Breckenridge's "permanent" population are shown in Table C.1.

Table C.1. Breckenridge—Demographic and Social Characteristics

Characteristic	
Gender/Age	
Male (%)	61.7
Female (%)	38.3
Under 5 Years (%)	3.0
65 Years and Over (%)	2.1
Race/Ethnicity (one race)	
White (%)	95.6
Hispanic or Latino (Of Any Race) (%)	5.4
Other	
Average Household Size	2.16
High School Graduate or Higher (%)	96.9

Source: U.S. Census Bureau, 2000, www.census.gov/

History

Long before white settlers from the east crossed the Continental Divide, Breckenridge was part of the summer hunting grounds of the nomadic White River and Middle Park Ute Native Americans. The Town of Breckenridge was born out of the mid-nineteenth century gold rush and formally created in November 1859.

In the fall of 1861, the Town secured the Denver, Bradford, and Blue River Road Wagon Company connection, which gave lifeblood to the little gold mining community. Breckenridge was established as the permanent county seat of Summit County. However, by the mid-1860s there was a drop in the Breckenridge population due to both the Civil War and the increasing difficulty in locating free, accessible gold. Many businessmen and merchants moved on to other boomtowns.

The late-1860s saw the introduction of large-scale hydraulic placer mining and Breckenridge was once again busy with mining endeavors. By 1879, Breckenridge was an important hard-rock mining location and prominent supply center. The discovery of rich silver deposits and lead carbonates in the hillsides nearby put the Breckenridge mining district on the map, and the community was formally incorporated in 1880.

Breckenridge remained a prosperous frontier mining town for many years, but by the turn of the century, the local mining technology had shifted primarily to dredge mining, which employed relatively few people. The population and economy continued to decline during the Great Depression. The last gold dredge shut down in 1942 as resources shifted to the war effort associated with World War II.

In 1961, the Breckenridge Ski Area opened and breathed new life into the Town, drawing new visitors to discover and settle in Breckenridge. To this day, the “recreation” rush to Breckenridge continues.

Economy

Mining activity was the primary economic force from the time Breckenridge was founded in 1859 until the early 1940s. The 1960s marked the beginning of a new era for Breckenridge, as recreation became the principal economic and population generator. Specifically, in 1961 the Breckenridge Ski Area was established, creating an enormous increase in the job market. The completion of I-70, the Eisenhower Tunnel, and Dillon Reservoir further enhanced the area’s attractiveness and continued the drive towards a tourism-based economy.

In addition to the tourism economy, the second-home building market has been a major contributor to the local economy. The second-home building market not only creates numerous jobs in construction, but also creates the need for a number of jobs that support the construction industry (e.g., material supplies, landscaping services, realtors) and the additional need for retail and service businesses to accommodate the construction workers. In turn, this creates the

demand for more construction to provide housing for the workforce. The second-home and investment property market in Summit County has become an economic driver approaching the level of tourism and may soon overtake winter tourism in economic importance.

According to the 2000 U.S. Census, the industries that employed the highest percentage of Breckenridge's labor force were arts, entertainment, recreation, accommodation, and food services (44.5%); finance, insurance, real estate, and rental and leasing (12.3%); and retail trade (10.1%). Select economic characteristics for Breckenridge from the 2000 Census are shown in Table C.2.

Table C.2. Breckenridge—Economic Characteristics

Characteristic	
Families below Poverty Level, 1999	17
Individuals below Poverty Level, 1999	200
Median Home Value	$580,100
Median Household Income, 1999	$43,938
Per Capita Income, 1999	$29,675
Population in Labor Force	1,939

Source: U.S. Census Bureau (2000), www.census.gov/

C.2 Hazard Identification and Profiles

Breckenridge's planning team identified the hazards that affect the community and summarized their geographic location, probability of future occurrence, potential magnitude or severity, and planning significance specific to the Town (see Table C.3). In the context of the countywide planning area, there are no hazards that are unique to Breckenridge.

Table C.3. Breckenridge—Hazard Summary

Hazard Type	Geographic Location*	Probability*	Magnitude*	Hazard Rating
Avalanche	Isolated	Unlikely	Limited	Low
Dam Failure	Small	Unlikely	Critical	Moderate
Drought	Large	Occasional	Limited	Moderate
Earthquake	Large	Unlikely	Limited	Low
Erosion/Deposition	Small	Likely	Limited	Low
Flood	Small	Likely	Critical	High
Hazardous Materials Release (Transportation)	Isolated	Unlikely	Critical	Low
Landslide, Mudflow/Debris Flow, Rock Fall	Isolated	Occasional	Limited	Low
Lightning	Large	Likely	Critical	Moderate
Mountain Pine Beetle Infestation	Medium	Highly Likely	Limited	Moderate
Severe Winter Weather	Large	Highly Likely	Critical	High
Wildfire	Large	Likely	Catastrophic	High
Windstorm	Large	Likely	Limited	Low

*See Section 3.2 for definitions of these factors

The likelihood of mud and debris flow is small within the Town limits. There is no historic evidence of large debris flows.

Information on past events for each hazard can be found in Section 3.2 Hazard Profiles in the body of this document.

C.3 Vulnerability Assessment

The intent of this section is to assess Breckenridge's vulnerability separately from that of the planning area as a whole, which has already been addressed in Section 3.3 Vulnerability Assessment. The following vulnerability assessment analyzes the population, property, and other assets at risk to hazards ranked of moderate or high significance that may vary from other parts of the planning area. For more information about how hazards affect the County as a whole, see Chapter 3 Risk Assessment.

Community Asset Inventory

Table C.4 shows the total population, number of structures, and assessed value of improvements to parcels in Breckenridge. Land values have been purposely excluded because land remains following disasters, and subsequent market devaluations are frequently short-term and difficult to quantify. Additionally, state and federal disaster assistance programs generally do not address loss of land or its associated value.

Table C.4. Breckenridge—Maximum Population and Building Exposure

2006 Population Estimate	Number of Structures	Structure Value ($)*
3,439	2,262	1,020,891,000

Source: HAZUS-MH MR 3 (2007) (structures); Colorado Division of Local Government State Demography Office, www.dola.colorado.gov/dlg/demog/pop_cnty.html
*Value represents "improved structure value" and includes contents

Table C.5 lists critical facilities and other community assets identified by Breckenridge's planning team as extremely important to protect in the event of a disaster.

Table C.5. Breckenridge—Critical Facilities and Other Community Assets

Name of Asset	Replacement Value ($)	Occupancy/ Capacity #	Hazard Specific Info/Comments
Breckenridge Town Hall	3,000,000	N/A	Governmental operations for the Town of Breckenridge
Breckenridge Police Department	4,500,000–facility 150,000–equipment	N/A	Public safety (law enforcement) services for the Town of Breckenridge
Red, White, and Blue Fire District	4,000,000–facilities 3,000,000–equipment	N/A	Public safety (fire/EMS) services for the Upper Blue Valley
Carriage House	1,400,000	104	Childcare facility
Little Red Schoolhouse	1,560,000	102	Childcare facility
Timberline Learning Center	3,900,000		Childcare facility
Breckenridge Elementary	10,000,000	310	Public school
Upper Blue Elementary	10,000,000	275	Public school
Transit Centers	950,000	N/A	Public transportation
Water Treatment Facilities	5,800,000	N/A	Provides safe, healthy water for citizens and guests
Water Storage Facilities	9,592,524	N/A	Provides a water supply for citizens and guests
Colorado State Highway 9	–		Main thoroughfare in and out of Breckenridge
Boreas Railroad Station Site	147,000		On Colorado State Register of Historic Properties and National Register of Historic Places
Breckenridge Historic District	660,000		On Colorado State Register of Historic Properties and National Register of Historic Places

Sources: Town of Breckenridge; Directory of Colorado State Register Properties, www.coloradohistory-oahp.org/programareas/register/1503/; National Register Information System, www.nr.nps.gov/

The locations of critical facilities in Breckenridge identified by Summit County GIS are illustrated in Figure C.2 HAZUS 100-Year Floodplain and Critical Facilities in Breckenridge.

A major concern of the Town's planning team is the necessary evacuation of the Town residents on Highway 9 (northbound and southbound) in the event of a disaster or significant emergency. There are two areas that seriously impact the possible speed of any evacuation. One is the development at the base areas of Peaks 7 and 8, which would have to enter into the Town limits before being able to leave the area. The other is the Block 11 planned development on Airport Road in Breckenridge, which consists of more than 400 units.

The Town also needs to further evaluate the seasonal workforce, which is greater than the Town's permanent population, to better understand their impact on the community and what needs to be done to protect them.

Vulnerability by Hazard

This section examines those existing and future structures and other assets at risk to hazards ranked of moderate or high significance that vary from the risks facing the entire planning area and estimates potential losses. These hazards include dam failure, flood, and wildfire.

Dam Failure

Existing Development

The Goose Pasture Tarn is located upstream of Breckenridge and has a maximum storage capacity of approximately 812 acre-feet. The Sawmill Reservoir Dam is also located upstream. Likelihood of failure is based on a dam's inspection rating, which in the case of both of the Breckenridge dams is conditionally satisfactory. An inundation map is included in the most recent emergency action plan dated December 2006, however the inundation maps were not available for this project. Therefore, structures and potential loss estimates in these areas could not be calculated. The Goose Pasture Tarn Dam does have a high hazard ranking indicating that loss of life is likely to result from its failure.

Future Development

There are probably no impacts to future development since the inundation zone is already developed below the Goose Pasture Tarn Dam. For the Sawmill Dam, the inundation zone of the Snowflake and Westridge subdivisions below the dam was excluded from development during the platting phases about 10 to 15 years ago. Below those subdivisions development had already occurred before the inundation mapping was updated in 2006.

Flood

The major drainageway through Breckenridge is the Blue River, which flows through the center of Town. The streambed is straight and rough containing large rocks. The floodplain is largely confined to the channel, but does increase to between 300 to 400 feet in width in the ponds and behind some of the culverts. Most of the floodplain in Breckenridge contains no vegetation but is covered in rocks. The downstream reaches have willow bushes and gravel tailings covering much of the floodplain. Tributaries flowing into the Blue River are steep and shallow (FEMA, 2001).

Flooding in Breckenridge is primarily caused by the overflow of the Blue River, Sawmill Gulch, Illinois Gulch, and Lehman Gulch, which is mostly likely to occur in mid-June due to runoff from snowmelt. According to the 2001 Flood Insurance Study, stream gage records indicate that 97 percent of the annual peak flow in the Blue River basin has been the result of melting winter

snow accumulations. The largest discharge recorded during 64 years of record on the Blue River near Dillon was 1,250 cubic feet per second on June 17, 1965, when a high snowmelt discharge in combination with a high-intensity thunderstorm centered on a tributary above the town. It was calculated as a 50-year flood. Flooding within the town was caused by backwater from blocked culverts and bridges. Many of the culverts have since been replaced. However, if these were to become blocked, flooding could result at major crossings. Some shallow flooding is caused by the culverts backing up and overland flow from gulches (FEMA, 2001).

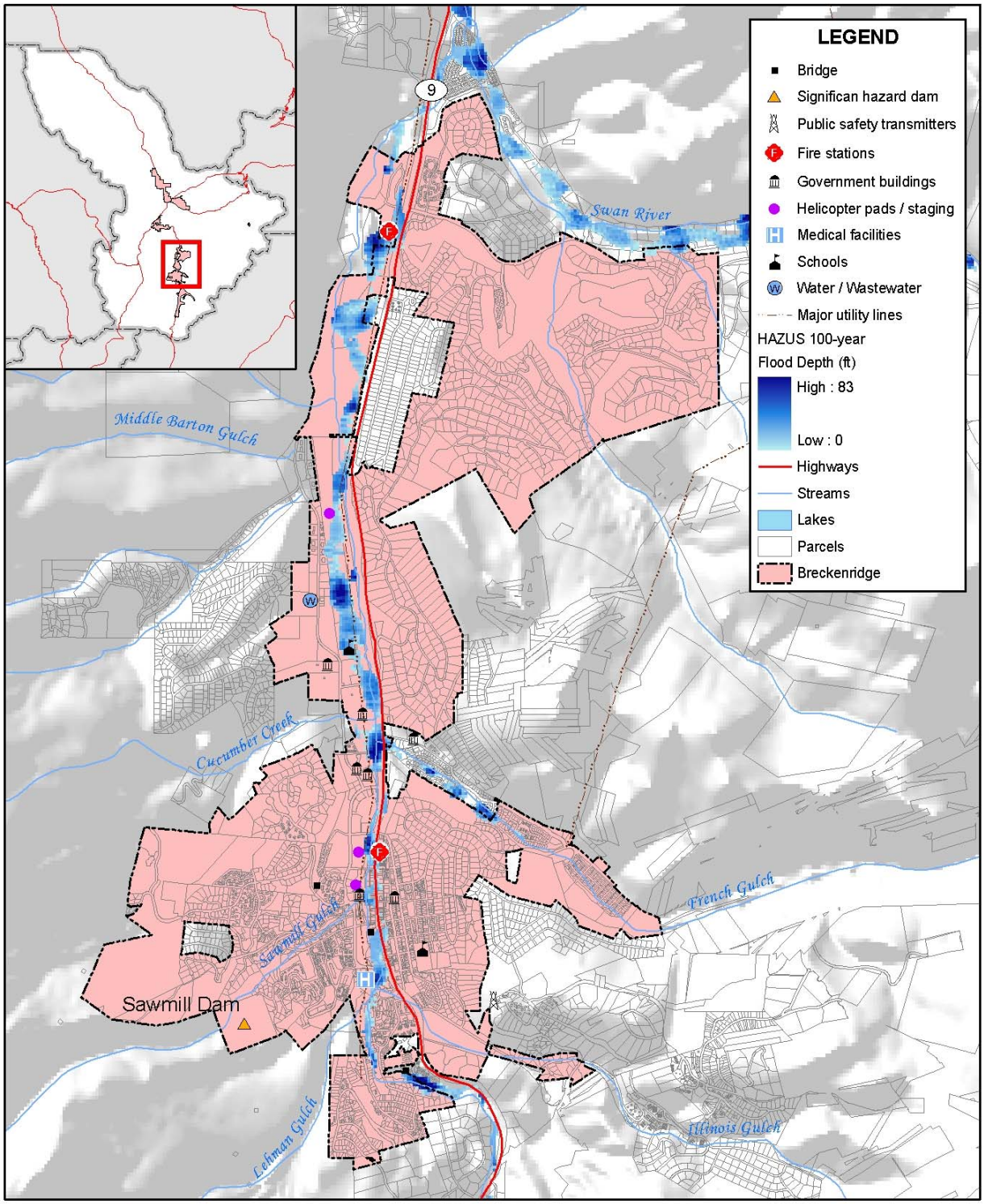
The Goose Pasture Tarn reduces the peak discharge of the Blue River due to rainfall but the effect is only marginal for runoff due to snowmelt, which is normally the major cause of peak flows. Other reservoirs provide only incidental flood protection (FEMA, 2001).

Existing Development

The Town's effective flood insurance rate map is from 2001. The Town is participating with Summit County in FEMA's map modernization program. The process to develop new digital flood insurance rate maps (DFIRMs) began in 2007; updated maps were not available for this planning process.

HAZUS-MH MR3, FEMA's loss estimation software, was used to generate a one percent annual flood, or 100-year flood, event on streams in the Town of Breckenridge. The software produces a flood polygon and flood-depth grid that represents the 100-year flood. While not as accurate as official flood maps, such as digital flood insurance rate maps, these floodplain boundaries are for use in GIS-based loss estimation. Figure C.2 shows the HAZUS-generated 100-year floodplain.

Figure C.2. HAZUS 100-Year Floodplain and Critical Facilities in Breckenridge



amec

0 0.75 1.5 Miles

N

Map compiled 9/2008; intended for planning purposes only.
Data Source: Summit County, HAZUS-MH MR3

HAZUS estimates the number of persons displaced, persons requiring sheltering, buildings impacted, building repair costs, and the associated loss of building contents and business inventory as a result of a 100-year flood event in Breckenridge. The software estimates 166 people would be displaced and 78 would require short-term sheltering. Building related losses are shown in Table C.6, which indicates a total loss of almost $29 million. More information on the methodology for this loss estimation can be found in Section 3.3 Vulnerability Assessment.

Table C.6. Breckenridge—HAZUS 100-Year Flood Estimated Building Losses

Cost Building Damage ($)	Cost Contents Damage ($)	Inventory Loss ($)	Relocation Loss ($)	Capital Related Loss ($)	Wages Loss ($)	Rental Income Loss ($)	Total Loss ($)
9,876,000	17,655,000	590,000	31,000	107,000	560,000	31,000	28,850,000

Source: HAZUS-MH MR3 (2007)

Table C.7 shows critical facilities identified by HAZUS as located in the 100-year floodplain in Breckenridge, which include the Red, White, and Blue Fire Station and the Upper Blue Elementary School. However, only the fire station is currently located in a special flood hazard area on the effective flood insurance rate map, and the Town is in the process of submitting a letter of map revision to remove it.

Table C.7. Breckenridge—HAZUS Critical Facilities in 100-Year Floodplain

Facility Name	Flood Depth (Feet)
Red, White, and Blue Fire Station	1.9
Upper Blue Elementary School	no data

Source: HAZUS-MH (MR 3)

National Flood Insurance Program

Breckenridge joined the National Flood Insurance Program (NFIP) on June 4, 1980. NFIP insurance data indicates that as of February 29, 2008, there were 19 flood insurance policies in force in the County with $5,700,500 of coverage. Of the 19 policies, 12 were residential (8 were single-family homes) and 7 were nonresidential. Eight of the policies were in A zones, and 11 were in B, C, and X zones.

There has been one historical claim for flood losses totaling $28,060. This loss was for a post-FIRM nonresidential property in a B, C or X zone. There were no repetitive or severe repetitive loss structures.

Future Development

The Breckenridge Flood Damage Prevention Ordinance meets minimum NFIP requirements and regulates development in special flood hazard areas. In addition, the Town addresses floodplain management policies in its Master Plan and Development Code (see Regulatory Capabilities section below).

Wildfire

Existing Development

A wildfire threat ranking was developed for the Summit County Community Wildfire Protection Plan by the County, fire protection districts, and U.S. Forest Service. It is based on fuel hazards, risk of wildfire occurrence, essential infrastructure at risk, community values at risk, and local preparedness and firefighting capability and classifies the wildfire threat as low, medium, high, and extreme. The wildfire threat GIS layer was used to determine the number of acres in each wildfire threat zone and map the wildfire threat in Breckenridge (see Table C.8 and Figure C.3).

Table C.8. Breckenridge—Acreage in Wildfire Threat Zones

Low		Medium		High		Extreme		
Acres	%Total	Acres	%Total	Acres	%Total	Acres	%Total	Total Acres
1,805	49	1,775	48	124	3	0.5	0	3,705

Source: Summit County

Based on the methodology described for wildfire in Section 3.3.3 Vulnerability by Hazard, the property values in Breckenridge were separated into wildfire threat zones. The breakdown of property values in Breckenridge by wildfire threat zone is shown in Table C.9.

Table C.9. Breckenridge—Property Values in Wildfire Threat Zones

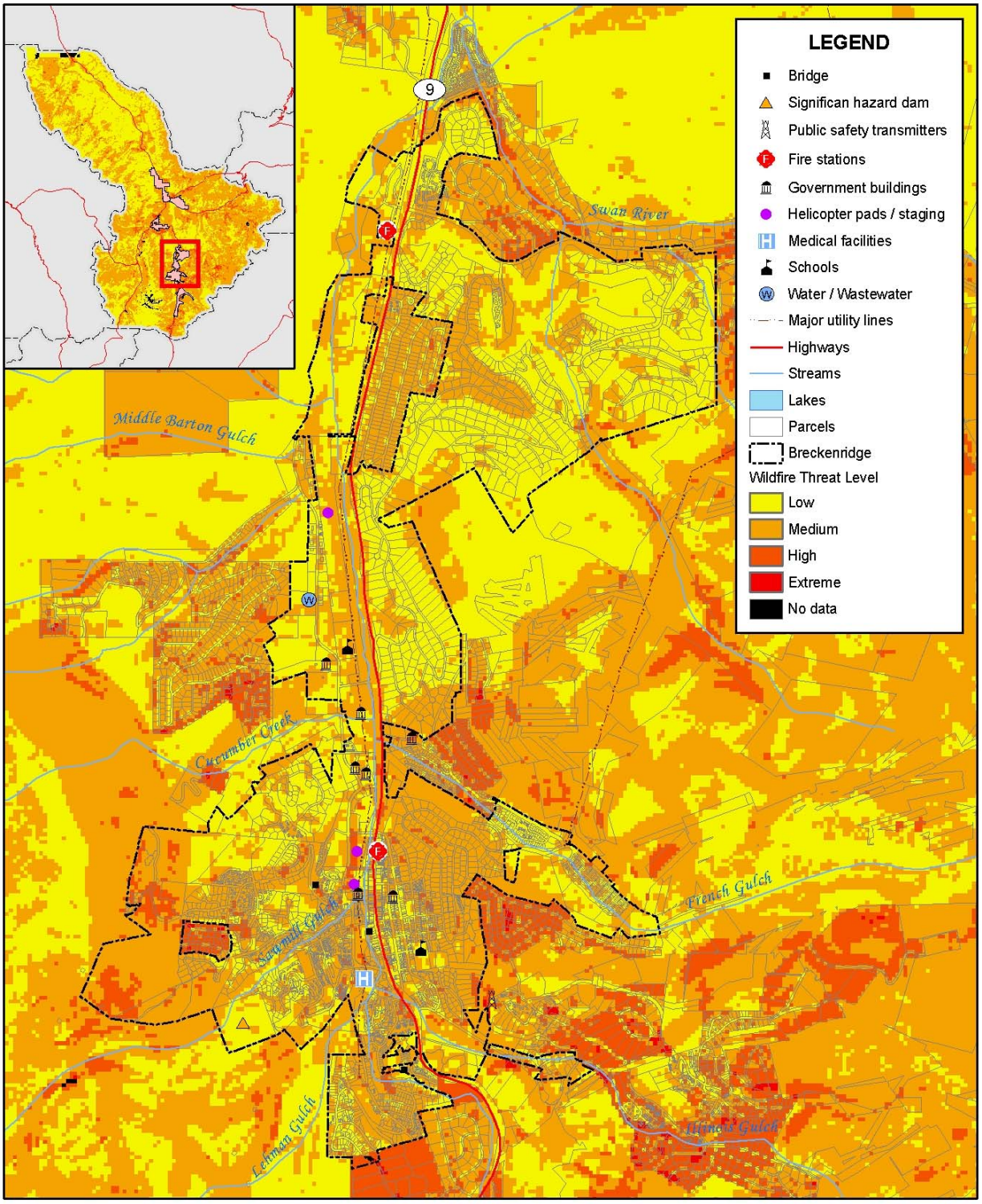
Threat Zone	Land Value ($)	Improved Value ($)	Total Value ($)
Low	446,064,897	955,123,201	1,401,188,098
Medium	537,489,201	1,661,023,586	2,198,512,787
High	39,708,297	84,830,589	124,538,886
Extreme	-	-	-
Totals	**1,023,262,395**	**2,700,977,376**	**3,724,239,771**

Source: Summit County.
Note: The total values in this table conflict with values in Table C.4 Maximum Population and Building Exposure, because those value were generated using HAZUS and these are generated from the Summit County Assessor's Data.

There is one critical facility, a helicopter pad/staging area, in a high wildfire threat zone in Breckenridge. Areas or subdivisions of particular concern are the following:

- Boulder Ridge
- Breckenridge South
- Christie Heights
- Corkscrew Flats
- Goldflake
- Highlands
- Iowa Hill
- Kenington Place
- Shock Hill
- Sunbeam Estates
- Vista Point
- Warriors Mark
- Wellington Neighborhood

Figure C.3. Wildfire Threat and Critical Facilities in Breckenridge



amec

0 1 2 Miles

N

Map compiled 9/2008; intended for planning purposes only.
Data Source: Summit County, HAZUS-MH MR3

Future Development

The Breckenridge Development Code requires that a wildfire plan is prepared and implemented for all areas designated with a "severe" wildfire rating and for all vegetated areas designated with a "hazard intensified due to slope" rating on the map of wildfire hazard and for all vegetated areas in excess of 30 percent slope. These plans must address wildfire prevention, mitigation, and control and shall further incorporate the recommendations contained within *Wildfire Hazards: Guidelines for Their Prevention in Subdivisions and Developments* prepared by the Colorado State Forest Service. The Town requires fuels mitigation for all properties seeking a development permit. Property owners with active development permits are now required to reduce fuels by limbing dead branches up to 10 feet off the ground and removing woody litter off the forest floor.

Growth and Development Trends

Table C.10 illustrates how Breckenridge has grown in terms of population and number of housing units between 2000 and 2006.

Table C.10. Breckenridge—Change in Population and Housing Units, 2000-2006

2000 Population	2006 Population Estimate	Estimated Percent Change 2000-2006	2000 # of Housing Units	2006 Estimated # of Housing Units	Estimated Percent Change 2000-2006
2,408	3,439	+42.8	4,270	6,292	+47.4

Source: Colorado Division of Local Government State Demography Office, www.dola.colorado.gov/dlg/demog/

Part of the growth in recent years can be attributed to the annexation of the Warrior's Mark area in 2002.

The Town's master plan estimates that the maximum build-out of housing units (7,514 excluding lodging and 7 accessory units) will eventually cap the maximum permanent population for the Town, assuming the current policy of approving no new density remains. Based on this build-out, the Town's permanent population is projected to top out at approximately 5,681. Based on a medium growth rate of 6 percent, the Town should reach the maximum permanent population sometime in 2012. Even with the low growth rate projections (4 percent), the Town could expect to reach maximum population no later than sometime in 2015 or 2016. With a high growth rate (8 percent), maximum population could be reached as soon as sometime in 2011. Regardless of which growth rate proves to be most accurate, in all likelihood, the Town can expect to reach maximum unit and population figures in the near future.

There is new development planned on the recently annexed Stan Miller property (155 units), at the base of Peak 7, 8, and 9 (mostly condominium and hotel units, 450-500 units, depending on size, mostly will be short-term rentals and time shares), some more units planned at Wellington Neighborhood Phase II (160 units, some already finished or under construction), about 45 units at Valley Brook (north of police and new childcare center), 250-300 units planned for Block 11

Airport (the old runway), and at Pinewood Village Phase 2 (30-40 units). The Town is also planning for the build-out of the skier parking lots in town (about 30 residential units and about 130 condominium and hotel units with about 35,000 square feet of commercial/skier services).

As far as new facilities, the Town is working on a new design for the Breckenridge Nordic Center located on Ski Hill Road, which also may double as a nature center.

C.4 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. The capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation outreach and partnerships, and other mitigation efforts.

Regulatory Mitigation Capabilities

Table C.11 lists planning and land management tools typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in Breckenridge.

Table C.11. Breckenridge—Regulatory Mitigation Capabilities

Regulatory Tool (Ordinances, Codes, Plans)	Yes/No	Comments
Master Plan	Yes	Town of Breckenridge Comprehensive Plan Draft (March 25, 2008)
Zoning Ordinance	Yes	
Subdivision Ordinance	Yes	
Growth Management Ordinance	Yes	Upper Blue Master Plan/Nonbinding agreement with Summit County government
Floodplain Ordinance	Yes	
Other Special Purpose Ordinance (Stormwater, Steep Slope, Wildfire)	Yes	Preventive Management Area Ordinance, Pine Beetle Ordinance
Building Code	Yes	Version: 2006 International Building Code
Fire Department ISO Rating	Yes	Rating: 4
Erosion or Sediment Control Program	Yes	
Stormwater Management Program	Yes	
Site Plan Review Requirements	Yes	
Capital Improvements Plan	Yes	
Economic Development Plan	No	
Local Emergency Operations Plan	Yes	Town of Breckenridge Emergency Operations Annex, 2005
Other Special Plans	Yes	Master Drainage Plan, 1993; Open Space, 2007
Flood Insurance Study or Other Engineering Study For Streams	Yes	FEMA Flood Insurance Study, June 20, 2001
Elevation certificates on file	Yes	
Other	Yes	Capacity Analysis for the Upper Blue Valley

Town of Breckenridge Master Plan Draft, 2008

The Breckenridge Master Plan guides the future development of the town. The purpose of the Master Plan is to promote the health, safety, and welfare of the community and provide guidelines for the conservation and development of community resources. The Plan identifies goals and policies for the following primary sections: Natural Environment, Population and Demographics, Transportation, Community Facilities, Economy, Housing, Recreation and Tourism, Cultural Resources, Historic Character, Community Character, and Land Use. It includes the following goals and policies related to hazard mitigation:

- **Goal:** Erosion/Landslide prevention and mitigation
  - **Policy:** Discourage development on slopes of 15 percent or greater or on land subject to natural hazards and require engineering when development on such sites is allowed.
  - **Policy:** Maintain undeveloped steep-slope areas exceeding 30 percent as natural open space to protect soils, vegetation, water, fish and wildlife, and open space resource value.
- **Goal:** Wildfire prevention and mitigation
  - **Policy:** Support hazardous and diseased tree removal and wildfire mitigation including the discouragement of wood shingles; but balance them with other goals such as landscaping, visual resources, buffers, etc.
- **Goal:** Flood loss prevention and mitigation
  - **Policy:** Maintain floodway areas in open and undeveloped land uses where legally permissible, including agriculture, parks, and open space.

Breckenridge Town Code

The Breckenridge Town Code serves as the legal framework for the Town and contains 12 titles and various subsections. Sections of the Town Code related to hazard mitigation are summarized below:

Title V. Public Health and Safety

The Public Health and Safety section of the Town Code includes several ordinances related to wildfire prevention and mitigation:

- Policy: Except where otherwise allowed by this Code, it shall be unlawful for any person to conduct open burning anywhere in the town.
- Policy: No person shall use or explode any fireworks, or supervise the use or explosion of any fireworks, other than permissible fireworks during times when the use or explosion of permissible fireworks is permitted pursuant to section 6-3C-11 of this code, in connection with, or as part of, a fireworks display unless a permit for such display has first been obtained from the town pursuant to this chapter.

- Policy: …all trees infested with mountain pine beetle must be removed within 10 days following receipt of the notice, or that an acceptable plan and schedule for removal of the beetle infested trees must be submitted to the director within such 10-day period.
- Policy: A wildfire plan shall be prepared and implemented for all areas designated with a "severe" wildfire rating and for all vegetated areas designated with a "hazard intensified due to slope" rating on the map of wildfire hazard and for all vegetated areas in excess of 30 percent slope. Such plans shall address wildfire prevention, mitigation, and control and shall further incorporate the recommendations contained within *Wildfire Hazards: Guidelines for Their Prevention in Subdivisions and Developments*, prepared by the Colorado State Forest Service.

Title IX. Land Use and Development

The Breckenridge Development Code includes the following policies and guidelines related to development in hazardous areas:

- Policy: No development shall occur in any area of, or affected by, a geologic hazard unless mitigated to the satisfaction of the Town. Proof of mitigation may require reports as specified by the Town.
- Policy: Erosion control measures shall be installed where required by the Town through the Breckenridge Water Quality and Sediment Transport Control Ordinance.
- Policy: No development shall increase danger to life or property from flood hazard within the Town. This shall include but not be limited to prohibition of actions which might increase the size of the floodway, reduce flood channel capacity, constrict the size or flow of the flood channel, create a significant backflow condition, increase the potential for debris in the floodway, or increase the volume or velocity of flood waters.
- Policy: For all areas located within the special flood hazard areas as delineated on the Flood Boundary Floodway Map, the Flood Insurance Rate Maps, and the Flood Insurance Study, a plan of onsite flood prevention, control, and hazard mitigation shall be prepared and implemented according to the provisions of the Breckenridge Flood Damage Prevention Ordinance.
- Policy: Improvements to the floodway or any part thereof which will result in an overall reduction of flooding potential or a reduction to the flood hazard area are encouraged.

Title X. Flood Control

This section includes ordinances for storm drainage, flood damage prevention, and water quality and sediment transport control standards:

- **Storm Drainage Ordinance**: Sets certain rules and standards for the control and drainage of storm and surface waters.
- **Flood Damage Prevention Ordinance**: The floodplain ordinance establishes the Town's special flood hazard areas (as identified by the flood insurance study and flood insurance rate

map) and prohibits development, construction, or improvement within such floodplains in an effort to prevent flood damage and protect public health, safety, and general welfare.

Town of Breckenridge Emergency Operations Annex, 2005

The purpose of the Town of Breckenridge Emergency Operations Annex is to provide general guidelines and principles for planning, managing, and coordinating the overall response and recovery activities of the town departments; Red, White, and Blue Fire Protection District; participating agencies; and volunteer agencies to be used before, during, and after a threatened, imminent, or actual major emergency or disaster. The plan's guidelines are consistent with the accepted standards of the National Incident Management System as well as emergency planning guidelines developed by FEMA as adopted by the Town of Breckenridge.

Master Drainage Plan, 1993

The Master Drainage Plan's purpose was to identify existing deficiencies and provide recommendations for corrections. This document identified and analyzed the drainage basins affecting the Town of Breckenridge. To date, all of those deficiencies have been corrected except for the addition of drainage structures to Main Street. In 2004, the Town initiated the planning process for improvements to Main Street. As part of these improvements, drainage will be evaluated and appropriate measures included with construction.

Engineering Standards, 1987

Street, storm drainage, flood damage prevention, water quality and sediment transport control standards (Engineering Standards) were developed in 1987 to address the design and implementation of the Town's drainage systems. Any newly developed area is required to meet these standards and therefore provide a functioning drainage system. These standards deal with water quantity and quality.

Breckenridge Open Space Plan, 2007

The Breckenridge Open Space Plan provides the framework for how the open space sales tax revenues should be used. The plan addresses land acquisition, natural resource protection, land conservation values, stewardship and management of open space, and land protection strategies.

Breckenridge Open Space Advisory Commission

In 1997, the Town Council established the Breckenridge Open Space Advisory Commission (the BOSAC), which advises the Council on the appropriate goals and objectives of the Town's Open Space Program, such as the acquisition, stewardship, and preservation of open space. The BOSAC helps define the types of open space to be protected, the criteria used to select parcels for acquisition, and the priorities for stewardship practices. The BOSAC is also the public forum for discussion on open space issues.

Town of Breckenridge Mountain Pine Beetle Program Guidelines, 2008

The overall goal of the Town of Breckenridge Mountain Pine Beetle Program Guidelines is to contain the spread of the pine beetle infestation that plagues lodgepole pine forests. This program supports efforts to prevent or mitigate wildfires, due to the fact that trees killed by the pine beetle contribute to escalated wildfire risk.

The program is a joint effort between the Town and property owners. Free beetle inspections are provided by Town staff for property owners, and beetle-infested trees that are a declared nuisance are required to be removed. Permits issued by the Town are required for tree removal. Property owners are responsible for cutting down the trees and the Town chips them at curbside and hauls the remaining debris.

Administrative/Technical Mitigation Capabilities

Table C.12 identifies the personnel responsible for activities related to mitigation and loss prevention in Breckenridge.

Table C.12. Breckenridge—Administrative and Technical Mitigation Capabilities

Personnel Resources	Yes/No	Department/Position	Comments
Planner/Engineer with Knowledge of Land Development/Land Management Practices	Yes	Engineering and Community Development	
Engineer/Professional Trained in Construction Practices Related to Buildings and/or Infrastructure	Yes	Engineering	
Planner/Engineer/Scientist with an Understanding of Natural Hazards	No		
Personnel Skilled in GIS	Yes	Engineering	
Full Time Building Official	Yes		
Floodplain Manager	Yes	Town Engineer	
Emergency Manager	No	Partner with Summit County government	
Grant Writer	No		
Warning Systems/Services (Reverse 9-11, Cable Override, Outdoor Warning Signals)	Yes	Summit County Communications	Reverse 911

Fiscal Mitigation Capabilities

Table C.13 identifies financial tools or resources that Breckenridge could potentially use to help fund mitigation activities.

Table C.13. Breckenridge—Fiscal Mitigation Capabilities

Financial Resources	Accessible/Eligible to Use (Yes/No)	Comments
Community Development Block Grants	Yes	
Capital Improvements Project Funding	Yes	
Authority to Levy Taxes for Specific Purposes	Yes	
Fees for Water, Sewer, Gas, or Electric Services	Yes	
Impact Fees for New Development	Yes	
Incur Debt through General Obligation Bonds	Yes	Town currently has two: golf course expansion and the indoor ice arena
Incur Debt through Special Tax Bonds	Yes	Town has done so in the past, but has not issued any in several years
Incur Debt through Private Activities	No	
Withhold Spending in Hazard Prone Areas	No	

In November of 1996, voters in Breckenridge passed a .5 cent sales tax to be used exclusively for open space and trails. The sales tax produced $1.64 million in 2006.

Mitigation Outreach and Partnerships

- The Town of Breckenridge uses the semiannual "Breckenridge Bulletin" to provide information to citizens in the Upper Blue Valley. It also uses local media (press releases), Town Council meetings, and pamphlets with information on wildfire, pine beetle, flooding, etc. that are available in town facilities and are free to the public.
- Each spring, the governments of Summit County, Breckenridge, Dillon, Frisco and Silverthorne distribute a packet of information to inform the communities about how to prepare for possible high water in May and/or June resulting from snowmelt.

Past Mitigation Efforts

- The Town of Breckenridge constructed a flood bank project to keep the Blue River within its flood banks in the event of a significant flood.
- In the 1990s, the Town rerouted Sawmill Creek to remove structures from the floodplain.
- In 2005 and 2006, the Town's staff inspected all Town-owned properties, including public rights of way, for beetle-infested or dead trees. The Town then had trees removed that were beetle infested. The Town also sprayed trees on visually sensitive Town-owned land as a preventive measure against pine beetle infestation.
- Breckenridge has received a Section 206 grant from the U.S. Army Corps of Engineers for a stream restoration project along approximately one mile of the Blue River north of Town.

C.5 Mitigation Goals and Objectives

Breckenridge had adopted the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 4 Mitigation Strategy.

C.6 Mitigation Actions

The planning team for Breckenridge identified and prioritized the following mitigation actions based on the risk assessment. Background information on how each action will be implemented and administered, such as ideas for implementation, responsible agency, potential funding, estimated cost, and timeline also are included.

Breckenridge will continue participation in and compliance with the National Flood Insurance Program. Specific activities that the Town will undertake to continue compliance include the following:

- Working with FEMA and the Colorado Water Conservation Board in the review and adoption of new digital flood insurance rate maps (DFIRMs) as part of the map modernization program
- Reviewing the flood damage prevention ordinance and identifying opportunities to strengthen requirements and enforcement when adopting new DFIRMs
- Considering joining the Community Rating System after adopting the new DFIRMs and updating the floodplain ordinance
- Continuing strong enforcement of the floodplain ordinance and working with developers and property owners to understand the program
- Restoring a section of the Blue River damaged by past mining activities to improve overall ecological functions of the river and floodplain

Mitigation Action: Breckenridge—1 Culvert Inspections

Jurisdiction:	Town of Breckenridge
Action Title:	Inspect metal culverts to determine risk of failure
Priority:	High
Issue/Background:	Failure of culverts could lead to potential flooding issues or road collapse.
Ideas for Implementation:	The Town of Breckenridge would hire an inspection company to inspect metal culverts throughout the Town to determine risk of failure.
Responsible Agency:	Town of Breckenridge
Partners:	Colorado Department of Transportation Summit County Road and Bridge Department
Potential Funding:	Town of Breckenridge; other unknown
Cost Estimate:	$50,000 for consultation services
Benefits: (Losses Avoided)	• Reliable culverts for water to move through reducing the risk of flooding • Mitigated risk of water moving across roadways, which could lead to damage or collapse • Passable transportation corridors
Timeline:	2009-2013

Mitigation Action: Breckenridge—2 Erosion Traps

Jurisdiction:	Town of Breckenridge
Action Title:	Install erosion traps
Priority:	High
Issue/Background:	Erosion hazards can contaminate the water supplies to the Breckenridge. The hazard could be severe after a wildfire.
Ideas for Implementation:	Install of erosion traps throughout the valley to catch erosion silt that could contaminate water supplies to the Town of Breckenridge.
Responsible Agency:	Town of Breckenridge
Partners:	Breckenridge Water and Sanitation District
Potential Funding:	Town of Breckenridge; other unknown
Cost Estimate:	$1,000,000 (+)
Benefits: (Losses Avoided)	• Reduce impacts to water quality from erosion hazards • Sustain healthy water sources for the Town of Breckenridge • Continue to provide water services after a wildfire
Timeline:	2009-2013

Mitigation Action: Breckenridge—3 Defensible Space and Beetle-Infested Trees

Jurisdiction:	Town of Breckenridge
Action Title:	Promote defensible space and removal of beetle-infested trees
Priority:	High
Issue/Background:	Wildfire risk is high in several neighborhoods in Breckenridge and public policy and education promoting defensible space could be further improved.
Ideas for Implementation:	Create public policy and public education initiatives enforcing 15 feet of defensible space around homes. Public policy would be accomplished by the passing of ordinances by the Breckenridge Town Council. This would include development of mitigation rules and guidelines for the removal of beetle kill trees within the determined defensible space perimeter. Public education would be accomplished by hiring a production company to produce public service announcements for local television stations and radio stations and through awareness articles published in a biannual newsletter to citizens of Breckenridge. This action may also include the development of a program to subsidize homeowners for their compliance efforts, in the form of reforestation assistance or assistance in the removal of beetle kill trees
Responsible Agency:	Town of Breckenridge
Partners:	Red, White, and Blue Fire Protection District
Potential Funding:	U.S. Forest Service, Town of Breckenridge
Cost Estimate:	$250,000
Benefits: (Losses Avoided)	• Creation of a firewise community • Reduce wildfire risk to people and property
Timeline:	2009-2013

Mitigation Action: Breckenridge—4 Winter Preparedness Kits

Jurisdiction: Town of Breckenridge

Action Title: Educate public about winter preparedness kits

Priority: High

Issue/Background: Severe winter weather is a priority hazard in Breckenridge, where frequent cold temperatures, high winds, heavy snow events can make travel very dangerous for citizens and visitors.

Ideas for Implementation: The Town of Breckenridge would hire a production company to educate the public on preparing household winter preparedness or survival kits to have readily available during times of severe winter weather. These public service announcements would be run on local television and radio stations.

The Town would partner with local merchants/grocers to educate the public about the types of supplies to include in the kits.

The Town would host Winter Preparedness Kit sessions at local grocery stores, demonstrating a prepared kit, in addition to distributing a "shopping list" of items they can purchase while at that location.

Responsible Agency: Town of Breckenridge Police Department

Partners: Local merchants

Potential Funding: Town of Breckenridge, donation from local merchants

Cost Estimate: $20,000

Benefits: (Losses Avoided)

- Reduce number of cars/citizens on roadways during times of severe winter weather, as supplies would be kept in homes
- Sustain food resources in local markets in the event deliveries to the area become impaired by road and weather conditions

Timeline: 2009-2013

Mitigation Action: Breckenridge—5 Evacuation Planning

Jurisdiction:	Town of Breckenridge
Action Title:	Update and enhance evacuation plan
Priority:	Low
Issue/Background:	Evacuation of Town residents along Highway 9 (northbound and southbound) in the event of an emergency is a major concenr. There are two areas that seriously impact the possible speed of any evacuation. One is the development at the base areas of Peaks 7 and 8, which would have to enter into the Town limits before being able to leave the area. The other is the Block 11 planned development on Airport Road in Breckenridge, which consists of more than 400 units.
Ideas for Implementation:	Update and expand upon current evacuation plans, such as egress and ingress routes. The enhanced plan would focus on high occupancy complexes and population centers and would include awareness notification, wayfinding, and sheltering options. Once the evacuation plans are developed, they will be reproduced in book form and distributed to all first responders (fire, police and EMS personnel).
Responsible Agency:	Town of Breckenridge Police Department
Partners:	Red, White, and Blue Fire Protection District Summit County Sheriff's Department
Potential Funding:	Staff time
Cost Estimate:	$10,000
Benefits: (Losses Avoided)	Planned, safe, and effective evacuation of at risk populations during times of disaster.
Timeline:	2009-2013

Mitigation Action: Breckenridge—6 Hazardous Materials Mapping and Planning

Jurisdiction:	Town of Breckenridge
Action Title:	Inventory and map locations of hazardous materials
Priority:	Low
Issue/Background:	Locations of hazardous materials need to be better understood by emergency responders.
Ideas for Implementation:	The Town of Breckenridge would hire a consultant to compile an inventory of hazardous materials processes and their storage (i.e. bodyshops, woodworking businesses, plastics fabrication, pool and spa water treatments, etc.). These locations would be mapped and provided to first responders.
Responsible Agency:	Town of Breckenridge
Partners:	Red, White, and Blue Fire Protection District, Summit County Local Emergency Planning Committee
Potential Funding:	
Cost Estimate:	$20,000
Benefits: (Losses Avoided)	• Improve responder knowledge of potential hazardous material release • Identify of populations at risk
Timeline:	2009-2013

Mitigation Action: Breckenridge—7 Portable Wayfinding Signage

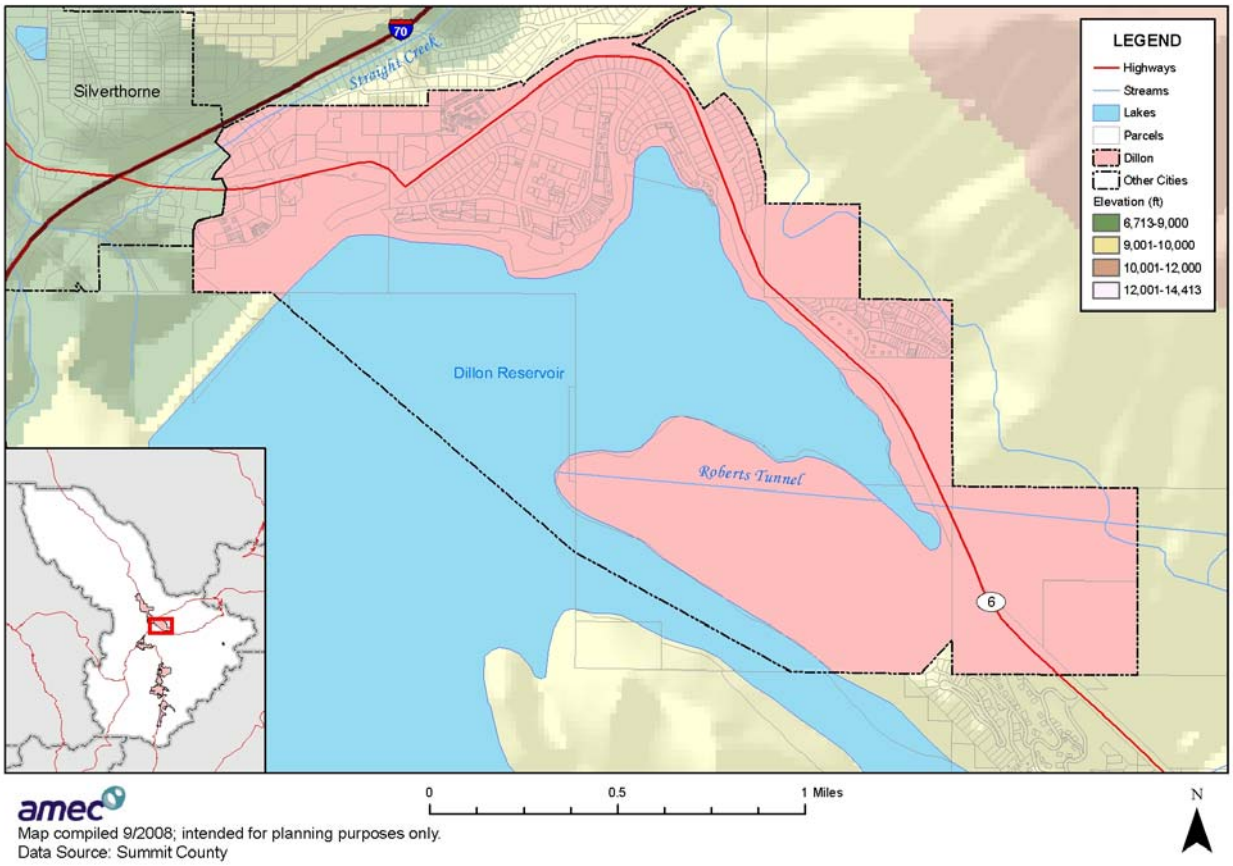
Jurisdiction:	Town of Breckenridge
Action Title:	Locate portable wayfinding signage around Town during emergency events
Priority:	Low
Issue/Background:	During emergency events, communication with the public is essential. Communication could be enhanced through using wayfinding signage.
Ideas for Implementation:	Purchase portable "wayfinding" signage to place throughout the Town of Breckenridge to assist citizens and guests with navigation in times of disaster. Additionally, it would be necessary to purchase a trailer to store the signage and make ready the rapid deployment of it during times of need.
Responsible Agency:	Town of Breckenridge
Partners:	
Potential Funding:	Town of Breckenridge
Cost Estimate:	$15,000 for the creation of signage and purchase of the trailer
Benefits: (Losses Avoided)	Improve safety of citizens during emergency events
Timeline:	2009-2013

ANNEX D: TOWN OF DILLON

D.1 Community Profile

Figure D.1 shows a map of the Town of Dillon and its location within Summit County.

Figure D.1. Map of Dillon



Geography

The Town of Dillon is located in central Summit County on the north shore of Dillon Reservoir directly south of Interstate 70 (I-70). Straight Creek runs in a southwesterly direction along the northern boundary of the Town. Dillon's total area is 2.3 square miles and the nearest city is Silverthorne, approximately two miles north on the opposite side of I-70. The elevation is 9,087 feet and the climate is typified by cold winters and temperate summers.

History

The Town of Dillon was first incorporated in 1883. Originally, three rivers came together where a trading post and clusters of cabins existed. This was the scene in the late 1800s until Denver needed water storage in the high country. In 1963 a water storage project was completed for the Denver metropolitan area which created Lake Dillon. The Town had to relocate to the northeastern shore of the lake while the reservoir was completed. The creation of the reservoir, the completion of the Eisenhower Tunnel in the 1960s, and the incorporation of the neighboring Town of Silverthorne all helped to establish Dillon's modern historical era.

Population

The estimated 2006 population of the Town of Dillon was 818. Select U.S. Census 2000 demographic and social characteristics for Dillon are shown in Table D.1.

Table D.1. Dillon—Demographic and Social Characteristics

Characteristic	
Gender/Age	
Male (%)	55.2
Female (%)	44.8
Under 5 Years (%)	3.6
65 Years and Over (%)	9.0
Race/Ethnicity (one race)	
White (%)	95.6
Hispanic or Latino (Of Any Race) (%)	10.3
Other	
Average Household Size	2.17
High School Graduate or Higher (%)	90.7

Source: U.S. Census Bureau, 2000, www.census.gov/

Economy

According to the 2000 U.S. Census, the industries that employed the highest percentages of Dillon's labor force were arts, entertainment, recreation, accommodation, and food services (25.7%); educational, health, and social services (13.6%); construction (13.4%); finance, insurance, real estate, and rental and leasing (12.4%); and retail trade (12.2%). Select economic characteristics for Dillon from the 2000 U.S. Census are shown in Table D.2.

Table D.2. Dillon—Economic Characteristics

Characteristic	
Families below Poverty Level, 1999	9
Individuals below Poverty Level, 1999	50
Median Home Value	364,300
Median Household Income, 1999	49,821
Per Capita Income, 1999	32,727
Population in Labor Force	516

Source: U.S. Census Bureau (2000), www.census.gov/

D.2 Hazard Identification and Profiles

Dillon's planning team identified the hazards that affect the community and summarized their geographic location, probability of future occurrence, potential magnitude or severity, and planning significance specific to the Town (see Table D.3). In the context of the countywide planning area, there are no hazards that are unique to Dillon.

Table D.3. Dillon—Hazard Summary

Hazard Type	Geographic Extent*	Probability*	Magnitude*	Hazard Rating
Avalanche	Isolated	Unlikely	Negligible	Low
Dam Failure	Small	Unlikely	Limited	Low
Drought	Large	Likely	Limited	Low
Earthquake	Large	Unlikely	Limited	Low
Erosion/Deposition	Medium	Likely	Limited	Moderate
Flood	Isolated	Unlikely	Limited	Low
Hazardous Materials Release (Transportation)	Isolated	Occasional	Critical	High
Landslide, Mudflow/Debris Flow, Rock Fall	Isolated	Unlikely	Limited	Low
Lightning	Large	Likely	Critical	Moderate
Mountain Pine Beetle Infestation	Small	Highly Likely	Limited	Moderate
Severe Winter Weather	Large	Highly Likely	Critical	High
Wildfire	Small	Occasional	Critical	Moderate
Windstorm	Large	Likely	Limited	Low

*See Section 3.2 for definitions of these factors

Information on past events for each hazard can be found in Section 3.2 Hazard Profiles of the main plan.

D.3 Vulnerability Assessment

The intent of this section is to assess Dillon's vulnerability separate from that of the planning area as a whole, which has already been assessed in Section 3.3 Vulnerability Assessment in the

main plan. This vulnerability assessment analyzes the population, property, and other assets at risk to hazards ranked of moderate or high significance that may vary from other parts of the planning area. For more information about how hazards affect the County as a whole, see Chapter 3 Risk Assessment in the main plan.

Community Asset Inventory

Table D.4 shows the total population, number of structures, and assessed value of improvements to parcels in Dillon. Land values have been purposely excluded because land remains following disasters, and subsequent market devaluations are frequently short-term and difficult to quantify. Additionally, state and federal disaster assistance programs generally do not address loss of land or its associated value.

Table D.4. Dillon—Maximum Population and Building Exposure

2006 Population Estimate	Number of Structures	Structure Value ($)*
818	689	267,779,000

Source: HAZUS-MH MR 3 (2007) (structures); Colorado Division of Local Government State Demography Office, www.dola.colorado.gov/dlg/demog/pop_cnty.html
*Value represents "improved structure value" and includes contents

Table D.5 lists critical facilities and other community assets identified by Dillon's planning team as important to protect in the event of a disaster.

Table D.5. Dillon—Critical Facilities and Other Community Assets

Name of Asset	Replacement Value ($)	Occupancy/ Capacity #	Hazard Specific Information
MGD Water Treatment Plant	4,716,472	5/1.5 mgd	Vulnerability assessment completed
Gold Run Sewage Lift Station	1,000,000	0	
Elevated Water Storage Tank	500,000	400,000 gallon	
Buried Water Storage Tank	745,625	500,000 gallon	
Public Works Maintenance Building	457,000	15	
Town Hall/Police Department	2,588,000	103	
Dillon Valley Emergency Water Interconnect	152,000	0	
Silverthorne Emergency Water Interconnect	190,000	0	
Straight Creek Water Diversion	166,000	0	
Old Dillon Reservoir	1,610,000	0	
Lake Dillon Fire District Station 8	n/a	n/a	
Lake Dillon Preschool	n/a	n/a	
Dillon Reservoir/Denver Water	n/a	n/a	
Porcupine Peak Site (prehistoric site)			National Register of Historic Places

Sources: Town of Dillon; Directory of Colorado State Register Properties, www.coloradohistory-oahp.org/programareas/register/1503/; National Register Information System, www.nr.nps.gov/

The locations of critical facilities in Dillon identified by Summit County GIS are illustrated in Figure D.2 HAZUS 100-Year Floodplain and Critical Facilities in Dillon.

For municipal water, Dillon shares the Old Dillon Reservoir with Silverthorne and Summit County, which greatly reduces the community's vulnerability to drought.

Vulnerability by Hazard

This section analyzes existing and future structures and other assets at risk to hazards ranked of moderate or high significance that vary from the risks facing the entire planning area and estimates potential losses. This only includes wildfire. Flood is also analyzed below despite the low risk in Dillon because of readily available data.

Flood

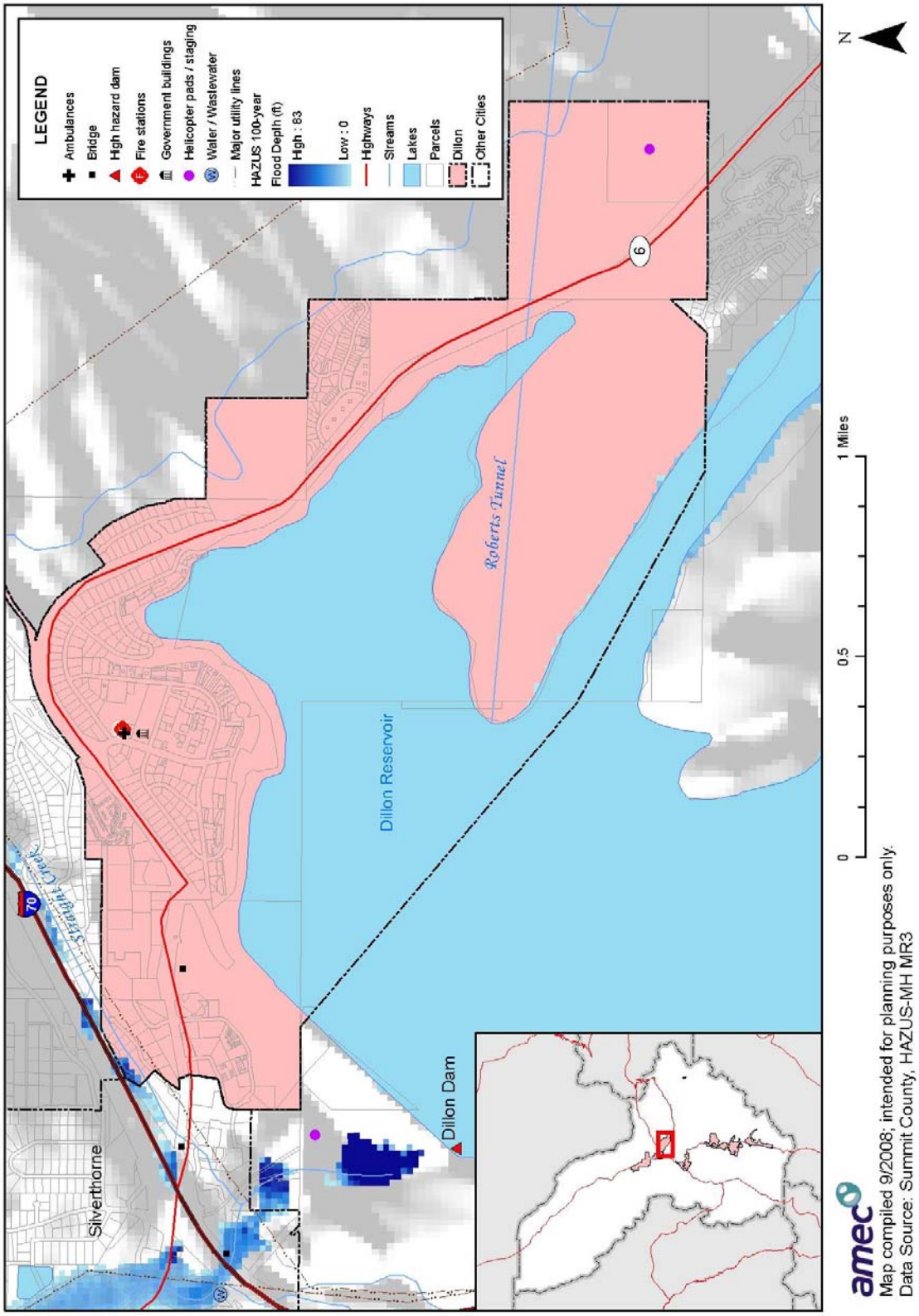
Existing Development

The Town of Dillon does not have a flood insurance rate map. HAZUS-MH MR3, FEMA's loss estimation software, was used to generate a one percent annual flood, or 100-year flood, event in the Town of Dillon. The software produces a flood polygon and flood-depth grid that represents the 100-year flood. While not as accurate as official flood maps, such as digital flood insurance rate maps, these floodplain boundaries are for use in GIS-based loss estimation. Figure D.2 shows the HAZUS-generated 100-year floodplain and the location of critical facilities.

HAZUS estimates the number of persons displaced, persons requiring sheltering, buildings impacted, building repair costs, and the associated loss of building contents and business inventory as a result of a 100-year flood event in Dillon. The software does not estimate any persons displaced or buildings damaged in this event. More information on the methodology for this loss estimation can be found in the Section 3.3 Vulnerability Assessment in the main plan.

As can be seen in Figure D.2, there are no critical facilities in the HAZUS 100-year floodplain. The HMPC only knew of one area where flooding sometimes occurs, which is Little Beaver Creek near I-70 and the Town of Silverthorne. Flooding sometimes occurs when a beaver dam is built up and backs up water. In this case, the Public Works department removes the dam.

Figure D.2. HAZUS 100-Year Floodplain and Critical Facilities in Dillon



National Flood Insurance Program

The Town of Dillon has not been mapped by FEMA and is not a participant in the National Flood Insurance Program. There are no repetitive loss properties.

Future Development

Based on existing floodplains and growth patterns, future development in flood hazard areas is unlikely to occur in Dillon. Although the Town does not have a floodplain ordinance in place, it addresses development in flood prone areas in its subdivision regulations. Proposed subdivisions impacting a flood-prone area must be designed to minimize flood damage within the flood-prone area; must locate and construct all public utilities and facilities, such as sewer, gas, electric and water systems, to minimize and eliminate flood damage; and must provide adequate drainage to reduce exposure to flood hazards.

Wildfire

Existing Development

A wildfire threat ranking was developed for the Summit County Community Wildfire Protection Plan by the County, fire protection districts, and U.S. Forest Service. It is based on fuel hazards, risk of wildfire occurrence, essential infrastructure at risk, community values at risk, and local preparedness and firefighting capability and classifies the wildfire threat as low, medium, high, and extreme. The wildfire threat GIS layer was used to determine the number of acres in each wildfire threat zone and map the wildfire threat in Dillon (see Table D.6 and Figure D.3).

Table D.6. Dillon—Acreage in Wildfire Threat Zones

Low		Medium		High		Extreme		
Acres	%Total	Acres	%Total	Acres	%Total	Acres	%Total	Total Acres
1,061	72	421	28	1	0	-	0	1,483

Source: Summit County

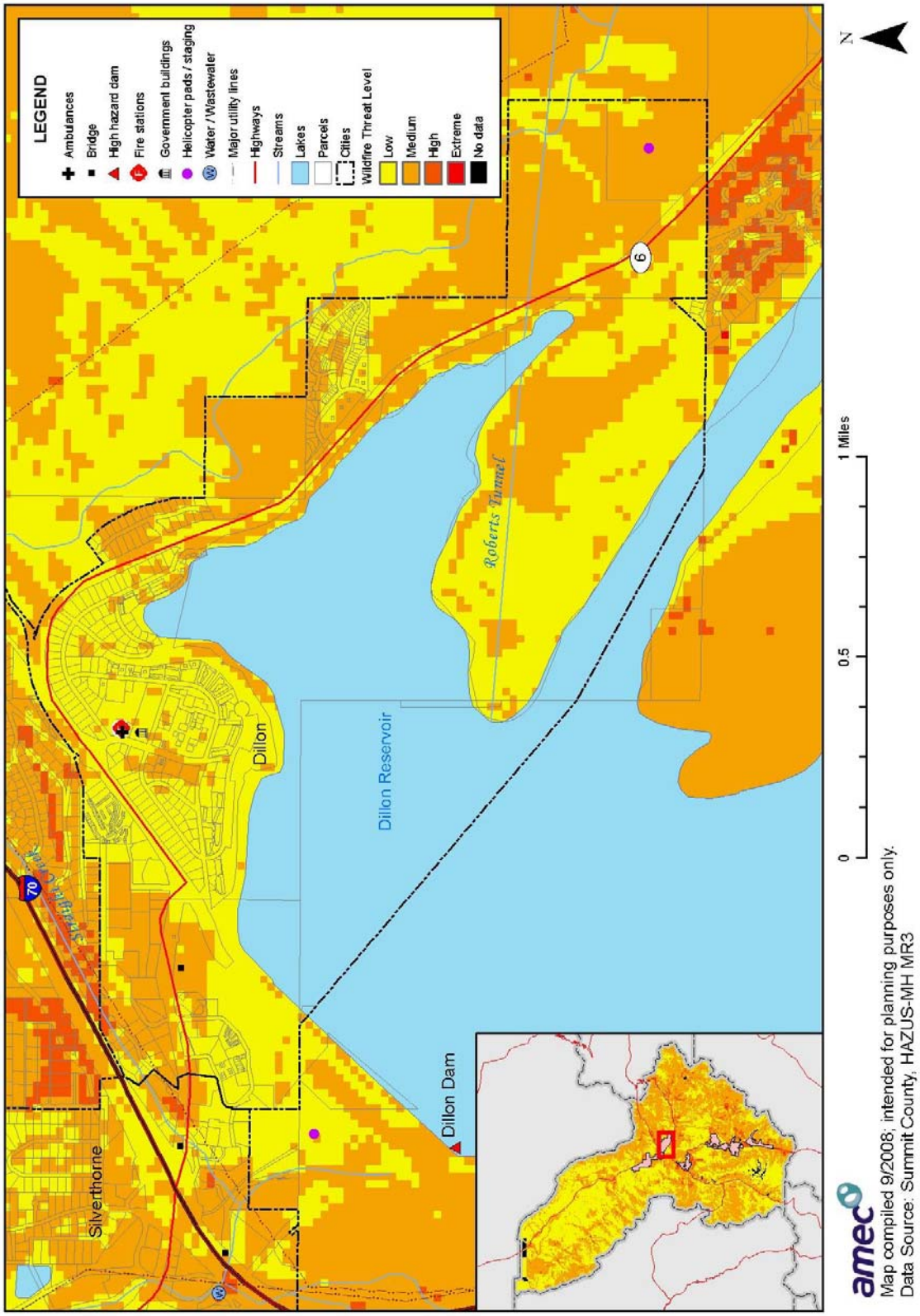
Based on the methodology described for wildfire in Section 3.3.3 Vulnerability by Hazard, the property values in Dillon were separated into wildfire threat zones. The breakdown of property values in Dillon by wildfire threat zone is shown in Table D.7.

Table D.7. Dillon—Property Values in Wildfire Threat Zones

Threat Zone	Land Value ($)	Improved Value ($)	Total Value ($)
Low	55,771,258	286,834,117	342,605,375
Medium	31,725,433	106,804,848	138,530,281
High	-	-	-
Extreme	-	-	-
Totals	**87,496,691**	**393,638,965**	**481,135,656**

Source: Summit County.
Note: The total values in this table conflict with values in Table D.4 Maximum Population and Building Exposure, because those values were generated using HAZUS. Values in this table were generated from the Summit County Assessor's data.

Figure D.3. Wildfire Threat and Critical Facilities in Dillon



There are no structures or critical facilities located in high or extreme wildfire areas in Dillon. In the last two years, much of the wildfire hazard in Dillon has been reduced as a result of the removal of trees infested with mountain pine beetle. The Town has removed a significant amount of infested trees as part of a program managed by the Public Works Department. The Town has been actively participating with the Summit County Wildfire Council in the establishment of a wildland-urban interface map. These efforts allow the County to apply for federal assistance in establishing defensible space around buildings under threat from wildfire.

Future Development

The Town does not have specific regulations in place related to future development in wildfire hazard areas. However, the comprehensive plan does have policies related to assisting homeowners in creating defensible space around homes and continuing to remove and replace beetle kill trees throughout Town.

Growth and Development Trends

Table D.8 illustrates how Dillon has grown in terms of population and number of housing units between 2000 and 2006.

Table D.8. Dillon—Change in Population and Housing Units, 2000-2006

2000 Population	2006 Population Estimate	Estimated Percent Change 2000-2006	2000 # of Housing Units	2006 Estimated # of Housing Units	Estimated Percent Change 2000-2006
802	818	+2.0	1,280	1,344	+5.0

Source: Colorado Division of Local Government State Demography Office, www.dola.colorado.gov/dlg/demog/

Dillon is surrounded by the Dillon Reservoir, I-70, and open space, and there is not a significant amount of new residential development occurring. New commercial development is planned in the Dillon Ridge Shopping Center. A goal of the Town's Comprehensive Plan is to provide open space throughout the community in order to protect features that are unique to Dillon, particularly open space along Dillon Reservoir and the hillsides that frame the existing community.

D.4 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. The capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation outreach and partnerships, and other mitigation efforts.

Regulatory Mitigation Capabilities

Table D.9 lists planning and land management tools typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in Dillon.

Table D.9. Dillon—Regulatory Mitigation Capabilities

Regulatory Tool (Ordinances, Codes, Plans)	Yes/No	Comments
Master Plan	Yes	Currently being updated
Zoning Ordinance	Yes	
Subdivision Ordinance	Yes	
Growth Management Ordinance	No	
Floodplain Ordinance	No	
Other Special Purpose Ordinance (Stormwater, Steep Slope, Wildfire)	Yes	
Building Code	Yes	Version: Adopting 2006 International Building Code in 2008
Fire Department ISO Rating	Yes	Rating: 4
Erosion or Sediment Control Program	Yes	
Stormwater Management Program	Yes	
Site Plan Review Requirements	Yes	
Capital Improvements Plan	Yes	Five-Year Capital Improvement Plan updated each year
Economic Development Plan	Yes	Possibly forming urban renewal authority
Local Emergency Operations Plan	No	Incorporated in Summit County Emergency Operations Plan
Other Special Plans	Yes	Forest Management Plan
Flood Insurance Study or Other Engineering Study For Streams	No	
Elevation Certificates	No	

Dillon Comprehensive Plan, 2008

The purpose of the Dillon Comprehensive Plan is to provide a framework for decision making regarding future development that is in the best long-term interest of the community. Goals and policies of the Comprehensive Plan related to hazard mitigation are listed below and address the hazards of wildfire, flood, landslide, erosion/deposition, and drought.

- **Goal**: To protect the environment and improve it whenever and wherever possible
  - Policy: Discourage development within or adjacent to areas identified as potential hazardous areas (steep slopes, unstable soils, flood plains, etc.), and developments proposed for any areas considered to pose a hazard should submit engineering investigations of the site and mitigate any potential negative impacts.
  - Policy: Limit development on slopes greater than 20 percent and require engineering investigations of sites over 20 percent during project review. Development on slopes in excess of 20 percent if allowed, should maintain the maximum vegetative cover

possible to protect soils, prevent land slippage, and retain wildlife habitat, view corridors and open space resources.
  - Policy: Require that the implications of any potential geological and geo-technical constraints be appropriately addressed by persons experienced and legally qualified to do so. Such evaluative and mitigation procedures should incorporate analytical and design methods representing current generally accepted professional practices.

- **Goal:** To preserve and foster the unique natural, physical, and man-made characteristics and cultural aspects of Dillon
  - Policy: Preserve shorelines and wildlife habitats from intensive development. If development occurs, developers should be encouraged to develop on land with minor constraints, and utilize clustering of development to minimize development impacts on sensitive areas.

- **Goal:** To preserve community water sources and the water quality of the community to enhance the livability of the Town.
  - Policy: Improve the Town's landscaping regulations including the adoption of regulations that would reduce the amount of water utilized for the maintenance of landscaping.
  - Policy: Continue to enact watering restrictions in times of drought and encourage voluntary water reduction at all times.
  - Policy: Provide guidance to the community in selection of drought resistant xeriscape plant species.
  - Policy: Work with Denver Water Board to preserve the areas near the lake to reduce erosion.
  - Policy: Monitor areas of high mortality due to pine beetle infestation and take steps to mitigate erosion following tree removal.

- **Goal:** To provide a water distribution and treatment system that meets the future needs of the community.
  - Policy: Continue to strive toward conservation of the community's water resources through policies in Town development ordinances.
  - Policy: Revise the current landscaping regulations and drought response program to reflect best management practices concerning water conservation and the use of drought-tolerant native plant species.

- **Goal**: To cooperate with Lake Dillon Fire Rescue to provide fire protection system that is of high quality and can meet the existing and future needs of the community and keep fire insurance rates as low as possible in the community.
  - Policy: Continue to work with the Joint Fire Authority to provide for the community's fire protection needs.

  - Policy: Continue to provide water lines and maintenance adequate to meet fire flow requirements, and the Town should not allow new developments unless adequate fire protection can be provided.
  - Policy: Evaluate existing development ordinances to insure they provide adequate measures for fire protection, and modify them if necessary.

- **Goal:** The Town should continue to cooperate in wildfire preparation with other jurisdictions.
  - Policy: Continue participation in the County Wildfire Council.
  - Policy: Assist homeowners in creating defensible space around homes.
  - Policy: Continue to remove and replace beetle kill trees throughout the Town.

Dillon Municipal Code

The Dillon Municipal Code serves as the legal framework for the Town. Sections related to hazard mitigation are described below.

Subdivision Regulations

The Improvements, Reservations, and Design Standards include the following policies related to hazard mitigation:

- Land which the Town determines to be unsuitable for subdivision or development due to flooding, improper drainage, steep slopes, rock formations, adverse earth formations or topography, utility easements, adverse visual impacts or other features which could be harmful to the safety of citizens can not be subdivided or developed unless adequate mitigation methods are in place.
- Development, including the placement of public improvements and the creation of sites for the placement of structures, shall only be allowed on slopes in excess of 15 percent if no other reasonable alternatives exist and the subdivider mitigates any potential negative impacts created by development on these slopes. No development should take place on slopes in excess of 20 percent.
- If a proposed subdivision impacts a flood-prone area: 1) it shall be designed to minimize flood damage within the flood-prone area; 2) all public utilities and facilities, such as sewer, gas, electric and water systems, shall be located and constructed to minimize and eliminate flood damage; and 3) adequate drainage shall be provided to reduce exposure to flood hazards.
- Wetland regulations that limit development activity in and around wetland areas.

Administrative/Technical Mitigation Capabilities

Table D.10 identifies the personnel responsible for activities related to mitigation and loss prevention in Dillon.

Table D.10. Dillon—Administrative and Technical Mitigation Capabilities

Personnel Resources	Yes/No	Department/Position	Comments
Planner/Engineer with Knowledge of Land Development/Land Management Practices	Yes	Planning/Engineering Department	
Engineer/Professional Trained in Construction Practices Related to Buildings and/or Infrastructure	Yes	Planning/Engineering Department	
Planner/Engineer/Scientist with an Understanding of Natural Hazards	Yes	Planning/Engineering Department	
Personnel Skilled in GIS	Yes	Planning/Engineering Department	
Full Time Building Official	No	Summit County Building Department	Contract
Floodplain Manager	No		
Emergency Manager	No	Summit County Emergency Manager	
Grant Writer	No		
Other Personnel	No		
Warning Systems/Services (Reverse 9-11, Cable Override, Outdoor Warning Signals)	Yes	Through Summit County Communications Center	
Other	Yes		Level 1 Inspector of Commercial Vehicles; Mountain Pine Beetle Program

Fiscal Mitigation Capabilities

Table D.11 identifies financial tools or resources that Dillon could potentially use to help fund mitigation activities.

Table D.11. Dillon—Fiscal Mitigation Capabilities

Financial Resources	Accessible/Eligible to Use (Yes/No)	Comments
Community Development Block Grants	Yes	
Capital Improvements Project Funding	Yes	
Authority to Levy Taxes for Specific Purposes	Yes	With vote
Fees for Water, Sewer, Gas, or Electric Services	Yes	Water and sewer fees
Impact Fees for New Development	Yes	Water, sewer, and housing
Incur Debt through General Obligation Bonds	Yes	With vote
Incur Debt through Special Tax Bonds	Yes	With vote
Incur Debt through Private Activities	No	
Withhold Spending in Hazard Prone Areas	No	

Mitigation Outreach and Partnerships

- Each spring, the governments of Summit County, Breckenridge, Dillon, Frisco and Silverthorne distribute a packet of information to inform the communities about how to prepare for possible high water in May and/or June resulting from snowmelt.
- The Dillon Town Council and Dillon Water Department request water conservation from citizens and businesses on a voluntary basis by eliminating the use of sprinklers and irrigation systems from 9 am to 6 pm every day.
- For many years, the Town has been working to control the spread of the Mountain Pine Beetle. Town crews have been conducting surveys on both public and private property and have been removing infested trees in an effort to protect our valuable community forests.

D.5 Mitigation Goals and Objectives

Dillon adopted the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 4 Mitigation Strategy.

D.6 Mitigation Actions

The planning team for Dillon identified and prioritized the following mitigation actions based on the risk assessment. Background information on how each action will be implemented and administered, such as ideas for implementation, responsible agency, potential funding, estimated cost, and timeline also are included.

Mitigation Action: Dillon—1 Local Mitigation Planning Committee

Jurisdiction:	Town of Dillon
Action Title:	Develop a Hazard Mitigation Planning Committee to guide policy and implementation
Priority:	Low
Ideas for Implementation:	Town department heads meet on a weekly basis. Department heads from all the jurisdictions meet on a monthly basis. Part of the staff reviews that are currently conducted are to discuss any hazards that have been identified and then bring the appropriate parties together to discuss the corrective course of action. One individual from each of the affected agencies would then work and develop an action plan. Identify one individual from each agency that would act as the representative of the Hazard Mitigation Planning Committee, meeting on a monthly basis with the other representatives to bring forward concerns and ideas on specific areas.
Responsible Agency:	Town of Dillon Police Department
Partners:	All towns and Summit County Special districts Summit County Office of Emergency Management
Potential Funding:	None needed for committee personnel.
Cost Estimate:	No cost for the committee; costs determined by hazard.
Benefits: (Losses Avoided)	Implements mitigation plan Improves communication and coordination Reduces risk when projects are implemented
Timeline:	Ongoing

Mitigation Action: Dillon—2 Public Involvement

Jurisdiction: Town of Dillon

Action Title: Improve education on risk and preparedness and mitigation measures

Priority: Low

Ideas for Implementation: The Summit Office of Emergency Management in coordination with the Towns will prepare and conduct a series of presentations focused upon coordination and improvement of mitigation activities.

The initial phases of this work will be in coordinating local adoption of the Town's annex. The next step will be using local media sources to announce progress on the mitigation plan and ideas for future activities. This project will also involve developing and expanding educational materials related to hazards in Summit County and household preparedness measures. These materials may include fact sheets, public service announcements, and presentations to specific groups. Severe winter weather, water conservation, and wildfire are priority hazards that the materials will address.

The Town of Dillon will coordinate with Summit County and other towns in these efforts and distribute materials within Dillon as appropriate.

Responsible Agency: Town of Dillon Police Department

Partners: All towns and Summit County
Special districts
Summit County Office of Emergency Management

Potential Funding: None needed

Cost Estimate: Staff time

Benefits: (Losses Avoided)

- Implements mitigation plan
- Improves communication and coordination
- Increases public education and awareness

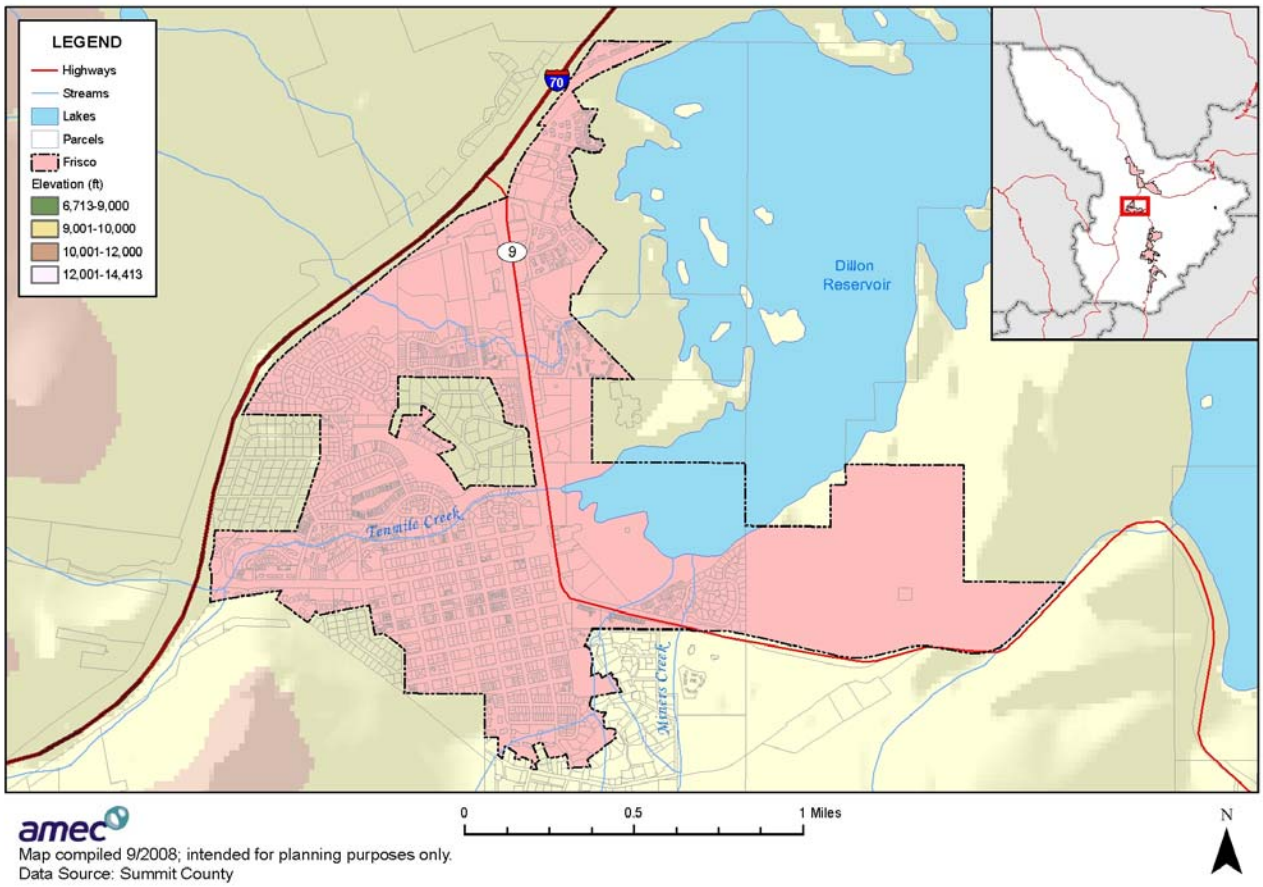
Timeline: Ongoing

ANNEX E: TOWN OF FRISCO

E.1 Community Profile

Figure E.1 shows a map of the Town of Frisco and its location within Summit County.

Figure E.1 Map of Frisco



Geography

The Town of Frisco is located in central Summit County on the west shores of Dillon Reservoir and east of the base of Royal Mountain. Ten Mile Creek runs in an easterly direction through the city. The Town's total area is 1.8 square miles and the nearest city is Silverthorne, approximately five miles east along Interstate 70. The elevation at Frisco is 9,075 feet, and the climate is typified by cold winters and temperate summers. Native vegetation consists of sparse subalpine forest and dispersed patches of evergreen shrubs.

Population

The estimated 2006 population of the Town of Frisco was 2,742. Select 2000 U.S. demographic and social characteristics for Frisco are shown in Table E.1

Table E.1. Frisco—Demographic and Social Characteristics

Characteristic	
Gender/Age	
Male (%)	57.9
Female (%)	42.1
Under 5 Years (%)	3.5
65 Years and Over (%)	5.0
Race/Ethnicity (one race)	
White (%)	96.4
Hispanic or Latino (Of Any Race) (%)	3.5
Other	
Average Household Size	2.32
High School Graduate or Higher (%)	92.2

Source: U.S. Census Bureau, 2000, www.census.gov/

History

The Town of Frisco was incorporated in 1880, and its early history was shaped by the mining industry. A stagecoach and two major railroad routes converged at the Town making it a gateway to the mining claims located near the crest of the Continental Divide. Skiing also has been a part of the Town's history going back at least 120 years. Much of Frisco's history is preserved within the Frisco Historical Park, including restored nineteenth century log cabins, a chapel, and a jailhouse.

Economy

According to the 2000 U.S. Census, the industries that employed the highest percentages of Frisco's labor force were arts, entertainment, recreation, accommodation, and food services (31.7%); construction (13.7%); retail trade (13.2%); and finance, insurance, real estate, and rental and leasing (10.6%). Select economic characteristics for Frisco from the 2000 U.S. Census are shown in Table E.2.

Table E.2. Frisco—Economic Characteristics

Characteristic	
Families below Poverty Level, 1999	9
Individuals below Poverty Level, 1999	170
Median Home Value	298,800
Median Household Income, 1999	62,267
Per Capita Income, 1999	31,232
Population in Labor Force	1,789

Source: U.S. Census Bureau (2000), www.census.gov/

E.2 Hazard Identification and Profiles

Frisco's planning team identified the hazards that affect the community and summarized their geographic location, probability of future occurrence, potential magnitude or severity, and planning significance specific to the Town (see Table E.3). In the context of the countywide planning area, there are no hazards that are unique to Frisco.

Table E.3. Frisco—Hazard Summary

Hazard Type	Geographic Extent*	Probability*	Magnitude*	Hazard Rating
Avalanche	Isolated	Unlikely	Negligible	Low
Dam Failure	Isolated	Unlikely	Limited	Low
Drought	Large	Likely	Limited	Moderate
Earthquake	Large	Unlikely	Limited	Low
Erosion/Deposition	Medium	Likely	Limited	Moderate
Flood	Isolated	Likely	Limited	Moderate
Hazardous Materials Release (Transportation)	Isolated	Occasional	Critical	High
Landslide, Mudflow/Debris Flow, Rock Fall	Isolated	Unlikely	Limited	Low
Lightning	Large	Likely	Critical	Moderate
Mountain Pine Beetle Infestation	Small	Highly Likely	Limited	High
Severe Winter Weather	Large	Highly Likely	Critical	High
Wildfire	Small	Occasional	Critical	High
Windstorm	Large	Likely	Limited	Low

*See Section 3.2 for definitions of these factors

Information on past events for each hazard can be found in Section 3.2 Hazard Profiles of the main plan.

E.3 Vulnerability Assessment

The intent of this section is to assess Frisco's vulnerability separate from that of the planning area as a whole, which has already been assessed in Section 3.3 Vulnerability Assessment in the

main plan. This vulnerability assessment analyzes the population, property, and other assets at risk to hazards ranked of moderate or high significance that may vary from other parts of the planning area. For more information about how hazards affect the County as a whole, see Chapter 3 Risk Assessment in the main plan.

Community Asset Inventory

Table E.4 shows the total population, number of structures, and assessed value of improvements to parcels in Frisco. Land values have been purposely excluded because land remains following disasters, and subsequent market devaluations are frequently short-term and difficult to quantify. Additionally, state and federal disaster assistance programs generally do not address loss of land or its associated value.

Table E.4. Frisco—Maximum Population and Building Exposure

2006 Population Estimate	Number of Structures	Structure Value ($)*
2,742	2,051	706,857,000

Source: HAZUS-MH MR 3 (2007) (structures); Colorado Division of Local Government State Demography Office, www.dola.colorado.gov/dlg/demog/pop_cnty.html
*Value represents "improved structure value" and includes contents

Table E.5 lists critical facilities and other community assets identified by Frisco as important to protect in the event of a disaster.

Table E.5. Frisco—Critical Facilities

Name of Asset	Replacement Value ($)
Police Station	550,000
Summit County Preschool	300,000
Frisco Elementary School	150,000
Lake Dillon Fire Station	500,000
Frisco Sanitation	-
Summit Stage Transfer Building	100,000

Source: Town of Frisco

The locations of critical facilities in Frisco identified by Summit County GIS are illustrated in Figure E.2 HAZUS 100-Year Floodplain and Critical Facilities in Frisco.

Vulnerability by Hazard

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

Flood

Streams in Frisco include Ten Mile, Meadow, and Jug Creeks. Ten Mile Creek flows easterly through Frisco and discharges into Dillon Reservoir. It drains approximately 94 square miles, all within Summit County. Vegetation along the channel through Frisco consists of sparse woods and scattered brush. The channel bed is mostly cobble materials with interspersed boulders. Meadow Creek also flows easterly through Frisco into Dillon Reservoir and drains an area of approximately six square miles. In Frisco, Meadow Creek is confined mainly to a constructed channel through residential and commercial areas (FEMA, 1994).

The principal flood problems along Ten Mile and Meadow Creeks from May through September are a result of snowmelt and/or intense rainstorms. Flows approximately equaling the 100-year flood were recorded on June 16, 1965, along Ten Mile Creek but no records of damages are available. There are no flood protection structures in place that reduce flood hazards in Frisco (FEMA, 1994).

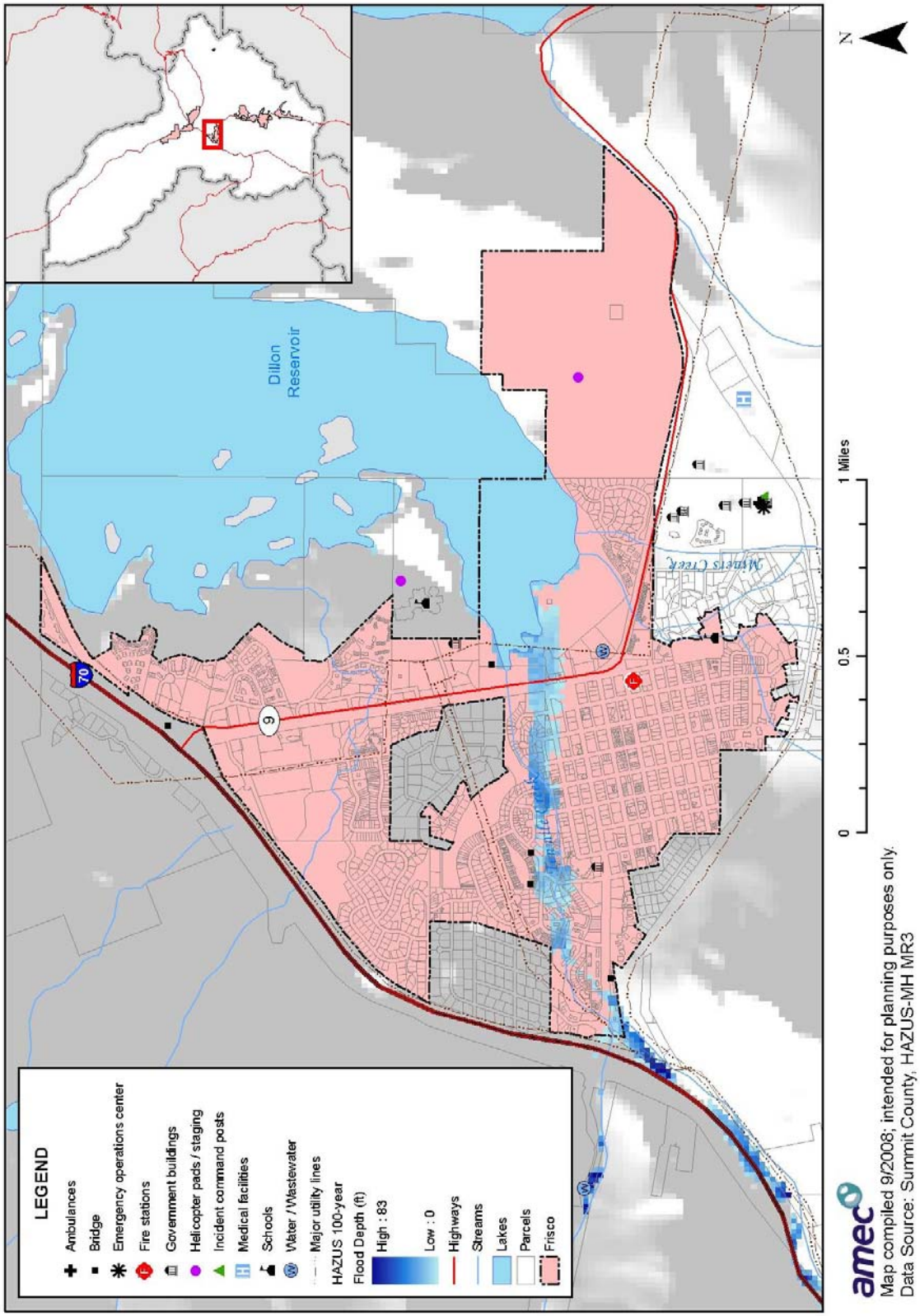
Existing Development

Floodplain development in Frisco consists primarily of condominium and townhome buildings along with single family residences along Ten Mile Creek. Additionally, there are several condominium developments in the floodplain along Meadow Creek.

The current effective flood insurance rate map is from 1994. The Town is participating with Summit County in FEMA's map modernization program. The process to develop new digital flood insurance rate maps (DFIRMs) began in 2007; updated maps were not available for this planning process.

HAZUS-MH MR3, FEMA's loss estimation software, was used to generate a one percent annual flood, or 100-year flood, event in the Town of Frisco. The software produces a flood polygon and flood-depth grid that represents the 100-year flood. While not as accurate as official flood maps, such as digital flood insurance rate maps, these floodplain boundaries are for use in GIS-based loss estimation. Figure E.2 shows the HAZUS-generated 100-year floodplain and the location of critical facilities in Frisco.

Figure E.2. HAZUS 100-Year Floodplain and Critical Facilities in Frisco



HAZUS estimates the number of persons displaced, persons requiring sheltering, buildings impacted, building repair costs, and the associated loss of building contents and business inventory as a result of a 100-year flood event in Frisco. The software estimates 119 people would be displaced and 32 would require short-term sheltering.

Building related losses are calculated by HAZUS using a methodology based on the building damage estimates. Flood damage is directly related to the depth of flooding. For example, a two-foot flood generally results in about 20 percent damage to the structure (which translates to 20 percent of the structure's replacement value). HAZUS uses depth damage curves to estimate building losses as the flood depth varies across the inundation area. More information on the methodology for this loss estimation can be found in the Section 3.3 Vulnerability Assessment in the main plan.

Building related losses are shown in Table E.6, which indicates a total loss of over $6 million. There are no critical facilities located in the floodplain in Frisco.

Table E.6. Frisco—Estimated Building Losses

Cost Building Damage ($)	Cost Contents Damage ($)	Inventory Loss ($)	Relocation Loss ($)	Capital Related Loss ($)	Wages Loss ($)	Rental Income Loss ($)	Total Loss ($)
3,128,000	2,958,000	44,000	11,000	12,000	104,000	3,000	6,260,000

Source: HAZUS-MH MR3 (2007)

National Flood Insurance Program

Frisco joined the National Flood Insurance Program (NFIP) on May 15, 1980. NFIP insurance data indicates that as of February 29, 2008, there were 108 flood insurance policies in force in the County with $21,206,500 of coverage. Of the 108 policies, 104 were residential (40 were for single-family homes) and 4 were nonresidential. 50 of the policies were in A zones and 58 were in B, C, and X zones. There have been two historical claims for flood losses totaling $921; both were for post-FIRM residential properties. One was in an A zone and the other was in a B, C or X zone. There were no repetitive or severe repetitive loss structures.

The Town of Frisco also participates in the Community Rating System (CRS). The Town has 1,100 total points for a CRS class ranking of 8, which provides a 10 percent ranking in flood insurance premiums for all policyholders in special flood hazard areas. Frisco achieves its CRS points through the following activities:

- Map Information Services
- Community Outreach Projects
- Floodplain Hazard Disclosure
- Flood Protection Information
- Open Space Preservation
- Higher Regulatory Standards

- Flood Data Maintenance
- Stormwater Management
- Drainage System Maintenance

The five-year cycle visit for the CRS occurred in July 2008, and the Town's rating will remain 8.

Future Development

The Flood Hazard Area regulations in the Town Code regulate development in mapped special flood hazard areas. Subdivision regulations also seek to prevent flood damage to persons and properties and minimize expenditures for flood control and to restrict building on floodlands, shorelands, steep slopes, areas covered by poor soils, or in areas otherwise poorly suited for building or construction.

Wildfire

A wildfire threat ranking was developed for the Summit County Community Wildfire Protection Plan by the County, fire protection districts, and U.S. Forest Service. It is based on fuel hazards, risk of wildfire occurrence, essential infrastructure at risk, community values at risk, and local preparedness and firefighting capability and classifies the wildfire threat as low, medium, high, and extreme. The wildfire threat GIS layer was used to determine the number of acres in each wildfire threat zone and map the wildfire threat in Frisco (see Table E.7 and Figure E.3).

Table E.7 Frisco—Acreage in Wildfire Threat Zones

Low		Medium		High		Extreme		
Acres	%Total	Acres	%Total	Acres	%Total	Acres	%Total	Total Acres
265	24	796	71	65	6	-	-	1,127

Based on the methodology described for wildfire in Section 3.3.3 Vulnerability by Hazard, the property values in Frisco were separated into wildfire threat zones, as shown in Table E.8

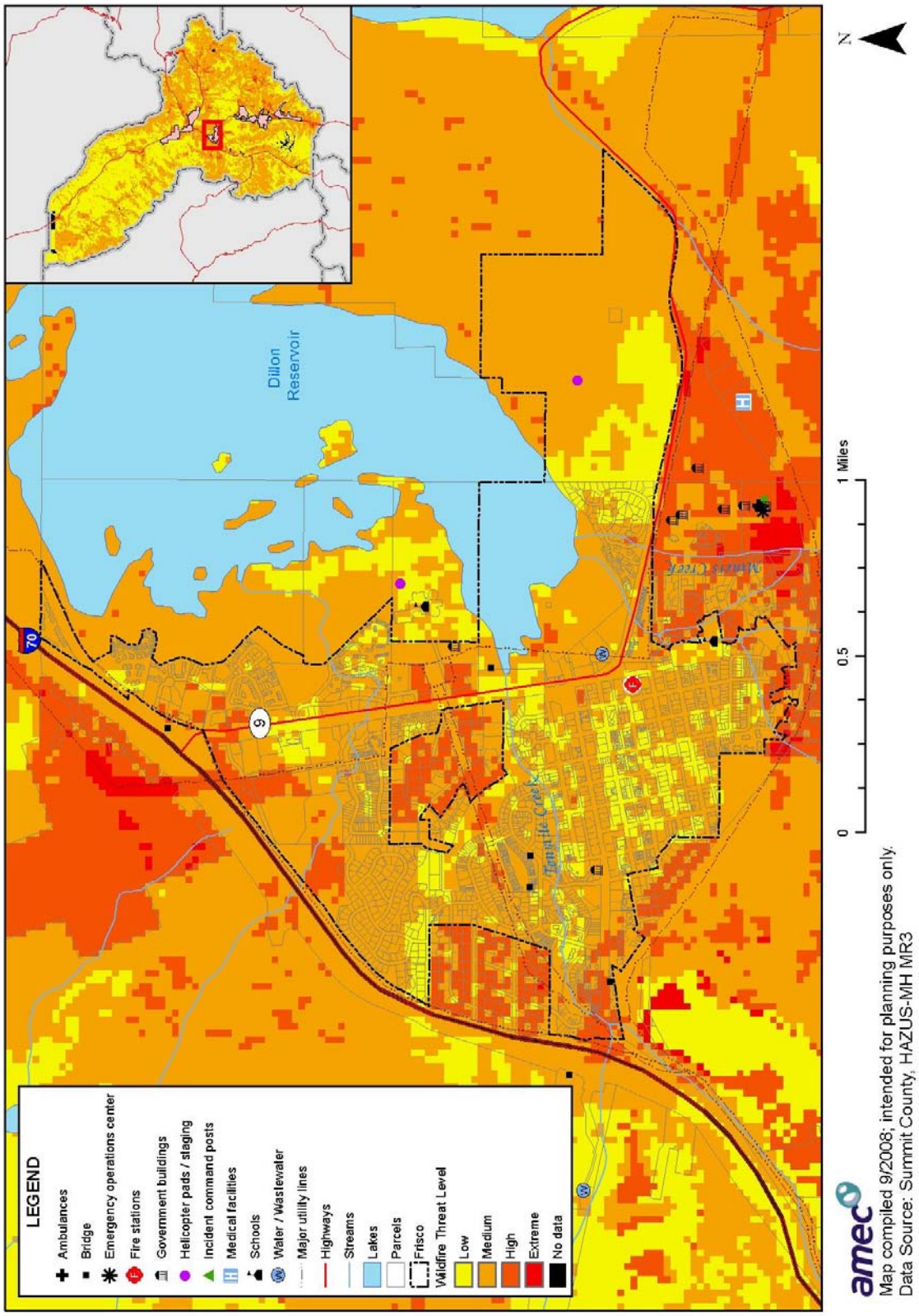
Table E.8. Frisco—Property Values in Wildfire Threat Zones

Threat Zone	Land Value ($)	Improved Value ($)	Total Value ($)
Low	73,253,033	166,942,901	240,195,934
Medium	239,765,830	854,853,086	1,094,618,916
High	21,130,652	36,200,688	57,331,340
Extreme	-	-	-
Totals	**334,149,515**	**1,057,996,675**	**1,392,146,190**

Source: Summit County.
Note: The total values in this table conflict with values in Table E.4 Maximum Population and Building Exposure, because those value were generated using HAZUS and these are generated from the Summit County Assessor's Data.

Most of the acreage in Frisco is in moderate wildfire threat areas (71 percent), as is the majority of improved values (over $850 million).

Figure E.3. Wildfire Threat and Critical Facilities in Frisco



There are no critical facilities located in high wildfire threat areas. The Lake Dillon Fire Protection District, which provides fire protection services to the Town of Frisco and surrounding area, is considered an initial attack center for wildland fires on all private land and takes a joint responsibility with the U.S. Forest Service for fires on federal land.

Future Development

Frisco does not have any policies or regulations in place to address new development in the wildland-urban interface.

Growth and Development Trends

Table E.9 illustrates how Frisco has grown in terms of population and number of housing units between 2000 and 2006.

Table E.9. Frisco—Change in Population and Housing Units, 2000-2006

2000 Population	2006 Population Estimate	Estimated Percent Change 2000-2006	2000 # of Housing Units	2006 Estimated # of Housing Units	Estimated Percent Change 2000-2006
2,443	2,742	+12.2	2,727	3,431	+25.8

Source: Colorado Division of Local Government State Demography Office, www.dola.colorado.gov/dlg/demog/

Because Frisco is essentially landlocked due to topography, the primary source of new growth is occurring as a result of the redevelopment of existing residential and commercial properties.

E.4 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. The capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation outreach and partnerships, and other mitigation efforts.

Regulatory Mitigation Capabilities

Table E.10 lists planning and land management tools typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in Frisco.

Table E.10. Frisco—Regulatory Mitigation Capabilities

Regulatory Tool (Ordinances, Codes, Plans)	Yes/No	Comments
Master Plan	Yes	Town of Frisco Master Plan, updated every 5 years
Zoning Ordinance	Yes	
Subdivision Ordinance	Yes	
Growth Management Ordinance	Yes	
Floodplain Ordinance	Yes	
Other Special Purpose Ordinance (Stormwater, Steep Slope, Wildfire)	No	
Building Code	Yes	2006 International Building Code
Fire Department ISO Rating	Yes	Rating: 4
Erosion or Sediment Control Program	Yes	
Stormwater Management Program	Yes	
Site Plan Review Requirements	Yes	
Capital Improvements Plan	Yes	
Economic Development Plan	Yes	
Local Emergency Operations Plan	Yes	Frisco Local Emergency Operations Plan, 2005
Flood Insurance Study or Other Engineering Study for Streams	Yes	FEMA Flood Insurance Study 1994
Elevation Certificates	Yes	
Other	Yes	Community Rating System: 8

Town of Frisco Master Plan

The Frisco Master Plan is an advisory document that presents a clear and concise community vision for the future of Frisco, and establishes realistic strategies for achieving that vision. The plan is visionary and not regulatory, and is intended to provide direction to elected officials, appointed officials, staff, and the citizenry. The current Master Plan does not identify goals or strategies that specifically relate to hazard mitigation, but rather supports a general framework of future sustainability and promotion of the community's health and welfare. Policies related to hazard mitigation include the following:

- **Policy ENV-1.3. Floodplain:** Maintain a floodplain/floodway management system to prevent future flood damage.
  - Action ENV-1.3.a. Monitor stream water levels during periods of high water runoff and continue to participate in the National Flood Insurance Program's Community Rating System, and maintain a class rating of 8 or better to allow residences that are in the floodplain a 10 percent discount on flood insurance.
- **Policy ENV-1.4. Wetlands and Riparian Areas:** Ensure the preservation and, where appropriate, enhancement of wetlands and riparian areas, as well as the provision of a suitable buffer around these features.
  - Principle ENV-2. Protect and preserve surrounding natural areas that contribute to and enhance the Town's quality of life and mountain character.

Town of Frisco Town Code

The Frisco Town Code serves as the legal framework for the Town, codifying allowable activities, and creating an enforcement structure for the adopted policy of the Town. Outlined below are the chapters in the Frisco Town Code that are related to hazard mitigation and loss avoidance:

- **Chapter 97 Flood Hazard Areas:** The purpose of the floodplain ordinance is to protect public health, safety, and welfare by regulating development and land use in mapped flood hazard areas.
- **Chapter 157 Subdivision of Land:** The subdivision regulations require that particular consideration will be given to geologic hazards and topography in relation to the suitability of the land for development, flooding, storm drainage, and preservation of natural areas for open space. Land subject to hazardous conditions such as landslides, mudflow, rock falls, snowdrifts, possible mine subsidence, shallow water table, floods, and polluted or nonpotable water supply shall be identified and shall not be subdivided until hazards have been or will be eliminated by the subdivider in accordance with the plans developed by a Colorado licensed engineer specializing in such matters, and as approved by the Town Council. Hazard related purposes of the regulations include the following:
  - Protect natural vegetation, wetlands, and scenic areas.
  - Prevent and control erosion, sedimentation, and other pollution of surface and subsurface water.
  - Prevent flood damage to persons and properties and minimize expenditures for flood control.
  - Restrict building on floodlands, shorelands, steep slopes, areas covered by poor soils, or in areas otherwise poorly suited for building or construction.
  - Prevent loss or injury from landslides, expansive soils, and other geological hazards.
- **Chapter 180 Zoning:** The purpose of this chapter is to lessen congestion in the streets, to conserve health, to secure safety from fire, flood, and other dangers.

Administrative/Technical Mitigation Capabilities

Table E.11 identifies the personnel responsible for activities related to mitigation and loss prevention in Frisco.

Table E.11. Frisco—Administrative and Technical Mitigation Capabilities

Personnel Resources	Yes/No	Department/Position	Comments
Planner/Engineer with Knowledge of Land Development/Land Management Practices	Yes	Community Development	
Engineer/Professional Trained in Construction Practices Related to Buildings and/or Infrastructure	Yes	Community Development and Public Works	
Planner/Engineer/Scientist with an Understanding of Natural Hazards	Yes	Community Development	
Personnel Skilled in GIS	Yes	Public Works	Part-time
Full Time Building Official	Yes	Community Development	
Floodplain Manager	Yes	Community Development	
Emergency Manager	No		Summit County Emergency Manager
Grant Writer	Yes	Community Development	
Warning Systems/Services		Police Department	EPN System/Roam Secure System online in the next few months

Fiscal Mitigation Capabilities

Table E.12 identifies financial tools or resources that Frisco could potentially use to help fund mitigation activities.

Table E.12. Frisco—Fiscal Mitigation Capabilities

Financial Resources	Accessible/Eligible to Use
Community Development Block Grants	Yes
Capital Improvements Project Funding	Yes
Authority to Levy Taxes for Specific Purposes	Yes
Fees for Water, Sewer, Gas, or Electric Services	Yes
Impact Fees for New Development	Yes
Incur Debt through General Obligation Bonds	Yes
Incur Debt through Special Tax Bonds	Yes
Incur Debt through Private Activities	Yes
Withhold Spending in Hazard Prone Areas	Yes

Mitigation Outreach and Partnerships

Frisco is also involved in ongoing outreach activities, which include the following:

- The Town has held fire safety classes at the elementary school
- Frisco participates in the Summit County Wildfire Council

- Each spring, the governments of Summit County, Breckenridge, Dillon, Frisco and Silverthorne distribute a packet of information to inform the communities about how to prepare for possible high water in May and/or June resulting from snowmelt

Other Mitigation Activities

The Town is currently installing flood pans as it paves alleys on both the north and south sides of Main Street at a cost of $300,000. This activity will specifically address past flooding at the intersection of 7th Avenue and Main Street and will return collected water back to Ten Mile Creek. Frisco is also replacing a culvert on Judd Creek.

E.5 Mitigation Goals and Objectives

Frisco adopted the hazard mitigation goals and objectives developed by the HMPC and described Chapter 4 Mitigation Strategy.

E.6 Mitigation Actions

The planning team for Frisco identified and prioritized the following mitigation actions based on the risk assessment. Background information on how each action will be implemented and administered, such as ideas for implementation, responsible agency, potential funding, estimated cost, and timeline also are included.

Frisco will continue participation in and compliance with the NFIP. Specific activities that the Town will undertake to continue compliance include the following:

- Working with FEMA and the State in the map modernization program and adopting new DFIRMs when effective
- Reviewing the flood damage prevention ordinance and identifying opportunities for strengthening the ordinance at the same time it is updated to adopt new DFIRMs
- Continuing participation in the Community Rating System and identifying opportunities to increase points and lower rating, such as through this planning process

Mitigation Action: Frisco—1 Mountain Pine Beetle Infestation/Wildfire Mitigation

Jurisdiction:	Town of Frisco
Action Title:	Continue to implement mountain pine beetle plan to mitigate wildfire hazard
Priority:	High
Issue/Background	Frisco has been hit hard by the mountain pine beetle infestation. The Town has taken aggressive action to mitigate further infestation and wildfire hazard by removing trees on our 217-acre peninsula, as well as making trees for removal within the Town proper. The Town has worked with the Summit County Mountain Pine Beetle Task Force to develop a multi-year plan to eradicate the problem on the peninsula as well as reforest the property. The Town has recently reimbursed property owners for removal and replanting trees.
Ideas for Implementation:	Continue to complete projects as part of multi-year plan and incorporate into mitigation strategy as appropriate. Finish replanting of peninsula and identifying trees on private property.
Responsible Agency:	Frisco Police Department, Public Works Department, and Community Development Department
Partners:	Summit County Mountain Pine Beetle Task Force
Potential Funding:	Town of Frisco
Cost Estimate:	Staff time
Benefits: (Losses Avoided)	• Reduces risk of wildfire • Reduces erosion • Protects public health and safety • Improves forest health
Timeline:	Ongoing

Mitigation Action: Frisco—2 Public Education

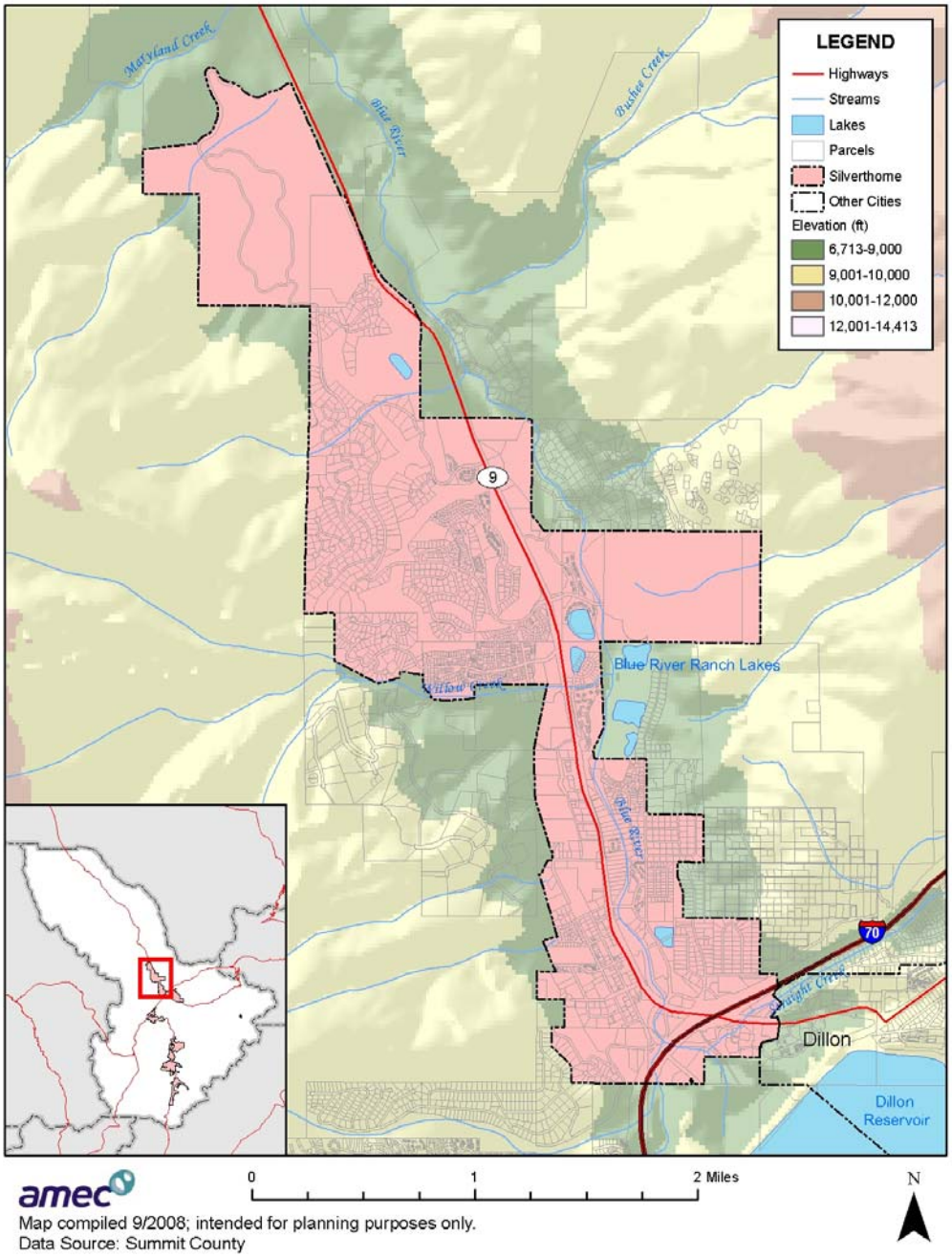
Jurisdiction:	Town of Frisco
Action Title:	Improve information on website about natural hazard risk and mitigation
Priority:	Low
Issue/Background	The Town of Frisco is continually improving information available on its website. The website is a primary tool for providing information to the public and could be used to help improve education on the natural hazards that impact Frisco, the actions that the local governments are taking to reduce risk, and actions that individuals and households can take to reduce potential losses.
Ideas for Implementation:	Incorporate new and improve existing material on the website related to the following types of information: • The National Flood Insurance Program and reduced premiums received through the Town's participation in the Community Rating System. • The Summit County Multi-Hazard Mitigation Plan • Household preparedness measures for severe winter weather and other types of emergencies • Wildfire mitigation and mountain pine beetle programs
Responsible Agency:	Frisco Community Development Department
Partners:	Frisco Police Department, Summit County Office of Emergency Management
Potential Funding:	Town of Frisco
Cost Estimate:	Staff time
Benefits: (Losses Avoided)	• Improve public education and awareness • Protect public health and safety
Timeline:	One year and ongoing

ANNEX F: TOWN OF SILVERTHORNE

F.1 Community Profile

Figure F.1 shows a base map of the Town of Silverthorne and its location in Summit County.

Figure F.1. Map of Silverthorne



Geography

Silverthorne is in the center of Summit County at an elevation of 8,790 feet, just downstream from the Dillon Reservoir on the Blue River. The Blue River flows north through the Town. Its discharge through Silverthorne is regulated by the Dillon Dam. Straight and Willow creeks are tributaries of the Blue River that flow through Silverthorne.

The Town is nestled below Buffalo Mountain and Red Peak, both part of the Gore Range to the west, and Ptarmigan Mountain and the Williams Fork Range to the east. Both sides of the valley are characterized by steep hillsides.

The climate of Silverthorne is that of a Colorado alpine valley. The mean annual temperatures is approximately 35°F, with minimum daily temperatures averaging approximately 16°F and maximum daily temperatures averaging approximately 52°F. The lowest annual temperature averages approximately -45°F and the highest yearly temperature averages approximately 89°F. Total annual precipitation averages 18.4 inches, with approximately 140 inches of snow.

Population

The estimated 2006 population of the Town of Silverthorne was 3,956. Select U.S. Census 2000 demographic and social characteristics for Silverthorne are shown in Table F.1.

Table F.1. Silverthorne—Demographic and Social Characteristics

Characteristic	
Gender/Age	
Male (%)	56.6
Female (%)	43.4
Under 5 Years (%)	6.8
65 Years and Over (%)	2.0
Race/Ethnicity (one race)	
White (%)	82.2
Hispanic or Latino (Of Any Race) (%)	23.5
Other	
Average Household Size	2.9
High School Graduate or Higher (%)	84.8

Source: U.S. Census Bureau, 2000, www.census.gov/

History

Incorporated in 1967, Silverthorne began as a residential area approximately two miles north of the old Town of Dillon. The Town is named for Judge Marshall Silverthorn who bought 160 acres at the Town's current location in 1881. Original subdivisions in the 1950s were home to the construction workers building the Dillon Dam.

Economy

According to the 2000 U.S. Census, the industries that employed the highest percentages of Silverthorne's labor force were arts, entertainment, recreation, accommodation, and food services (22.3%); construction (18.2%); and retail trade (15.2%). Select economic characteristics for Silverthorne from the 2000 U.S. Census are shown in Table F.2.

Table F.2. Silverthorne—Economic Characteristics

Characteristic	
Families below Poverty Level, 1999	21
Individuals below Poverty Level, 1999	228
Median Home Value	264,300
Median Household Income, 1999	58,839
Per Capita Income, 1999	24,271
Population in Labor Force	2,161

Source: U.S. Census Bureau (2000), www.census.gov/

F.2 Hazard Identification and Profiles

Silverthorne's planning team identified the hazards that affect the community and summarized their geographic location, probability of future occurrence, potential magnitude or severity, and planning significance specific to the Town (see Table F.3). In the context of the countywide planning area, there are no hazards that are unique to Silverthorne.

Table F.3. Silverthorne—Hazard Summary

Hazard Type	Geographic Extent*	Probability*	Magnitude*	Hazard Rating
Avalanche	Isolated	Unlikely	Negligible	Low
Dam Failure	Large	Unlikely	Catastrophic	High
Drought	Large	Likely	Limited	Moderate
Earthquake	Large	Unlikely	Limited	Low
Erosion/Deposition	Small	Likely	Limited	Low
Flood	Small	Likely	Critical	High
Hazardous Materials Release (Transportation)	Isolated	Occasional	Critical	High
Landslide, Mudflow/Debris Flow, Rock Fall	Isolated	Likely	Limited	Low
Lightning	Large	Likely	Critical	Moderate
Mountain Pine Beetle Infestation	Medium	Likely	Limited	Moderate
Severe Winter Weather	Large	Highly Likely	Critical	High
Wildfire	Small	Likely	Critical	High
Windstorm	Large	Likely	Limited	Low

*See Section 3.2 for definitions of these factors

Information on past events for each hazard can be found in Section 3.2 Hazard Profiles of the main plan.

F.3 Vulnerability Assessment

The intent of this section is to assess Silverthorne's vulnerability separate from that of the planning area as a whole, which has already been assessed in Section 3.3 Vulnerability Assessment. This vulnerability assessment analyzes the population, property, and other assets at risk to hazards ranked of moderate or high significance that may vary from other parts of the planning area. For more information about how hazards affect the County as a whole, see Chapter 3 Risk Assessment.

Community Asset Inventory

Table F.4 shows the total population, number of structures, and assessed value of improvements to parcels in Silverthorne. Land values have been purposely excluded because land remains following disasters, and subsequent market devaluations are frequently short-term and difficult to quantify. Additionally, state and federal disaster assistance programs generally do not address loss of land or its associated value.

Table F.4. Silverthorne—Maximum Population and Building Exposure

2006 Population Estimate	Number of Structures	Structure Value ($)*
3,956	1,653	467,704,000

Source: HAZUS-MH MR 3 (2007) (structures); Colorado Division of Local Government State Demography Office, www.dola.colorado.gov/dlg/demog/pop_cnty.html
*Value represents "improved structure value" and includes contents

Table F.5 lists critical facilities and other community assets identified by Silverthorne's planning team as important to protect in the event of a disaster.

Table F.5. Silverthorne—Other Community Assets

Name of Asset	Replacement Value ($)	Hazard Concerns
Medical Offices	$3,000,000	
Police Station/Town Hall	$8,500,000	
Fire Station	$2,500,000	
Summit Education Center	$5,000,000	
Silverthorne Elementary School	$14,000,000	
Water and Wastewater Treatment Facilities	$40,000,000 plus collection/distribution systems	Blue River Wastewater Treatment Plant is in the floodplain but designed to withstand the 100-year flood.

Sources: Town of Silverthorne; Summit County GIS

Interstate-70 is also a critical facility and key asset to the community. The locations of critical facilities in Silverthorne identified by Summit County GIS are illustrated in Figure F.2 HAZUS 100-Year Floodplain and Critical Facilities in Silverthorne.

Vulnerability by Hazard

This section analyzes existing and future structures and other assets at risk to hazards ranked of moderate or high significance that vary from the risks facing the entire planning area and estimates potential losses. These hazards include dam failure, flood, and wildfire.

Dam Failure

Existing Development

The Dillon Dam and Reservoir are located approximately .5 miles upstream of the southern corporate limits of Silverthorne. As discussed in Chapter 3 Risk Assessment, failure of the Dillon Dam would have catastrophic effects to the Town of Silverthorne, damaging and destroying the majority of structures. The dam failure inundation map was not available for this planning project; therefore, estimates of structures at risk and potential losses could not be calculated. Further information on the potential impacts of a Dillon Dam failure was considered to sensitive for this public planning document.

Future Development

Most future development occurring in Silverthorne will be at risk to a failure of the Dillon Dam.

Flood

The principal causes of flooding in Silverthorne are along the Blue River, Straight Creek, and Willow Creek from April to July as a result of snowmelt runoff. There have been no serious flood problems in Silverthorne since the Dillon Dam began operating in 1963. The highest discharge has been about 2,000 cubic feet per second (cfs), which is less than the 10-year event. The largest flood on record prior to the construction of the dam was in 1918 when the combined flow of the Blue River, Ten Mile Creek, and the Snake River was 3,500 cfs just upstream of the present location of Silverthorne. U.S. Geological Survey records show high flows on all three streams during May and June of several other years, but no significant damage was reported.

Flooding also is known to occur along a private road to the south of Willow Creek, which can cause ponding along State Highway 9.

Existing Development

The Town’s current effective flood insurance rate map (FIRM) is from 2001. The Town is participating with Summit County in the Federal Emergency Management Agency’s (FEMA) map modernization program. The process to develop new digital flood insurance rate maps (DFIRMs) began in 2007; digital maps were not available for this planning process.

HAZUS-MH MR3, FEMA's loss estimation software, was used to generate a 1 percent annual flood, or 100-year flood, event in the Town of Silverthorne. The software produces a flood polygon and flood-depth grid that represents the 100-year flood. While not as accurate as official flood maps, such as DFIRMs, these floodplain boundaries are for use in GIS-based loss estimation. Figure F.2 shows the HAZUS-generated 100-year floodplain.

HAZUS estimates the number of persons displaced, persons requiring sheltering, buildings impacted, building repair costs, and the associated loss of building contents and business inventory as a result of a 100-year flood event in Silverthorne. The software estimates 311 people would be displaced and 226 would require short-term sheltering.

Building related losses are calculated by HAZUS using a methodology based on the building damage estimates. Flood damage is directly related to the depth of flooding. For example, a two-foot flood generally results in about 20 percent damage to the structure (which translates to 20 percent of the structure's replacement value). HAZUS uses depth damage curves to estimate building losses as the flood depth varies across the inundation area. More information on the methodology for this loss estimation can be found in the Section 3.3 Vulnerability Assessment in the main plan.

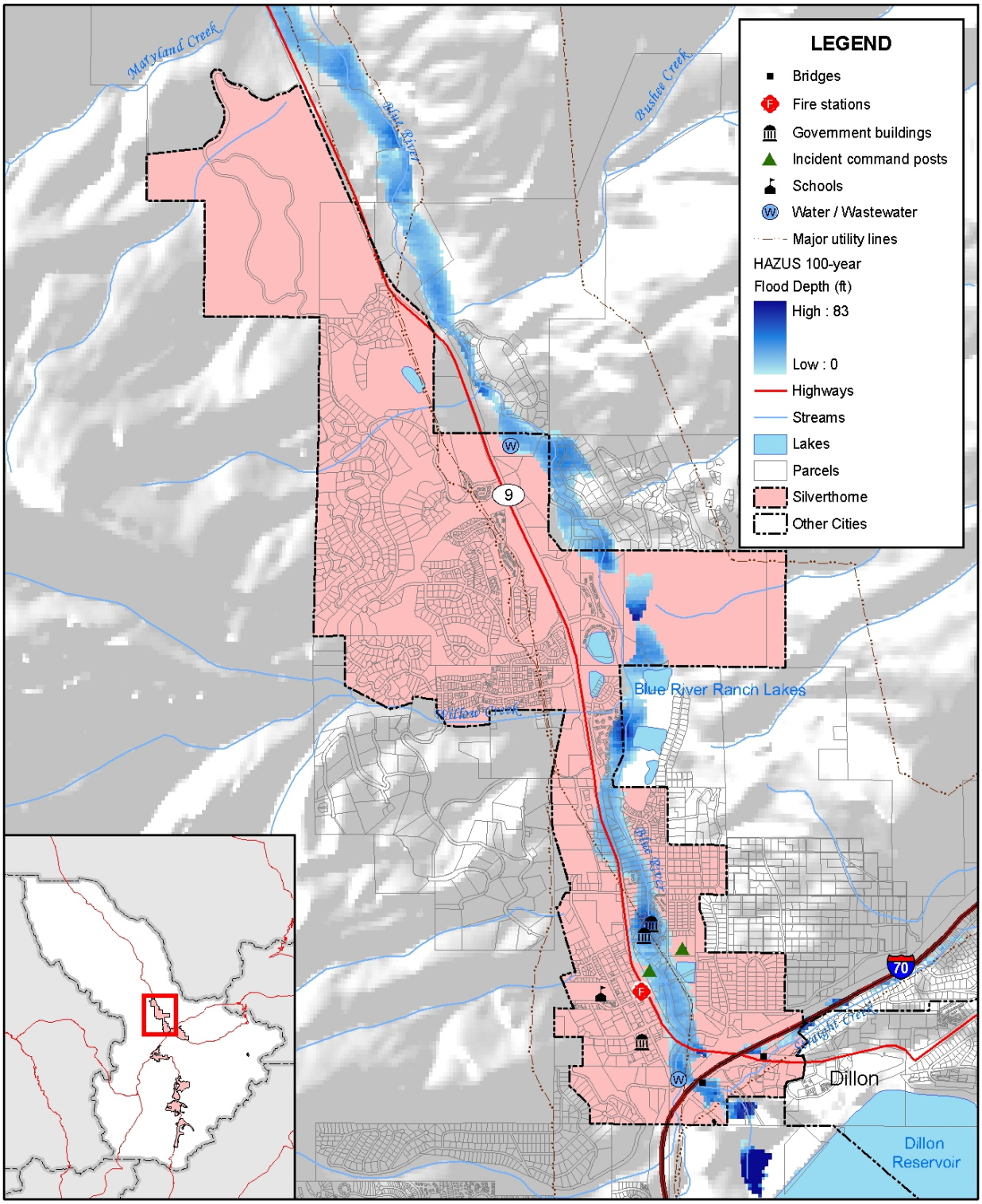
Building related losses are shown in Table F.6, which indicates a total loss of almost $13 million in Silverthorne.

Table F.6. Silverthorne—HAZUS Estimated Building Losses

Cost Building Damage ($)	Cost Contents Damage ($)	Inventory Loss ($)	Relocation Loss ($)	Capital Related Loss ($)	Wages Loss ($)	Rental Income Loss ($)	Total Loss ($)
5,131,000	7,233,000	338,000	21,000	20,000	208,000	9,000	12,960,000

Source: HAZUS-MH MR3 (2007)

Figure F.2. HAZUS 100-Year Floodplain and Critical Facilities in Silverthorne



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Map compiled 9/2008; intended for planning purposes only.
Data Source: Summit County, HAZUS-MH MR3

Table F.7 shows critical facilities located in the HAZUS 100-year floodplain in Silverthorne, which includes the Blue River Wastewater Treatment Plant operated by the Silverthorne Dillon Joint Sewer Authority, an Incident Command Post, Silverthorne Town Hall, and the County's North Branch Library. See Figure F.3 for a map of the floodplain and critical facilities.

Table F.7. Silverthorne—Critical Facilities in HAZUS 100-Year Floodplain

Facility Name	Flood Depth (Feet)
Blue River Wastewater Treatment Plant	2.2
Incident Command Post	3.2
Silverthorne Town Hall	4.4
County North Branch Library	3.2

Source: HAZUS-MH (MR 3)

The Blue River Wastewater Treatment Plant is in the floodplain but is designed for the 100-year flood. Critical operating floor elevations are above the 100-year floodplain. In addition, the effective FIRM does not put the town hall or library within special flood hazard areas. HAZUS models more extensive flooding in the area of these two structures than the FIRM. This could be due to the approximate nature of the 30-meter digital elevation model used by HAZUS or due to the existence of local flood control mechanisms not accounted for by HAZUS. The discharge rate below Dillon Dam modeled by HAZUS was only slightly greater than that of the FIRM.

National Flood Insurance Program

Silverthorne joined the National Flood Insurance Program (NFIP) on May 1, 1980. NFIP insurance data indicates that as of February 29, 2008, there were 69 flood insurance policies in force in the Town with $10,840,000 of coverage. Of the 69 policies, all were residential (26 were for single-family homes). 44 of the policies were in A zones and 25 were in B, C, and X zones.

There have been no historical claims for flood losses. Thus, there were no repetitive or severe repetitive loss structures.

Silverthorne participates in the Community Rating System (CRS). The Town has 770 total points for a CRS class ranking of 9, which provides a 5 percent reduction in flood insurance premiums for all policyholders in the community. Silverthorne achieves its CRS points through the following activities:

- Elevation certificates
- Map information service
- Hazard disclosure
- Higher regulatory standards
- Flood data maintenance
- Stormwater management
- Drainage system maintenance

Future Development

Based upon the 2000 FEMA Flood Insurance Study, there is limited development within the 100-year floodplain in Silverthorne. Most development in the floodplain occurs along the northwest segment of Mesa Drive and on the east side of Highway 9 in an area where 11th and 9th streets would cross the Blue River if they were extended to the east. The Town's flood damage prevention ordinance regulates development in special flood hazard areas.

Significant wetland areas exist east of State Highway 9 and north of 12th Street in Silverthorne as the Blue River meanders northwards. There are also many wetland areas adjacent to ponds, streams, and tributaries to the Blue River. All water bodies and wetlands are protected by the waterbody, wetland, and riparian protection regulations of the Town Code (Town of Silverthorne 2004).

Silverthorne is considering the development of a kayak park in the Blue River for recreational purposes. Because the park would be considered development within the floodway, the Town will be submitting a conditional letter of map revision to FEMA. Current budgeting for the project plans for construction in 2010.

Landslide, Mud Flow/Debris Flow, Rock Fall

Existing Development

Geologic hazards in Silverthorne include avalanches, landslides, rock falls, mudflows, debris fans, and unstable slopes. The majority of the Silverthorne community is located in areas that have little potential for these hazards. However, as Silverthorne grows and development on steep hillsides continues to be considered, the hazard potential will increase.

While most of the town itself is relatively flat, the Eagles Nest and Willow Creek Highlands subdivisions in the northwestern portion of the town have been developed on forested hillsides. There are several areas in the Town that have slopes between 10 and 20 percent. These areas are located primarily west of Highway 9 in and around Golden Eagle Road in the Willowbrook Subdivision. South of Golden Eagle Road there are slopes between 10 and 20 percent along the western most edge of town, west of Brian/Adams Avenues and west of Warren Avenue. Slopes of this same percent are also found in the portion of Town that extends east in and around Buffalo Mountain Ranch. There are also many slopes within the Town and its immediate vicinity that are over 30 percent (Silverthorne Comprehensive Plan, 2004).

Future Development

The Town's subdivision regulations address procedures and requirements for development in geologic hazard areas. The following information was extracted from the Silverthorne Comprehensive Plan (2004). Slope is the most limiting factor to be considered in the design of access roads and residential subdivisions. Slope stabilization in the Silverthorne area is difficult even where homes are constructed on nearly level pads. Snow removal also becomes an increasingly greater problem as more homes are built. The surface runoff that results from

snowmelt increases the erosion hazards on cut and fill slopes. Although seeding can minimize this hazard, it can be difficult to establish a viable plant growth in these areas. Homes should be designed to use the existing slope as much as possible and keep foundation cuts to a minimum. Roads should be designed to keep cut and fill slopes to a minimum and provide drainage outlets for snowmelt. All-weather asphalt roads are impractical in many areas unless provisions are made to offset shrink-swell and frost action.

Wildfire

Existing Development

A wildfire threat ranking was developed for the Summit County Community Wildfire Protection Plan by the County, fire protection districts, and U.S. Forest Service. It is based on fuel hazards, risk of wildfire occurrence, essential infrastructure at risk, community values at risk, and local preparedness and firefighting capability. It classifies the wildfire threat as low, medium, high, and extreme. The wildfire threat GIS layer was used to determine the number of acres in each wildfire threat zone and map the wildfire threat in Silverthorne (see Table F.8 and Figure F.3).

Table F.8 Silverthorne—Acreage in Wildfire Threat Zones

Low		Medium		High		Extreme		
Acres	%Total	Acres	%Total	Acres	%Total	Acres	%Total	Total Acres
1,560	63	908	37	7	0	-	0	2,475

Source: Summit County

Based on the methodology described for wildfire in Section 3.3.3 Vulnerability by Hazard, the property values in Silverthorne were separated into wildfire threat zones, as shown in Table F.9

Table F.9. Silverthorne—Property Values in Wildfire Threat Zones

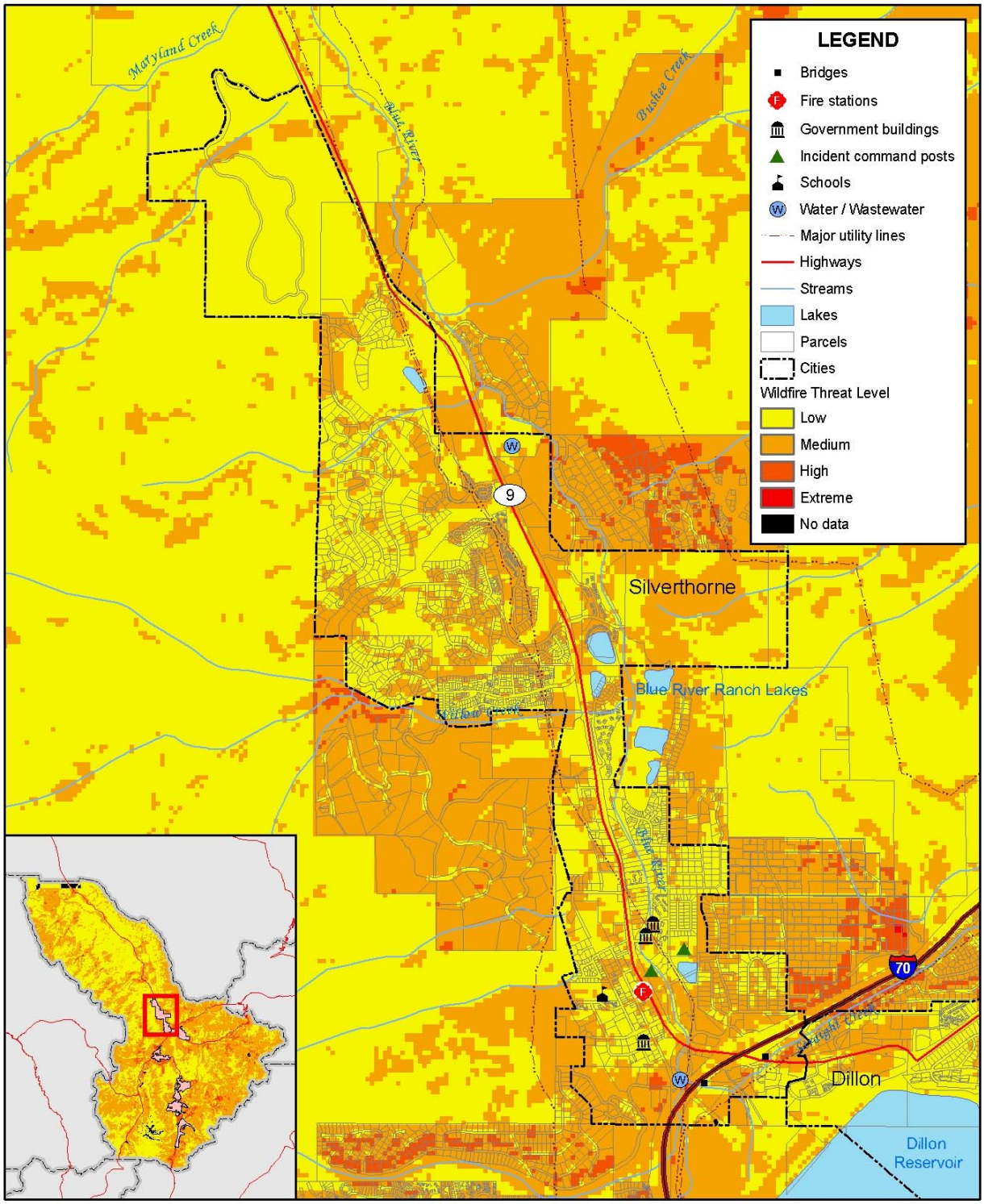
Threat Zone	Land Value ($)	Improved Value ($)	Total Value ($)
Low	248,852,421	382,800,151	631,652,572
Medium	146,900,694	301,559,038	448,459,732
High	1,554,530	1,202,273	2,756,803
Extreme	-	-	-
Totals	**397,307,645**	**685,561,462**	**1,082,869,107**

Source: Summit County.
Note: The total values in this table conflict with values in Table F.4 Maximum Population and Building Exposure, because those value were generated using HAZUS and these are generated from the Summit County Assessor's Data.

Most of the acreage in Silverthorne is in low to medium wildfire threat zones. However, the analysis indicates that over $1 million in improved property value is located in high wildfire threat areas. The Lake Dillon Fire Protection District, which provides fire protection services to the Town of Silverthorne and surrounding area, is considered an initial attack center for wildland fires on all private land.

There are no critical facilities in an extreme or high wildfire threat zone in Silverthorne.

Figure F.3. Wildfire Threat and Critical Facilities in Silverthorne



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Map compiled 9/2008; intended for planning purposes only.
Data Source: Summit County, HAZUS-MH MR3

Future Development

Wildfire hazards, especially the wildland-urban interface, are becoming a larger issue in Silverthorne and the surrounding public lands. Most of the valley floor in the Town has been developed and residential subdivisions are now being built on the forested slopes that surround the Town. Areas of significant concern include the Wildernest and Mesa Cortina subdivisions located in Summit County (but within Silverthorne's three-mile area), and the Ptarmigan Mountain area (Government Small Tracks Subdivision) on the southeast side of town. Many of these subdivisions do not comply with current fire codes and present significant challenges to the fire district, especially with regard to access. The Eagles Nest and Willow Creek Highlands subdivisions and the Heitt and Clark Ranches on the northeast side of town are other areas were wildfire hazard is a concern (Silverthorne Comprehensive Plan, 2004).

Silverthorne's Fire Hazard Mitigation ordinance establishes permitted fire mitigation standards for new and existing development.

Growth and Development Trends

Table F.10 illustrates how Silverthorne has grown in terms of population and number of housing units between 2000 and 2006.

Table F.10. Silverthorne—Change in Population and Housing Units, 2000-2006

2000 Population	2006 Population Estimate	Estimated Percent Change 2000-2006	2000 # of Housing Units	2006 Estimated # of Housing Units	Estimated Percent Change 2000-2006
3,196	3,956	+23.8	1,582	2,077	+31.3

Source: Colorado Division of Local Government State Demography Office, www.dola.colorado.gov/dlg/demog/

In 2007, the Town of Silverthorne building department issued permits for 32 single-family residences and 8 multi-family units. The majority of this growth occurred in the subdivisions of Three Peaks, Eagles Nest, and Willowbrook. Residential building permits in coming years are expected to remain steady. There is a total of 2,688 acres within the incorporated limits of the Town. In 2008, there were a total of 2,944 zoned residential units, of which 2,079 have been platted, and 1,813 have been built.

The Town of Silverthorne, in combination with the Lake Dillon Fire Protection District, recently approved construction of a new joint facility. It will replace the existing fire station in Silverthorne and will also provide office space for the wastewater treatment plant. The total cost of the facility will be approximately $8 million. It will be located on the north end of town along Highway 9, near the elementary school. It will be located outside of the 100-year floodplain and in an area of low wildfire threat.

F.4 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. The capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation outreach and partnerships, and other mitigation efforts.

Regulatory Mitigation Capabilities

Table F.11 lists planning and land management tools typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in Silverthorne.

Table F.11. Silverthorne—Regulatory Mitigation Capabilities

Regulatory Tool (Ordinances, Codes, Plans)	Yes/No	Comments
Master Plan	Yes	2004. Update in process.
Zoning Ordinance	Yes	
Subdivision Ordinance	Yes	
Growth Management Ordinance	No	
Floodplain Ordinance	Yes	
Other Special Purpose Ordinance (Stormwater, Steep Slope, Wildfire)	Yes	Removal of Dead Diseased and Beetle Infested Trees
Building Code	Yes	2003 International Building Code, 2006 International Fire Code and Amendment, 2006 International Energy Conservation Code
Fire Department ISO Rating	Yes	Rating: 4
Erosion or Sediment Control Program	Yes	
Stormwater Management Program	Yes	
Site Plan Review Requirements	Yes	
Capital Improvements Plan	Yes	
Economic Development Plan	Yes	
Local Emergency Operations Plan	No	Incorporated in Summit County Emergency Operations Plan
Other Special Plans	Yes	Dam Failure; Parks, Trails, and Open Space Master Plan
Flood Insurance Study or Other Engineering Study for Streams	Yes	FEMA Flood Insurance Study, August 9, 2001
Elevation Certificates	Yes	
Other	Yes	Community Rating System Rating: 9

Silverthorne Comprehensive Plan, 2004

The Silverthorne Comprehensive Plan defines a long-term vision for the Town. In addition to defining the community's view of its future, the Comprehensive Plan outlines goals, policies,

and specific strategies to guide decision makers in the future. The goals of the Comprehensive Plan are the following:

- Protect the health, safety, and general welfare of the citizens in the community,
- Improve the physical, social, and economic environment of the community, and
- Understand and make decisions on proposed short-term, individual actions that are based upon the long-range impacts of those actions.

Chapter 2 Planning Influences describes Environmental Constraints to development in Silverthorne and provides an overview of geologic hazards, slope and topography, floodplains and wetlands, and wildfire hazards.

Chapter 3 Land Use Element includes the following goals and policies related to hazard mitigation:

- **Goal 3-1**: To establish a pattern of future land uses which will promote the highest degree of health, safety, efficiency, and well being for all segments of the community, and make the most efficient use of land, community facilities, services, while protecting the environment and natural resources.
  - Policy 3.1.14: The Town shall establish open space land dedication requirements that preserve and protect areas of significance to the community. These include but are not limited to wetlands, steep slopes, 100-year floodplains, significant landforms, significant vegetation, and view corridors.

- **Goal 3-6:** To protect the environment and improve it whenever and wherever possible.
  - Policy 3.6.1: The Town shall prohibit development within or adjacent to areas identified as potential hazardous areas. Developments proposed for any areas considered to pose a hazard shall submit engineering investigations of the site and mitigate potential negative impacts.
  - Policy 3.6.2: The Town shall prohibit development on slopes greater than 30 percent and require engineering investigations of steep sites during project review. Development on slopes in excess of 15 percent shall maintain the maximum vegetative cover possible to protect soils, prevent land slippage, and retain wildlife habitat and open space resources.
  - Policy 3.6.3: The Town shall encourage the paving of gravel roadways, driveways and parking lots to decrease pollution from dust.
  - Policy 3.6.7: The Town shall require new and existing developments to provide adequate measures to control any adverse effects to the water quality and groundwater resources of the region.
  - Policy 3.6.8: The Town shall develop a storm water management plan to protect water quality.

Silverthorne Town Code

The Silverthorne Town Code serves as the legal framework for the Town, codifying allowable activities and creating an enforcement structure for its adopted policy. The Town Code is organized under 12 titles and various subsections; those related to hazard mitigation are outlined below.

Chapter 3 Public Works Article VIII Flood Damage Prevention Ordinance, 1999

The purpose of the ordinance is to promote the public health, safety, and general welfare and to minimize public and private losses due to flood conditions to specific areas by provisions designed:

- (1) To protect human life and health;
- (2) To minimize expenditures of public money for costly flood control projects;
- (3) To minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- (4) To minimize prolonged business interruptions;
- (5) To minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets and bridges located in areas of special flood hazard;
- (6) To help maintain a stable tax base by providing for the sound use and development of areas of special flood hazard so as to minimize future flood blight areas;
- (7) To ensure that potential buyers are notified that property is in an area of special flood hazards; and
- (8) To ensure that those who occupy the areas of special flood hazards assume responsibility for their actions.

In order to accomplish its purposes, this Article includes methods and provisions for:

- (1) Restricting or prohibiting uses which are dangerous to health, safety and property due to water or erosion hazards, or which result in damaging increases in erosion or in flood heights or velocities;
- (2) Requiring that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;
- (3) Controlling the alteration of natural floodplains, stream channels and natural protective barriers, which help accommodate or channel flood waters;
- (4) Controlling filling, grading, dredging and other development which may increase flood damage; and
- (5) Preventing or regulating the construction of flood barriers which will unnaturally divert flood waters or which may increase flood hazards in other areas.

In all areas of special flood hazards where base flood elevation data has been provided, residential and nonresidential new construction and substantial improvement must have the lowest floor elevated to at least one foot above base flood elevation.

The ordinance designates the Public Works Director as the floodplain administrator and defines the administrator's duties.

Chapter 4 Community Development Article IV Procedures and Requirements for Subdivisions

One of the purposes of this article is to promote the general health, safety, and welfare of the present and future inhabitants of the Town by requiring that land proposed for subdivision shall be used safely for the intended purpose without danger to health or peril from fire, flood, geologic hazards, or other natural hazards. It requires that no land shall be subdivided which is determined by the Town to be unsuitable for subdivision by reason of flooding, bad drainage, rock or soil creep, mudflow, rockslide, avalanche or snow slide, steep topography, or any other natural or environmental hazard, feature or condition of potential harm to the health, safety, or welfare of the future residents of the proposed subdivision or to the Town.

Chapter 4 Community Development Article VIII Environmental Guidelines

Division 4 Fire Hazard Mitigation establishes permitted fire mitigation standards for the protection of life and property from wildfire**s** by reducing the hazards from threat of wildland fires on structures. Mitigation regulations include the following

- All new construction of residential and commercial structures shall be required to install a Class A roof covering.
- All existing residential and commercial structures when re-roofing will require a Class A roof cover to be installed.
- A property owner may remove all trees and shrubs within 10 feet of structures on site.
- Tree branches of large trees should be trimmed to a minimum of six feet from the ground.
- Cut or piled combustible materials may be a minimum of 10 feet from the property line and/or 10 feet from any structure.
- Grass and/or other combustible materials on undeveloped parcels of any size which pose a fire hazard as determined by the Community Development Department or Lake Dillon Fire Department shall be removed.
- Dead, diseased and/or beetle infested trees must be removed from the property within 10 days of receipt of written notice to the property owner or responsible party.
- Upon remodeling, renovation, or repairs requiring a building permit, the owners of the residential property will retrofit all existing wood stoves/wood burning fireplace chimneys with approved spark arrestors as approved by the building official.

Administrative/Technical Mitigation Capabilities

Table F.12 identifies the personnel responsible for activities related to mitigation in Silverthorne.

Table F.12. Silverthorne—Administrative and Technical Mitigation Capabilities

Personnel Resources	Yes/No	Department/Position
Planner/Engineer with Knowledge of Land Development/Land Management Practices	Yes	Community Development/Director; Planning Manager, Planner II
Engineer/Professional Trained in Construction Practices Related to Buildings and/or Infrastructure	Yes	Public Works/Director, Engineer; Utilities Manager
Planner/Engineer/Scientist with an Understanding of Natural Hazards	Yes	Community Development; Public Works/Director, Engineer
Personnel Skilled In GIS	Yes	Public Works and Utilities Personnel; Community Development/Information Systems Technician
Full Time Building Official	Yes	Community Development/Building Official
Floodplain Manager	Yes	Public Works/Engineer
Emergency Manager	No	Summit County Office of Emergency Management/Emergency Manager
Grant Writer	Yes	Parks and Recreation/Director
Warning Systems/Services	Yes	Summit County Office of Emergency Management/Emergency Manager

Fiscal Mitigation Capabilities

Table F.13 identifies financial tools or resources that Silverthorne could potentially use to help fund mitigation activities.

Table F.13. Silverthorne—Fiscal Mitigation Capabilities

Financial Resources	Accessible/Eligible to Use (Yes/No)
Community Development Block Grants	Yes
Capital Improvements Project Funding	Yes
Authority to Levy Taxes for Specific Purposes	Yes
Fees for Water, Sewer, Gas, or Electric Services	Yes, water and sewer
Impact Fees for New Development	Yes
Incur Debt through General Obligation Bonds	Yes
Incur Debt through Special Tax Bonds	Yes
Incur Debt through Private Activities	Yes
Withhold Spending in Hazard Prone Areas	Yes

The Town of Silverthorne is currently investigating forming a special improvement district to fund burying utility lines underground.

Mitigation Outreach and Partnerships

Silverthorne is involved in ongoing outreach activities and partnerships related to hazard mitigation, which include the following:

- Each spring, the governments of Summit County, Breckenridge, Dillon, Frisco, and Silverthorne distribute a packet of information to inform the communities about how to prepare for possible high water in May or June resulting from snowmelt.
- After the December 2007 severe winter storm, the Town met with the Red Cross to improve guidelines and procedures for deploying an emergency shelter in the Silverthorne Recreation Center. Specific times of operation, capacity of the building, and capacity of each room within the building were determined. The Town will apply the new procedures during the next emergency event that requires sheltering.

Past Mitigation Efforts

Other mitigation related programs and projects that Silverthorne has implemented in the past include the following:

- In November 2007, a tree survey of public and private forested properties was conducted to help manage the mountain pine beetle infestation in Silverthorne. The survey identified 2,129 trees that needed to be cut and removed (or cut and chipped) before the summer of 2008. Property owners were responsible for taking action on trees on their property.
- In 2006, the Town hired a consultant to review all Town-owned property, including public rights of way, for beetle or other infestation killed trees. The Town then had the dead and downfall trees removed and preventive spraying applied to specified trees per the consultant's recommendations.
- The Town completed a stream restoration project on the Blue River to improve fish habitat and ecological function. This project also deepened the flow channel, which reduces flooding.
- Within the past 10 years, the Town has implemented an automatic backup power source for the Town's water supply system to insure an available water source during emergencies, such as a wildfire incident.
- Initiated in 2000 and continued annually, the Town provides a dropoff site for slash and processes the collected slash into chips that are transported to the Climax Mine as part of their reclamation efforts.

F.5 Mitigation Goals and Objectives

Silverthorne adopted the hazard mitigation goals and objectives developed by the Summit County Hazard Mitigation Planning Committee and described in Chapter 4 Mitigation Strategy.

F.6 Mitigation Actions

The planning team for Silverthorne identified and prioritized the following mitigation actions based on the risk assessment. Background information on how each action will be implemented and administered, such as ideas for implementation, responsible agency, potential funding, estimated cost, and timeline also are included. The Town also chose to include emergency response actions related to water and wastewater facilities in their annex.

As part of their mitigation strategy, Silverthorne will continue participation in and compliance with the NFIP. Specific activities that the Town will undertake to continue compliance include the following:

- Working with FEMA and the State in the map modernization program and adopting new DFIRMs when effective
- Continuing participation in the Community Rating System and identifying opportunities to increase points and lower rating, such as through this planning process
- Revising language of the flood damage prevention ordinance to improve clarity and ease of use (see Mitigation Action—3).

Mitigation Action: Silverthorne—1 Utility Undergrounding

Jurisdiction: Town of Silverthorne

Action Title: Pursue implementation of special improvement districts as a mechanism to fund the undergrounding of existing overhead utility lines

Priority: High

Issue/Background Many of the older neighborhoods in Silverthorne have existing overhead utility lines. A utility undergrounding project would improve safety and reliability, particularly during severe weather events.

The Town of Silverthorne passed a resolution in 2007 acknowledging its willingness to participate in the undergrounding of utility lines in existing neighborhoods by establishing special improvement districts for the purpose of funding. Town Council will only consider forming a special improvements district following receipt of a petition from neighborhoods with signatures of at least 51 percent of the property owners. Area 2 and Area 4 submitted valid petitions with signatures representing over 50 percent of properties in their areas.

Ideas for Implementation: Town staff will develop more detailed information regarding costs, plans, and specifications for neighborhoods that submitted valid petitions. The Town Council will then conduct a public hearing for each petition to determine whether or not to form a special improvement district. If it chooses to create the district, the Council would contract for the work to be performed. The work would involve reconstructing utility lines underground and removing the existing overhead lines and poles.

Responsible Agency: Public Works Department – Engineering program

Partners: Other Town departments

Potential Funding: Silverthorne Town Council passed a formal resolution authorizing financial participation at a level of $4,000 per lot for any special improvement districts formed by neighborhood petitions by June1, 2008. Other costs will be borne by property owners within these districts.

Cost Estimate: Xcel, Qwest, and Comcast determine the cost for undergrounding their lines and have not provided estimates. Costs will vary by potential special improvement districts.

Benefits: (Losses Avoided)

- Prevents power outages due to windstorms, severe winter weather, or other severe weather events
- Prevents loss of other critical facility and infrastructure services
- Reduces economic losses
- Protects public health, safety, welfare

Timeline: Expected construction would occur in 2009 and 2010

Mitigation Action: Silverthorne—2 Mountain Pine Beetle Ordinance

Jurisdiction: Town of Silverthorne

Action Title: Continue to implement mountain pine beetle program and enforce ordinance

Priority: High

Issue/Background Silverthorne's Code Section 4-8-44 (adopted in 2006) requires land owners to remove all dead, diseased, and/or beetle-infested trees located on their property within 10 days of notification. In November 2007, a tree survey of public and private forested properties was conducted to help manage the mountain pine beetle infestation in Silverthorne. The survey identified 2,129 trees that needed to be cut and removed (or cut and chipped) before the summer of 2008. Land owners were responsible for taking action on trees on their property. The tree removal deadline was June 20, 2008, and enforcement measures for remaining trees began in July 2008.

The Town also has removed beetle infested trees from Town-owned property at a cost of approximately $50,000 in 2007 and $70,000 in 2008.

Ideas for Implementation: Silverthorne will continue with program for the next three to five years Between September 20 and October 1, 2008, the Town will survey trees on residential properties in Silverthorne to identify and mark trees that have been recently infected with pine beetle. These trees will be marked with a blue paint ring. Upon the completion of the survey, property owners with infected or dead trees on their property will receive a follow-up notification indicating removal requirements. The Town will also conduct media outreach to inform property owners of the program. Trees that have not been removed by the stated deadline will be removed by the Town and property owners charged at double the full cost of removal plus additional fines. The Town will offer a site for citizens to take slash for disposal and will pay for grinding at the end of the year.

Responsible Agency: Silverthorne Town Manager's office and Community Development Department

Partners: All Town departments

Potential Funding: The Town of Silverthorne will provide funding for the tree survey, slash disposal site and grinding, and staff time to administer and enforce program. Property owners pay for tree removal.

Cost Estimate: Annual cost estimate is $7,000-10,000 for tree survey, $10,000 for slash disposal site and grinding, $50,000 for tree removal on Town-owned property, and significant staff time to administer and enforce

Benefits: (Losses Avoided)

- Reduces wildfire hazard
- Reduces rate of spread of mountain pine beetle infestation

Timeline: Ongoing for next three to five years

Mitigation Action: Silverthorne—3 Flood Damage Prevention Ordinance

Jurisdiction:	Town of Silverthorne
Action Title:	Revise language of Silverthorne flood damage prevention ordinance to improve clarity and ease of use
Priority:	Medium
Issue/Background	Property owners and developers often have a hard time understanding the language and intent of the Town's flood damage prevention ordinance, which is based upon standard National Flood Insurance Program (NFIP) language. This can result in users misinterpreting requirements and increases staff time spent answering questions and working through issues.
Ideas for Implementation:	Analyze common misperceptions and questions regarding the ordinance to focus revisions on the most problematic areas. Consider how other communities have improved upon standard NFIP language. Communicate with other Town departments on needed changes and provide any needed education on the final product.
Responsible Agency:	Public Works Department – Engineering program
Partners:	Other Town departments
Potential Funding:	Staff time
Cost Estimate:	$20,000
Benefits: (Losses Avoided)	• Improved public understanding of the Town's floodplain management program • Improved administration and enforcement of the flood damage prevention ordinance
Timeline:	Within next two years

Mitigation Action: Silverthorne—4 Emergency Power for Wastewater Treatment Plant

Jurisdiction: Town of Silverthorne

Action Title: Insure emergency power for wastewater treatment plant during extended power outage

Priority: Medium

Issue/Background A 450 kilowatt emergency generator was installed in 2000. The generator consumes approximately 33 gallons of diesel per hour. The fuel is supplied from a 1,000 gallon tank which would require refilling on a daily basis during an extended power outage. Possible solutions are to arrange for the delivery of a tanker during an emergency.

Ideas for Implementation: Evaluate increasing emergency generator capacity to reflect plant expansions and increased plant loading since the generator was installed in 2000. The generator is capable of running the main plant and digestor but would require that aeration be cycled to various basins on a rotating basis since the generator cannot operate all of the required blowers on a continuous basis.

The dewatering facility is on a separate transformer and cannot be operated by the emergency generator. If it became necessary to operate the centrifuge during an extended power outage, a 150 kilowatt generator could be rented. Availability and guaranteed rental should be investigated.

The flow equalization pond provides additional backup during an extended power failure. Approximately 24 hours of partially treated wastewater could be stored in the pond on an emergency basis.

An engineering evaluation for installing increased generator capacity should be initiated.

Responsible Agency: Silverthorne/Dillon Joint Sewer Authority

Partners: Town of Silverthorne and Town of Dillon

Potential Funding: Capital funding

Cost Estimate: Costs will be estimated based upon engineering evaluation

Benefits: (Losses Avoided)

- Prevent loss of services during extended power outages
- Avoid discharging raw wastewater and associated violations and possible penalties

Timeline: Generator capacity engineering study and design in 2010 with capital appropriation and construction in 2012.

Mitigation Action: Silverthorne—5 Emergency Power for Water Distribution

Jurisdiction:	Town of Silverthorne
Action Title:	Insure continued water distribution during extended power outage
Priority:	Medium
Issue/Background	The Water and Sewer program maintains the Town's water system and sewage transmission line. Water is provided by the Town of Silverthorne through a system of wells, storage tanks, and distribution lines. Some emergency power generators are in place but additional generators and fuel sources are needed to maintain services during extended power outages.
Ideas for Implementation:	Secure fuel source for generators in place. Verify rental companies can accommodate our needs. Budget for a mobile generator to run all stations.
Responsible Agency:	Silverthorne Public Works Department – Water and Sewer program
Partners:	
Potential Funding:	Town of Silverthorne
Cost Estimate:	$50,000
Benefits: (Losses Avoided)	• Prevent interruption of fire flows • Prevent loss of services to customers • Protection public health and safety
Timeline:	Completed by 2010

Mitigation Action: Silverthorne—6 Action Plan for Explosive Gas Event

Jurisdiction: Town of Silverthorne

Action Title: Develop action plan for responding to an explosive gas event at the head works of the Silverthorne/Dillon Joint Sewer Authority

Priority: Low

Issue/Background Explosive gas detectors are located at the head works and the Buffalo Mountain and the Dillon/Dillon Valley flume vaults. An alarm is triggered at the head works when an explosive gas concentration reaches 10 percent lower explosive limit. The overhead door opens automatically and an exhaust fan turns on.

Ideas for Implementation: If the alarm persists, plant personnel should be notified and assemble at the sludge building. The plant gate should be locked to prevent entry by non-essential personnel. The fire and police departments should be notified of the situation and placed on stand by.

If an explosion were to occur and damage or destroy the head works, it would be necessary to establish bypass pumping using the Silverthorne/Dillon Joint Sewer Authority's 4x4 and 6x6 trash pumps. The damage could extend up the sewer line for some distance and an additional discharge hose might be required. Extended time pumping would require additional pumps be rented.

Responsible Agency: Silverthorne/Dillon Joint Sewer Authority

Partners:

Potential Funding: Purchase additional discharge hose from plant operations and maintenance budget.

Cost Estimate: Less than $10,000

Benefits: (Losses Avoided)

- Prevent loss of services, continue plant operations and meet discharge permit

Timeline: Purchase discharge hose in 2009.

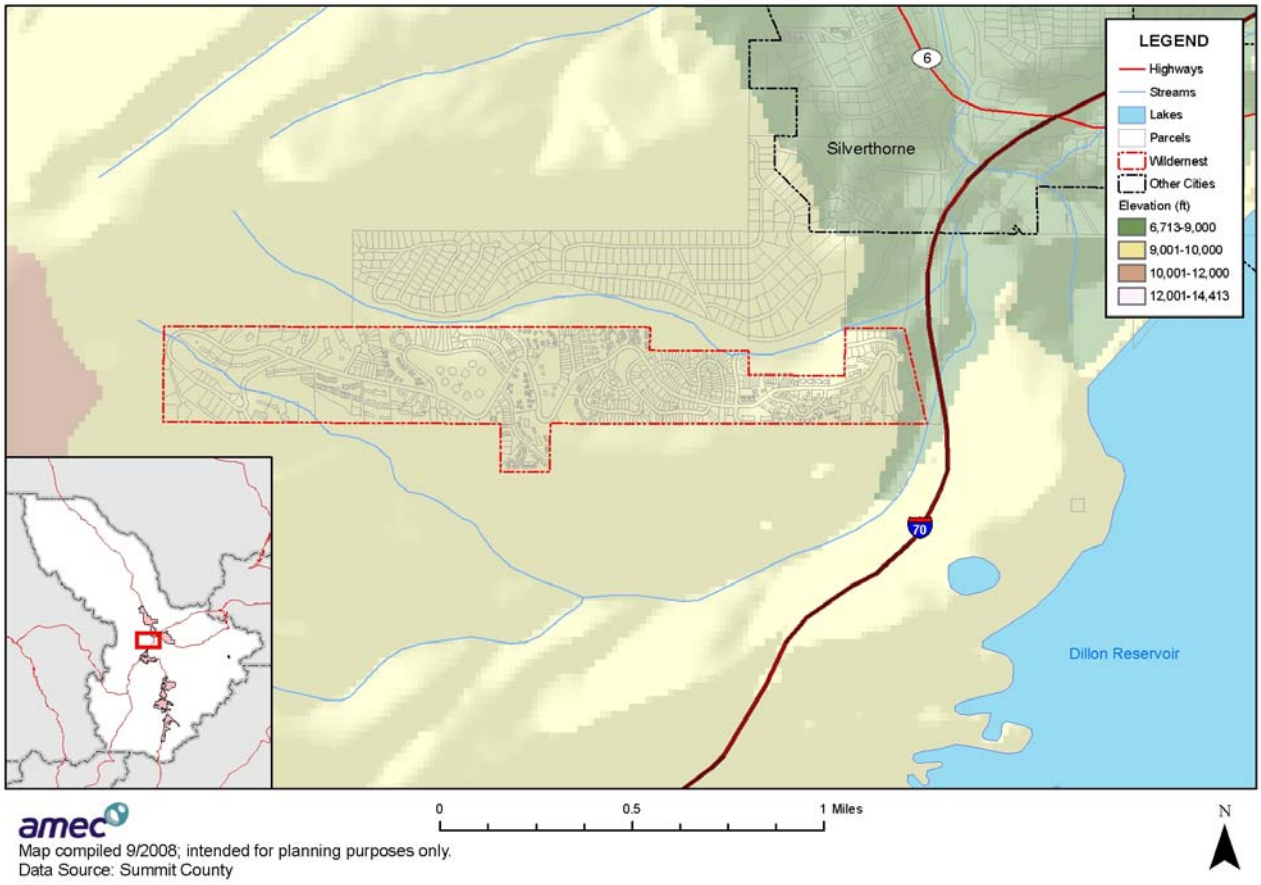
ANNEX G: BUFFALO MOUNTAIN METROPOLITAN DISTRICT

G.1 Community Profile

Buffalo Mountain Metropolitan District is a special district in Summit County, which provides services for the Wildernest subdivision located on the southwest side of the Town of Silverthorne. The District provides water and sewer, road maintenance, and snow removal services and also functions as a homeowners' association providing architectural review and covenant enforcement. The District also coordinates with the U.S. Forest Service and Summit County, who own and manage most of the surrounding land.

The District operates under the direction of an elected Board of Directors that sets policy decisions. The District serves approximately 3,000 residential units located on 300 acres.

Table G.1. Approximate Area Served by the Buffalo Mountain Metropolitan District



G.2 Hazard Identification and Profiles

Representatives of the Buffalo Mountain Metropolitan District identified the hazards that affect the District and summarized their geographic location, probability of future occurrence, potential magnitude or severity, and planning significance specific to the District (see Table G.1). In the context of the countywide planning area, there are no hazards that are unique to the Buffalo Mountain Metropolitan District.

Table G.1. Buffalo Mountain Metropolitan District—Hazard Summary

Hazard Type	Geographic Extent*	Probability*	Magnitude*	Hazard Rating
Avalanche	Isolated	Unlikely	Negligible	Low
Dam Failure	Isolated	Unlikely	Limited	Low
Drought	Large	Likely	Limited	Moderate
Earthquake	Large	Occasional	Limited	Low
Erosion/Deposition	Small	Likely	Limited	Low
Flood	Isolated	Occasional	Limited	Low
Hazardous Materials Release (Transportation)	Isolated	Unlikely	Limited	Low
Landslide, Mudflow/Debris Flow, Rock Fall	Small	Occasional	Limited	Low
Lightning	Large	Likely	Limited	Low
Mountain Pine Beetle Infestation	Large	Highly Likely	Limited	Moderate
Severe Winter Weather	Large	Highly Likely	Critical	High
Wildfire	Large	Highly Likely	Critical	High
Windstorm	Large	Likely	Limited	Low

*See Section 3.2 for definitions of these factors

Information on past events for each hazard can be found in Section 3.2 Hazard Profiles of the main plan.

G.3 Vulnerability Assessment

The intent of this section is to assess the Buffalo Mountain Metropolitan District's vulnerability separate from that of the planning area as a whole, which has already been assessed in Section 3.3 Vulnerability Assessment in the main plan. For more information about how hazards affect the County as a whole, see Chapter 3 Risk Assessment in the main plan.

District Asset Inventory

Table G.2 lists critical facilities and other community assets identified by the District as important to protect in the event of a disaster.

Table G.2. Buffalo Mountain Metropolitan District—Critical Facilities

Name of Asset	Replacement Value ($)	Occupancy/ Capacity #	Hazard Concerns
Water storage and delivery	$9,200,000	2,000,000 gallons/7 miles	Fire, drought, landslide
Sewage collection	$3,700,000	7 miles	Landslide
Roads and walkways	$22,000,000	7 miles/3 miles	Fire and landslide

Source: Buffalo Mountain Metropolitan District

Vulnerability by Hazard

This section analyzes existing and future structures and other assets at risk to hazards ranked of moderate or high significance that vary from the risks facing the entire planning area and estimates potential losses. For the District, this only includes wildfire.

Wildfire

Existing Development

Wildernest is a high-density residential subdivision of 2,970 living units on approximately 300 acres. It is heavily forested and surrounded by Summit County open space and national forest, both of which are also heavily forested. The District has identified approximately 2,500 trees within 10 feet of residential structures that create high risk in the event of a wildfire.

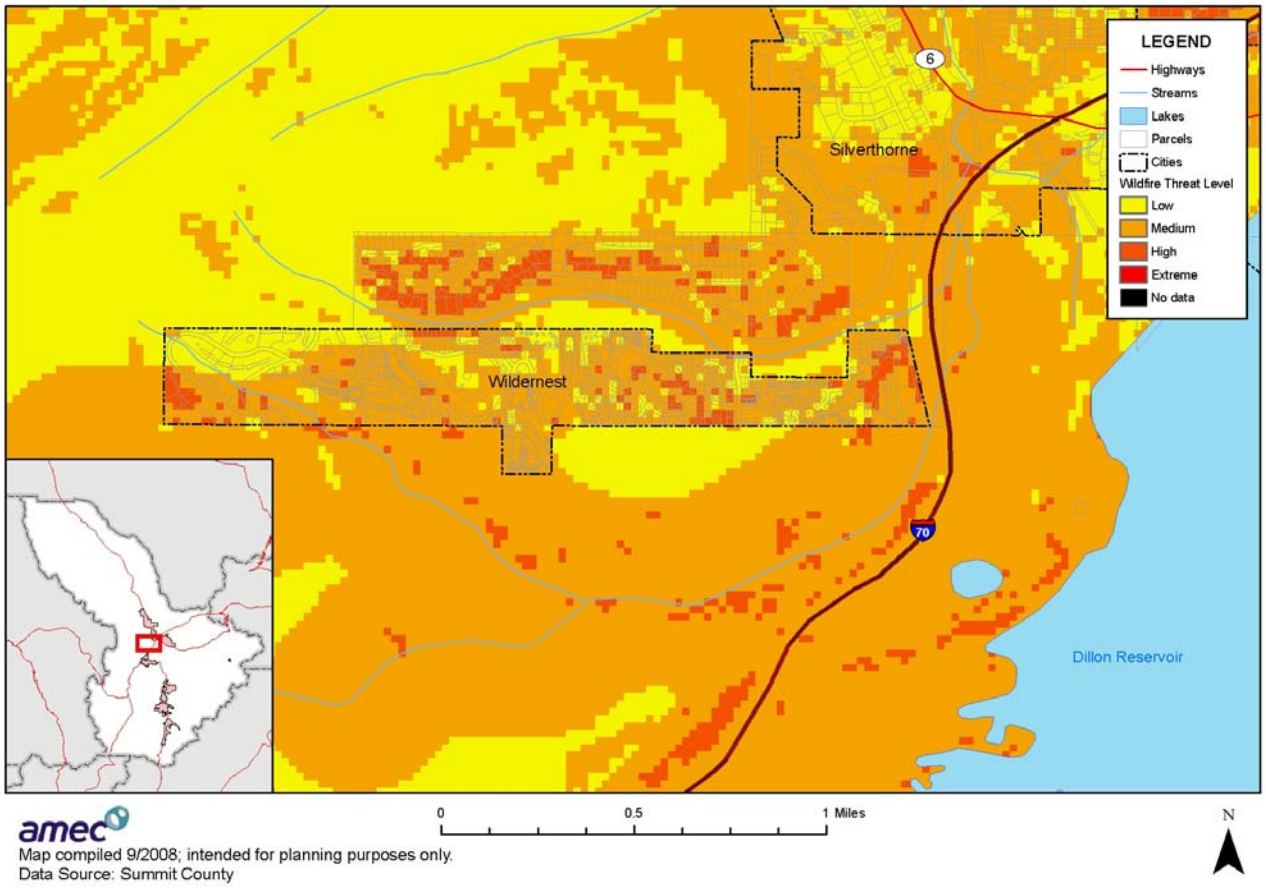
A wildfire threat ranking was developed for the Summit County Community Wildfire Protection Plan by the County, fire protection districts, and U.S. Forest Service. It is based on fuel hazards, risk of wildfire occurrence, essential infrastructure at risk, community values at risk, and local preparedness and firefighting capability and classifies the wildfire threat as low, medium, high, and extreme. Figure G.1 shows a map of the wildfire threat ranking in the Wildernest subdivision served by the Buffalo Mountain Metropolitan District. Figure See Section 3.3 Vulnerability Assessment or Annex I Fire Protection Districts for more information.

The estimated replacement cost of all residential property in Wildernest is in excess of $500 million and is located in a high wildfire threat area. Many Wildernest residents do not have access to private transportation in the event of an emergency, so evacuation is a concern for wildfire and other emergency events.

Future Development

The Wildernest subdivision has reached 95 percent buildout, so future development will be limited and subject to wildfire mitigation policies of Summit County.

Figure G.1. Wildernest Wildfire Threat



Growth and Development Trends

As previously stated, the Wildernest subdivision is a high density residential neighborhood that has reached 95 percent buildout, so future development will be limited and subject to codes and ordinances of Summit County, as well as the subdivision covenant.

G.4 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. The capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, and mitigation outreach and partnerships.

Regulatory Mitigation Capabilities

Regulatory mitigation capabilities include the planning and land management tools typically used by local jurisdictions to implement hazard mitigation activities. The District is governed under the policies and programs of Summit County, including its building codes and land use

planning. There are architectural guidelines that are part of the site plan review requirements in the Wildernest subdivision. The District also has a service plan, which includes information on the services the District has the authority to provide, and a long range financial plan.

Administrative/Technical Mitigation Capabilities

The District works with Summit County departments of engineering, emergency management, and GIS on activities related to hazard mitigation and loss prevention within the District. Lake Dillon Fire Protection District provides wildfire protection within the Buffalo Mountain Metropolitan Service District. The District has one full-time employee, the district manager. Other services are contracted through a separate business

Fiscal Mitigation Capabilities

The District receives revenue from rates, fees, property taxes, and interest on investments. Fiscal mitigation capabilities are financial tools or resources that the Buffalo Mountain Metropolitan District could or already does use to help fund mitigation activities. These include the following:

- Capital improvements project funding
- Taxes for specific purposes
- Fees for water, sewer, and other services
- Impact fees for new development
- General obligation bonds

Mitigation Outreach and Partnerships

Other mitigation related activities include the following:

- Since 2004, the District's summer newsletter has included outdoor watering guidelines to promote water conservation.
- Since 2007, quarterly newsletters include fire safety, wildfire mitigation, and emergency preparedness information.
- The District has worked with property owners since 2005 to provide assistance with the removal of beetle-infested and dead trees to improve forest health and reduce wildfire risk. Over 4,000 trees have been removed.

G.5 Mitigation Goals and Objectives

The Buffalo Mountain Metropolitan District adopts the hazard mitigation goals and objectives developed by the Hazard Mitigation Planning Committee and described in Chapter 4 Mitigation Strategy.

G.6 Mitigation Actions

The Buffalo Mountain Metropolitan District identified and prioritized the following mitigation actions based on the risk assessment. Background information on how each action will be implemented and administered, such as ideas for implementation, responsible agency, potential funding, estimated cost, and timeline also are included.

Mitigation Action: Buffalo Mountain Metropolitan District—1 Defensible Space

Jurisdiction:	Buffalo Mountain Metropolitan District
Action Title:	Reduce the risk of wildfire in the Wildernest subdivision by assisting property owners with the creation of defensible spaces around residential buildings.
Priority:	High
Issue/Background:	Wildernest is a high-density residential subdivision of 2,970 living units on approximately 300 acres. It is heavily forested and surrounded by Summit County open space and national forest, both of which are also heavily forested. The District has identified approximately 2,500 trees within 10 feet of residential structures, putting these structures at high risk in the event of a forest fire.
Ideas for Implementation:	For the past three years, the District has provided assistance to property owners by chipping logs and branches removed from private property in addition to removing trees from rights-of-way within the subdivision. The District could provide greater assistance in creating defensible spaces if additional funding were available.
Responsible Agency:	Buffalo Mountain Metropolitan District
Partners:	Summit County
Potential Funding:	District revenue from rates, fees, property taxes, and interest on investments Summit County Wildfire Mitigation Grant Program FEMA Hazard Mitigation Grant Program and Pre-Disaster Mitigation Program
Cost Estimate:	$250,000 to remove the estimated 2,500 trees from within 10 feet of residential structures.
Benefits: (Losses Avoided)	• Reduced risk of property damage and loss from wildfire. (Estimated replacement cost of all residential property in excess of $500 million). • Protection of public health and safety.
Timeline:	Create defensible spaces around residential structures within five years.

Mitigation Action: Buffalo Mountain Metropolitan District—2 Digital Data and Maps

Jurisdiction:	Buffalo Mountain Metropolitan District
Action Title:	Enhance the ability to ensure continuity of water and sewer service during emergencies by converting paper as-built infrastructure drawings to digital format.
Priority:	Medium
Issue/Background:	As-built drawings for the approximately 14 miles of water and sewer mains in Wildernest exist only on 30-year old paper sheets. They are difficult to update, subject to loss or deterioration, and may not provide an appropriate level of detail during an emergency.
Ideas for Implementation:	Participate with other Summit County entities to obtain up-to-date aerial imagery, convert paper as-built drawings to digital format, field verify locations of water and sewer infrastructure components, and annotate digital drawings with critical infrastructure data.
Responsible Agency:	Buffalo Mountain Metropolitan District
Partners:	Other Summit County jurisdictions
Potential Funding:	District revenue from rates, fees, property taxes, and interest on investments,
Cost Estimate:	$25,000 ($2,000 for aerial imagery, $16,000 for data conversion and field verification, $7,000 for computer hardware and software).
Benefits: (Losses Avoided)	• Improve access to critical infrastructure data at all times, but especially during emergencies. • Protect public health and safety.
Timeline:	Aerial imagery, data conversion, field verification, and annotation to be completed by 2010.

Mitigation Action: Buffalo Mountain Metropolitan District—3 Backup Power for Critical Facilities

Jurisdiction:	Buffalo Mountain Metropolitan District
Action Title:	Obtain backup power for water pumping stations
Priority:	Low
Issue/Background:	The District provides water drawn from the Blue River alluvial to the Wildernest subdivision by pumping to a series of underground storage tanks, the uppermost of which is approximately 1,200 feet higher in elevation than the treatment plant. There are five pumping stations, none of which have backup power. Providing backup power would improve continuity of services during emergencies requiring large volumes of water, such as forest fires, which may disrupt normal power supplies.
Ideas for Implementation:	Develop specification, identify suppliers, and purchase backup generators as funding allows.
Responsible Agency:	Buffalo Mountain Metropolitan District
Partners:	
Potential Funding:	District revenue from rates, fees, property taxes, and interest on investments. FEMA Hazard Mitigation Grant Program
Cost Estimate:	$250,000 (five pumping stations at $50,000 each)
Benefits: **(Losses Avoided)**	• Improve continuity of services during emergencies • Reduce wildfire risk • Protect public health and safety
Timeline:	Complete installation of five backup generators by 2015, subject to funding availability.

ANNEX H: FIRE PROTECTION DISTRICTS

H.1 District Profiles

The material presented in this annex applies to two fire protection districts in Summit County, which are described below. Each of the districts participated individually in this planning process. Figures H.1-H.2 show maps of the Districts' boundaries based upon best available data from Summit County GIS. However, these boundaries are not completely accurate, and there are small areas of the County not covered by a fire protection district.

Lake Dillon Fire Protection District

The Lake Dillon Fire Protection District, also known as Lake Dillon Fire Rescue, is funded by taxpayers through their property tax. It is a career department with over 50 firefighters, three 24-hour stations, and two reserve stations covering Frisco, Silverthorne, Dillon, Keystone, and Montezuma. The Lake Dillon Fire Protection District is the successful consolidation of five former fire districts. It has a response area of 310 square miles and protects the majority of the shoreline of Lake Dillon, Loveland Pass, which is a designated hazardous materials corridor by the Colorado Department of Transportation, and approximately 20 miles of the highest stretch of Interstate 70 in the United States. The ski resorts of Arapahoe Basin and Keystone are also included in the protection area. Protected municipalities include Dillon, Frisco, and Silverthorne as well as 12 water entities or districts.

Red, White, and Blue Fire Protection District

The name Red, White, and Blue originates from three different fire companies that were organized in 1882 to protect the mining district of Breckenridge after three large fires almost destroyed the town. In 1947, the fire department changed names to the Breckenridge Volunteer Fire Department. In 1976, a special taxing district was officially formed renaming the department to the Red, White, and Blue Fire Protection District, as it is called today. The District covers approximately 140 square miles of Summit County, including the towns of Breckenridge and Blue River, the Breckenridge Ski Resort, and unincorporated sections of Summit County. The District boundaries are Hoosier Pass to the south, Frisco town limits to the north, the Continental Divide to the east, and the Ten Mile range to the west. Red, White, and Blue is a career department with approximately 50 paid personnel in 4 divisions: Operations, Administration, C.H.A.M.P Division, and the Division of Training, Safety, and Health.

H.2 Hazard Identification and Profiles

Representatives from each district identified the hazards that affect the districts and summarized their geographic location, probability of future occurrence, potential magnitude or severity, and planning significance (see Table H.1). Each of the districts includes similar terrain and hazards;

the hazards that impact the districts are summarized below. Magnitude and overall hazard rating are assessed in terms of impacts to the fire protection districts.

Table H.1. Summit County Fire Protection Districts—Hazard Summary

Hazard Type	Geographic Extent*	Probability*	Magnitude*	Hazard Rating
Avalanche	Isolated	Likely	Limited	Low
Dam Failure	Small	Unlikely	Critical	Low
Drought	Large	Likely	Critical	Moderate
Earthquake	Large	Occasional	Limited	Low
Erosion/Deposition	Small	Likely	Limited	Low
Flood	Small	Likely	Limited	Moderate
Hazardous Materials Release (Transportation)	Isolated	Occasional	Critical	Moderate
Landslide, Mudflow/Debris Flow, Rock Fall	Isolated	Likely	Critical	Moderate
Lightning	Large	Likely	Critical	Moderate
Mountain Pine Beetle Infestation	Large	Highly Likely	Critical	High
Severe Winter Weather	Large	Highly Likely	Limited	Low
Wildfire	Large	Highly Likely	Catastrophic	High
Windstorm	Large	Likely	Limited	Low

*See Section 3.2 for definitions of these factors

Information on past events for each hazard can be found in Section 3.2 Hazard Profiles of the main plan.

H.3 Vulnerability Assessment

The intent of this section is to assess the vulnerability of the fire protection districts separate from that of the planning area as a whole, which has already been assessed in Section 3.3 Vulnerability Assessment in the main plan. For the Districts' purposes, wildfire is the hazard that varies from other parts of the planning area, and for which the Districts have responsibilities. For more information about how hazards affect the County as a whole, see Chapter 3 Risk Assessment in the main plan.

District Asset Inventory

Table H.2 lists critical facilities and other community assets identified by the Lake Dillon Fire Protection District as important to protect in the event of a disaster. The Red, White, and Blue Fire Protection Districts identified no facilities.

Table H.2. Lake Dillon Fire Protection District—Critical Facilities

Name of Asset	Replacement Value ($)	Occupancy/ Capacity #
Lake Dillon Fire Protection District Station 2 – Frisco	2.3 million	Fire Station and Fire Prevention Offices/ Occupancy 20
Lake Dillon Fire Protection District Station 8 – Dillon	2.1 million	Fire Station/ Occupancy 13
Lake Dillon Fire Protection District Station 10 – Silverthorne	1.1 million	District Administrative. Offices/ Occupancy 30
Lake Dillon Fire Protection District Station 11 – Keystone	2.5 million	Fire Station and Support and Fleet Services/Occupancy 50
Other Community Assets		
Dillon Town Hall		
Frisco Town Hall		
Silverthorne Town Hall		
Summit County Commons Building		
Summit Stage Facilities		
Silverthorne-Dillon Joint Sanitation Plant		
Snake River Sanitation Plant		
Frisco Sanitation District Facilities		
Summit County Emergency Operations Center		
Xcel Energy Regional Service Facility and Substations		
Summit County Community Center		
Silverthorne Recreation Center		
U.S. Forest Service Dillon District Ranger Offices		
Keystone Resort Gondolas		
Dillon Dam and Facilities		
Green Mountain Dam and Facilities		
Eisenhower/Johnson I-70 Tunnels		
Summit Medical Center – Frisco		
Summit Middle School – Frisco		
Frisco Elementary School		
Dillon Valley Elementary School		
Silverthorne Elementary School		
Summit Cove Elementary School		
Summit County 9-1-1 Communications		
Summit County Ambulance Headquarters		

Source: Lake Dillon Fire Protection District

Other areas of concern include the protection of critical watershed areas for the Ten Mile, Snake River, and Lower Blue basins as well as almost 21 miles of Dillon Reservoir shoreline. Over 49 miles of high power transmission lines lie within the boundaries of Lake Dillon Fire Protection District response areas, which supply major portions of the western United States. The District also is challenged geographically with natural and manmade features that make response

extremely challenging. Among these are the Dillon Dam and Eisenhower Tunnel, both of which have been identified as National Critical Infrastructure. Protection also includes three mountain passes at the Interstate-70 tunnel approaches, Loveland Pass (which is a Colorado Department of Transportation designated Hazardous Materials route), and Ute Pass (which carries a significant amount of hazardous materials from the Henderson Mill).

According to the Colorado Department of Transportation, traffic on Interstate 70 through the Lake Dillon Fire Protection District has increased by a factor of three over the past decade. Due to its unique location, Lake Dillon Fire Protection District, along with other areas of Summit County, are geographically isolated and in the event of natural disasters such as blizzards, wildfires, avalanches, or landsides may become isolated for an extended period of time. Manmade disasters such as hazardous materials, bioterrorism, or explosions will also isolate the Lake Dillon Fire Protection District and other areas of Summit County. This may serve as an impediment for receiving aid from outside the County for a period of time.

Vulnerability by Hazard

This section analyzes existing and future structures and other assets at risk to hazards ranked of moderate or high significance that vary from the risks facing the entire planning area and estimates potential losses. For the Districts' purposes, wildfire is the hazard that varies from other parts of the planning area, and for which the Districts have responsibility.

Wildfire

Existing Development

A wildfire threat ranking was developed for the Summit County Community Wildfire Protection Plan by the County, fire protection districts, and U.S. Forest Service. It is based on fuel hazards, risk of wildfire occurrence, essential infrastructure at risk, community values at risk, and local preparedness and firefighting capability and classifies the wildfire threat as low, medium, high, and extreme. The wildfire threat GIS layer was used to determine the number of acres in each wildfire threat zone and to map the wildfire threat in each of the fire protection districts (see Table H.4 and Figures H.1-H.2).

Table H.4. Acreage in Wildfire Threat Zones by District

	No Data		Low		Medium		High		Extreme		
Jurisdiction	Acres	% Total	Acres	% Total	Acres	% Total	Acres	% Total	Acres	% Total	Total Acres
Lake Dillon FPD	933	0.5	89,417	52.4	73,648	43.1	6,619	3.9	84	0.0	170,701
Red, White, and Blue FPD	1,522	1.9	36,986	46.2	37,212	46.5	4,169	5.2	120	0.2	80,009

Source: Summit County

Based on the methodology described for wildfire in Section 3.3.3 Vulnerability by Hazard, the property values in the Districts were separated into wildfire threat zones. The breakdown of property values in each District by wildfire threat zone is shown in Table H.5.

Table H.5. Property in Wildfire Threat Zones by District

Jurisdiction	Land Value ($)	Improved Value ($)	Total Value ($)
Lake Dillon Fire Protection District			
Low	499,765,545	1,649,372,776	2,149,138,321
Medium	1,059,925,341	2,922,759,899	3,982,685,240
High	210,299,297	332,477,680	542,776,977
Extreme	2,466,604	2,663,375	5,129,979
No Data	112,351	0	112,351
Totals	**1,772,569,138**	**4,907,273,730**	**6,679,842,868**
Red White and Blue Fire Protection District			
Low	632,730,557	1,261,144,512	1,893,875,069
Medium	1,024,523,992	2,402,834,203	3,427,358,195
High	287,297,733	404,617,956	691,915,689
Extreme	10,735,812	14,283,005	25,018,817
No Data	30,957	0	30,957
Totals	**1,955,319,051**	**4,082,879,676**	**6,038,198,727**

Source: Summit County

The Lake Dillon Fire Protection District has the most acreage at risk (6,703 acres) in high and extreme wildfire threat zones, but the Red, White, and Blue Fire Protection District has a greater percentage of their district (5.4 percent) in high and extreme wildfire threat zones. Red, White, and Blue has more total property value in high and extreme wildfire threat areas (more than $25 million in the extreme wildfire threat zone alone, all of which is located in unincorporated areas).

Future Development

Residential development continues to occur in the wildland-urban interface where limited access, lack of a central water supply with fire hydrants, and longer response times elevate the risk associated with the a wildfire event. Development in wildland-urban interface areas is regulated through the building code and land use planning policies of the jurisdiction in which the development is located. Summit County and the towns of Blue River, Breckenridge, and Silverthorne have wildfire mitigation policies as a part of their county or municipal code.

Figure H.1. L Wildfire Threat in Lake Dillon Fire Protection District

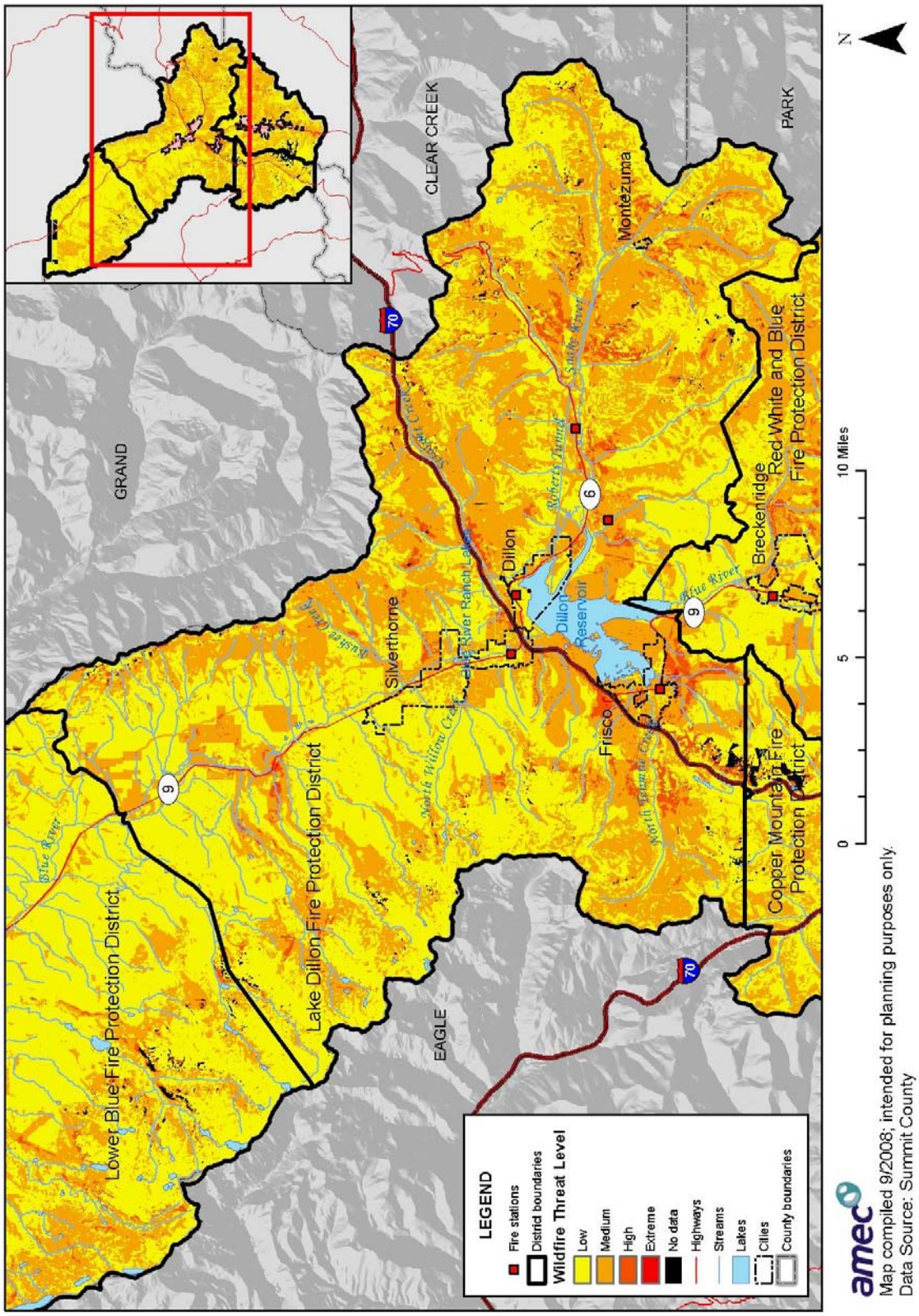
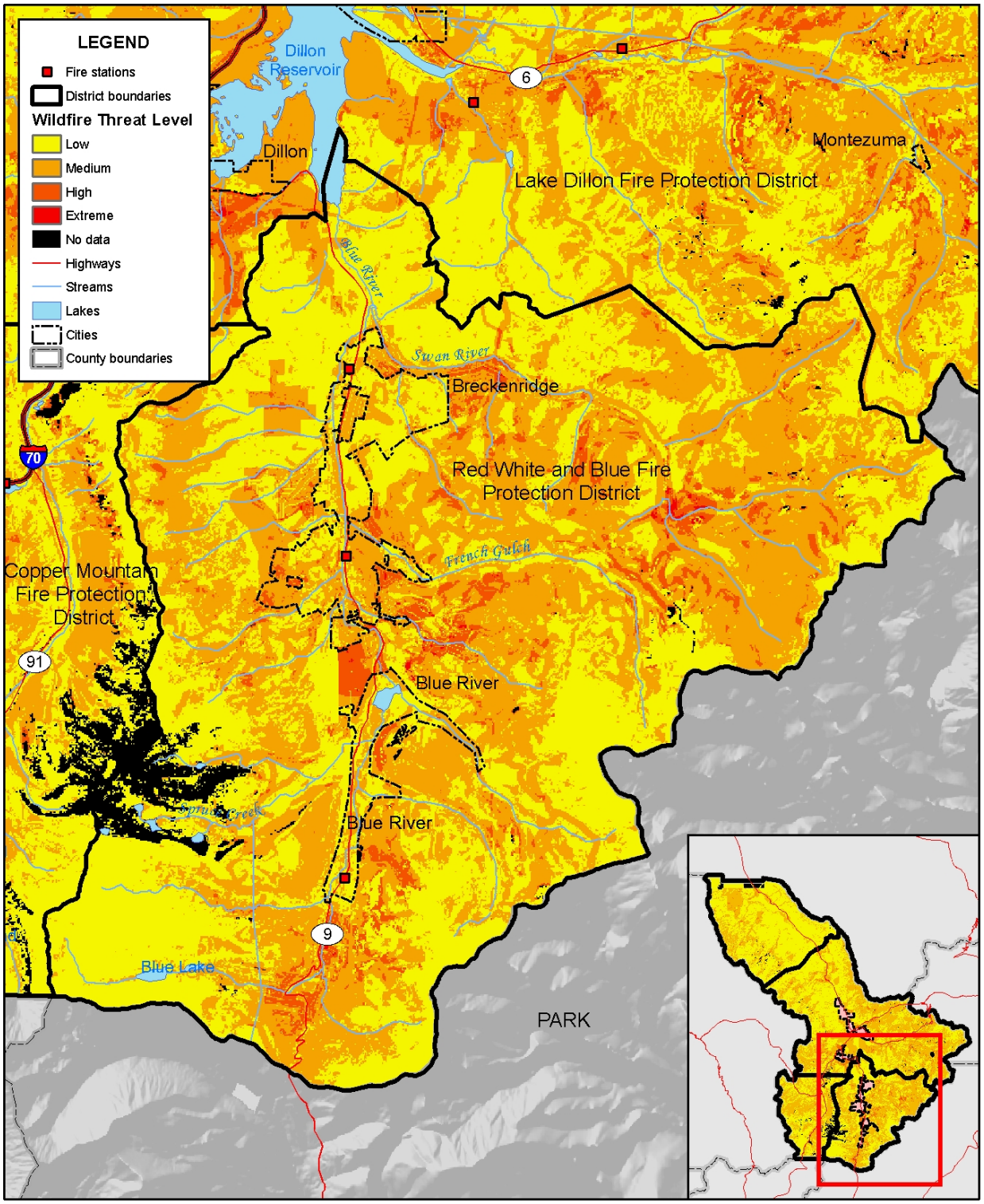


Figure H.2. Wildfire Threat in Red, White, and Blue Fire Protection District



amec

0 2.5 5 Miles

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Map compiled 9/2008; intended for planning purposes only.
Data Source: Summit County

Other Hazards

The Districts are also affected by other hazards that exacerbate wildfire hazard conditions, such as drought, lightning, and windstorms. In addition, lands damaged by wildfire are subject to increased runoff and erosion as well as landslides, mudslides/debris flows, and rock fall.

Growth and Development Trends

Residential development is likely to continue to occur in the wildland-urban interface in both districts. The Town of Silverthorne has the greatest potential for commercial growth followed by Frisco and Dillon. Resort growth and redevelopment is projected to occur in Keystone in the Mountain House base area neighborhood. This area will likely see several hundred new condominium units constructed with underground parking and approximately 50,000 square feet of commercial space within the span of the next 10 years.

H.4 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. The capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, and mitigation outreach and partnerships.

Regulatory Mitigation Capabilities

Regulatory mitigation capabilities include the planning and land management tools typically used by local jurisdictions to implement hazard mitigation activities. The fire protection districts are governed under the policies and programs of Summit County, including its building codes and land use planning and the Fire Hazard Mitigation Amendment adopted by Summit County as an amendment to the International Building Code.

The Lake Dillon Fire Protection District Service Plan was updated and adopted in 2006. The District performs site plan reviews for local jurisdictions. The District has an Insurance Services Office (ISO) rating of four, except for a class nine in Montezuma, Arapahoe Basin, Ptarmigan Mountain, and Bill’s Ranch.

The Red, White, and Blue Fire Protection District has an annual wildfire operating plan. The District enforces the 2006 International Fire Code as amended by Summit County and performs site plan review requirements for emergency access and water supply. The District has an ISO rating of four in all areas serviced by a water system, and nine in all other areas of the district

Administrative/Technical Mitigation Capabilities

The Districts work with Summit County departments of engineering, emergency management, and GIS on activities related to hazard mitigation and loss prevention. Each has its own grant writing capabilities and both are career fire departments with approximately 50 people on staff.

Fiscal Mitigation Capabilities

The fire protection districts are funded through property taxes. Fiscal mitigation capabilities are financial tools or resources that the fire protection districts could or already do use to help fund mitigation activities. These include the following:

- Capital improvements project funding
- Taxes for specific purposes
- Debt through general obligation bonds
- Grants from state and federal agencies

Mitigation Outreach and Partnerships

Other mitigation related activities for each district include the following:

Lake Dillon Fire Protection District

- Coordinates annual fire-safety education programs in the schools and for the general public in October of each year as part of the National Fire Protection Association's National Fire Prevention Week.
- Provides public education and information to citizen groups and homeowners associations concerning fire hazard mitigation and wildfire preparedness.
- Maintains a proactive public information office staffed by a full-time public affairs officer to keep educational fire safety information, public awareness of fire district activities, and active participation in community events promoting fire safety.
- Manages the fire hazard mitigation program for the County and the Summit Fire Authority that utilizes strategies similar to the Firewise Communities program.
- Instrumental in planning and organizing the Summit County Incident Management Team in 1996.
- Actively participated and contributed to the development of an expanded evacuation plan for all areas of Summit County and a majority of the towns protected by the department.
- Currently participating in the effort to improve and upgrade security and emergency response capacity to the Colorado Department of Transportation managed Eisenhower/Johnson Tunnels on Interstate 70, which is a designated critical infrastructure facility located in both Clear Creek and Summit counties.
- While Lake Dillon Fire-Rescue and the Lower Blue Fire Protection District share an agreement to provide assistance to each other in the event of larger-scale incidents, as of

January 1, 2008, Lake Dillon and Lower Blue are now operating under a new, wider intergovernmental agreement that enhances training, equipment, and administrative assistance between the two departments.

Red, White, and Blue Fire Protection District

- Provides public education and information in fire safety, Risk Watch, and all-hazard emergency preparedness.

H.5 Mitigation Goals and Objectives

Each of the fire protection districts adopts the hazard mitigation goals and objectives developed by the Hazard Mitigation Planning Committee and described in Chapter 4 Mitigation Strategy.

H.6 Mitigation Actions

Each of the fire protection districts identified and prioritized the following mitigation actions based on the risk assessment. Background information on how each action will be implemented and administered, such as ideas for implementation, responsible agency, potential funding, estimated cost, and timeline also are included.

Mitigation Action: Lake Dillon Fire Protection District—1 Wildfire Mitigation Program

Jurisdiction:	Lake Dillon Fire Protection District
Action Title:	Maintain and enhance wildfire mitigation program
Priority:	High
Background/Issue:	Summit County has been identified as having a high risk of a catastrophic wildfire. This affects not only the water quality for most of the Front Range of Colorado but major power line grids for the western United States. In addition, Interstate 70, a major transportation corridor, runs directly through Summit County. This stretch is the highest elevation in the country. Summit County is at the epicenter of a massive beetle kill with a 95 percent mortality rate affecting several million acres of land.
Ideas for Implementation:	Apply for funding to maintain and enhance via code enforcement and public education a wildfire mitigation office for Lake Dillon Fire Protection District and expand the process to include all of Summit County including all municipalities. Current funding of the existing one person wildfire mitigation office is not present for the entire year of 2009. The continuation and expansion of this critical office is one of the highest priorities of Summit County and Lake Dillon Fire Protection District.
Responsible Agency:	Lake Dillon Fire Protection District
Partners:	Red, White, and Blue Fire Protection District and Copper Mountain Consolidated Metropolitan District. All municipalities within Summit County and Summit County government.
Potential Funding:	U.S. Forest Service, Colorado State Forest Service, 50 percent cash match possible via Summit Fire Authority and Summit County Government
Cost Estimate:	94,500 annually
Benefits: (Losses Avoided)	Unable to place an exact dollar amount; however, the water supply to over 300,000 people in Denver and loss of power to large portions of the west would be in the hundreds of millions of dollars.
Timeline:	Ready to implement immediately upon acquiring funding

Mitigation Action: Lake Dillon Fire Protection District—2 Emergency Generators

Jurisdiction:	Lake Dillon Fire Protection District
Action Title:	Install emergency generators in three fire stations
Priority:	Medium
Background/Issue:	Lake Dillon Fire Protection District has been identified as having a high risk of a catastrophic wildfire due to massive beetle infestation. Three of the response stations would be directly affected by a likely power outage in the event of a wildfire. The ability to operate the stations as Incident Command Centers, shelters, as well as for incident response is paramount to critical infrastructure protection.
Ideas for Implementation:	Install three back-up generators for fire stations 2, 8, and 11.
Responsible Agency:	Lake Dillon Fire Protection District
Partners:	Possible U.S. Forest Service, Colorado State Forest Service, law enforcement organizations; FEMA Hazard Mitigation Grant Program
Potential Funding:	Very little funding available locally
Cost Estimate:	$225,000
Benefits: (Losses Avoided)	The ability to operate out of the three primary fire response stations during a wildfire, hazardous material incident, or natural disaster will help protect lives and property and the economic engine (tourism, watershed, energy, transportation) not just of Summit County but for the entire State of Colorado.
Timeline:	Implementation in summer 2009 if funding acquired

Mitigation Action: Red, White, and Blue Fire Protection District—1 Defensible Space

Jurisdiction:	Red, White and Blue Fire Protection District
Action Title:	Create public education program encouraging wildfire defensible space
Priority:	High
Ideas for Implementation:	Create public education initiatives encouraging defensible space around homes in accordance with nationally recognized standards. This would include the removal of pine beetle infested trees. Public education would be accomplished by hiring a production company to produce public service announcements for local television stations, radio stations, newsprint, and other local media sources.
Responsible Agency:	Red, White, and Blue Fire Protection District
Partners:	Town of Breckenridge, Town of Blue River, Summit County, and Lake Dillon Fire Rescue
Potential Funding:	Budgeted and grant funding
Cost Estimate:	$40,000
Benefits: (Losses Avoided)	Reduces property loss during wildfire events
Timeline:	2009–2013

Mitigation Action: Red, White, and Blue Fire District—2 Winter Preparedness Kits

Jurisdiction: Red, White, and Blue Fire Protection District

Action Title: Promote household winter preparedness kits

Priority: High

Ideas for Implementation: The Red, White, and Blue Fire District would coordinate the hiring a production company to educate the public on preparing household winter preparedness or survival kits to have readily available during times of inclement/hazardous winter weather. These public service announcements would be run on local television, radio stations, newsprint, and other sources.

Jurisdictions could partner with local merchants/grocers educating public as to what types of supplies would be necessary to include in the kits.

Fire protection districts could host preparedness kit sessions at local grocery stores, demonstrating a prepared kit, in addition to distributing a "shopping list" of items they can purchase while at that location.

Responsible Agency: Red, White, and Blue Fire District

Partners: Local merchants, Summit County, Towns of Blue River, Breckenridge, Dillon, Frisco, and Silverthorne

Potential Funding: Budgeted and grant funded

Cost Estimate: $20,000

Benefits: (Losses Avoided)

- Reduce the number of cars and citizens on roadways during times of inclement/hazardous weather, as supplies would be kept in homes
- Improve sustainability of food resources in local markets in the event deliveries to the area become impaired by road and weather conditions

Timeline: 2009–2013

Mitigation Action: Red, White, and Blue Fire Protection District—3 Power Backup Generators

Jurisdiction:	Red, White, and Blue Fire Protection District
Action Title:	Provide backup power to fire stations to protect continuity of services
Priority:	Medium
Ideas for Implementation:	The Red, White, and Blue Fire District would contract for the installation of emergency backup power generators at fire stations to allow for the continuity of emergency response services from strategically located facilities.
Responsible Agency:	Summit County, towns of Breckenridge and Blue River, private sector
Partners:	Public and private sector
Potential Funding:	Budgeted and grant funded; FEMA Hazard Mitigation Grant Program
Cost Estimate:	$250,000
Benefits: (Losses Avoided)	Maintain emergency response capabilities from strategically located fire stations in the event of power loss due to a disaster event Protect public health and safety
Timeline:	2009–2013

Mitigation Action: Red, White, and Blue Fire Protection District—4 Evacuation Drills

Jurisdiction:	Red, White and Blue Fire District
Action Title:	Conduct periodic community evacuation drills
Priority:	Medium
Ideas for Implementation:	Conduct periodic community evacuation drills, which include public information and education and appropriate road signage.
Responsible Agency:	Town of Breckenridge, Town of Blue River, Summit County, and Red, White, and Blue Fire District
Partners:	See above, plus various lodging companies/businesses.
Potential Funding:	Budgeted and grant funding
Cost Estimate:	Approximately $10,000 per exercise
Benefits: (Losses Avoided)	• Safe and efficient evacuation of citizens and guests in the event of an emergency or disaster. • Minimize loss of life.
Timeline:	2009–2013

Mitigation Action: Red, White, and Blue Fire District—5 Hazardous Materials Mapping

Jurisdiction:	Red, White, and Blue Fire District
Action Title:	Inventory and map locations of hazardous materials
Priority:	Low
Ideas for Implementation:	The Red, White, and Blue Fire District would hire a consultant to compile an inventory of hazardous materials processes and their storage (i.e., bodyshops, woodworking businesses, plastics fabrication, pool and spa water treatments, etc.) This information would be mapped using GIS and analyzed with maps of hazard prone areas, such as the floodplain, and provided to first responders and other emergency planning organizations
Responsible Agency:	Red, White, and Blue Fire Protection District
Partners:	Town of Breckenridge, Town of Blue River, Summit County, Lake Dillon Fire Rescue, Summit County Local Emergency Planning Committee (LEPC)
Potential Funding:	Budgeted and grant funding
Cost Estimate:	$20,000
Benefits: (Losses Avoided)	• Improve responder knowledge of potential hazardous material release • Identify populations at risk • Protect public health and safety
Timeline:	2009–2013

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APPENDIX B: PLANNING PROCESS DOCUMENTATION

The following materials are provided to help document the planning process:

1. Summit County Hazard Mitigation Planning Committee (HMPC) Members
2. Letter of Invitation to Kickoff Meeting
3. Invitation List to Kickoff Meeting
4. Kickoff Meeting Agenda
5. Kickoff Meeting Sign-In Sheet
6. HMPC Meeting #2 Agenda
7. HMPC Meeting #2 Sign-In Sheet
8. HMPC Meeting #3 Agenda
9. HMPC Meeting #3 Sign-In Sheet
10. Letter of Invitation to Natural Hazards Planning Open House
11. Invitation List to Natural Hazards Planning Open House
12. Flyer for Natural Hazards Planning Open House
13. Natural Hazards Planning Open House Sign-In Sheet
14. Invitation to Comment on Draft Plan
15. Flyer for Draft Plan Public Review Period
16. Announcement in *Summit Daily News* of Draft Plan Public Review Period

1. Summit County Hazard Mitigation Planning Committee Members

Representative	Agency/Organization
Joel Cochran	Summit County Emergency Management
John Minor	Summit County Sheriff's Office
Derek Woodman	Summit County Sheriff's Office
Steve Hill	Summit County
Rich Ferris	Summit County Information Systems (GIS)
Ric Pocius	Summit County Engineering Department
Robert Jacobs	Summit County Engineering Department
Lindsay Hirsh	Summit County Planning Department
Tim Faia	Summit County Planning Department
Dan Hendershott	Summit County Environmental Health
Kevin McCormick	Snake River Wastewater Treatment Plant
Gary Drescher	Buffalo Mountain Metropolitan District
Susan Fairweather	Town of Dillon
Scott O'Brien	Town of Dillon
Eric Holgerson	Town of Dillon Public Works
Joe Wray	Dillon Police Department
Greg Morrison	Breckenridge Police Department
Kim Green	Breckenridge Police Department
Mark Hanschmidt	Silverthorne Police Department
Mark Heminghous	Frisco Police Department
Tom Hill	Blue River Trustee
Lindsay Backas	Blue River Mayor
Keats Scott	Lower Blue Fire Protection District
Jack Taylor	Lower Blue Fire Protection District
Gary Green	Red, White, and Blue Fire Protection District
Jay Nelson	Red, White, and Blue Fire Protection District
Dave Parmley	Lake Dillon Fire Protection District
Gary Severson	Northwest Colorado Council of Governments
Ross Wilmore	U.S. Forest Service
Marilyn Gally	Colorado Division of Emergency Management
Julie Baxter	AMEC Earth and Environmental
Shelby Hudson	AMEC Earth and Environmental
Will Meyer	AMEC Earth and Environmental

OFFICE OF EMERGENCY MANAGEMENT

970-453-2232
fax 970-453-7329
Post Office Box 210
501 N. Park Street
Breckenridge, Colorado 80424

January 23, 2008

RE: Summit County Multi-Hazard Mitigation Plan

Summit County has received funding to develop a multi-hazard mitigation plan. The purpose of this plan is to reduce or eliminate long-term risk to the people and property of Summit County from the effects of natural hazard events. The Disaster Mitigation Act of 2000 requires all local governments to assess their risks to natural hazards and identify actions that can be taken in advance to reduce future losses. The law requires all local governments and districts to have an approved local hazard mitigation plan after November 1, 2004, to be eligible for certain federal disaster assistance and mitigation funding programs.

Summit County Emergency Management has taken the lead in developing this plan. The County has hired a consultant, AMEC Earth and Environmental, to manage the planning project. AMEC will facilitate the planning process, collect the necessary data, and perform other technical services, including preparing the risk assessment and plan document. However, County Emergency Management and AMEC will need your help to successfully complete this project.

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

Your organization's participation on the committee is requested due to your jurisdictional need for inclusion in the County Plan, and/or your ability to contribute needed information, technical knowledge, or other valuable experience to the plan. Please designate a representative to serve on the committee and attend the kickoff meeting, which will discuss the benefits of developing a hazard mitigation plan, the project schedule, and the hazards that affect Summit County, such as wildfire, flooding, drought, winter storms, and more.

Summit County Multi-Hazard Mitigation Plan Kickoff Meeting
Friday, February 15, 2008
9:00 am-12:00 pm
County Commons, Buffalo Mountain Room, 0037 Peak One Drive, Frisco, CO 80443

Please respond as to whether or not you or your representative will be able to attend the kickoff meeting by contacting me at (970) 453-2232 x336 or jcochran@co.summit.co.us. Thank you for your early attention and response to this important project. I look forward to seeing you on February 15.

Sincerely,

Joel Cochran
Summit County Emergency Manager
(970) 453-2232 x336; jcochran@co.summit.co.us

3. Invitation List to Kickoff Meeting

Municipal Governments

Town of Blue River
P.O. Box 1784
Breckenridge, CO 80424
970-547-0545
Lindsay Backus, Mayor, 970-485-1040
Kathy Neel, Town Clerk, blueriv@colorado.net

Town of Breckenridge
P.O. Box 168
Breckenridge, CO 80424
970-453-2251
Greg Morrison, Assistant Police Chief, gregm@breckgov.com

Town of Dillon
P.O. Box 8
Dillon, CO 80435
970-468-2403
Joe Wray, Chief of Police, jway@townofdillon.com

Town of Frisco
P.O. Box 4100
Frisco, CO 80443
970-668-5276

Town of Montezuma
P.O. Box
Dillon, CO 80435
Steve Hornback, Hstephen21@gmail.com, 970-468-8174

Town of Silverthorne
P.O. Box 1309
Silverthorne, CO 80498
Mark Handschmidt, Police Chief, 970-262-7300

Special Districts

Breckenridge Sanitation District
P.O. Box 1216
Breckenridge, CO 80424
970-453-2723

Buffalo Mountain Metro District
P.O. Box 2430
Silverthorne, CO 80498

Copper Mountain Consolidated Metropolitan District
P.O. Box 3002
Copper Mountain, CO 80443

Mark Thomas, Assistant Chief
Copper Mountain Fire Department
Copper2@cmcmdi.com

Dillon Valley Metropolitan District
P.O. Box
970-921-3738
Water Solutions, Inc
Matt Willits, 262-0217
P.O. Box 192
Silverthorne, CO 80498

East Dillon Water District
P.O. Box 627
970-668-5655

Hamilton Creek Metropolitan District
P.O. Box 627
Frisco, CO 80443
970-468-6256

Heeney Water Company

Lake Dillon Fire Protection District
P.O. Box 4428
Dillon, CO 80435
970-513-4100

Lower Blue Fire Protection District
7000 County Road 30
Heeney, CO 80498
Ron Stephens, 970-724-3698
Keats Scott, 970-513-1313, keats@coloradodreams.com

Mesa Cortina Metro District

Red, White and Blue Fire Protection District
P.O. Box 710
Breckenridge, CO 80424
970-452-2474

Snake River Sanitation District
4344 Swan Mountain Road
Dillon, CO 80435

Summit School District – Administration
P.O. Box 7
Frisco, CO 80443
970-668-3011

Willowbrook Metropolitan District
P.O. Box 1337
Silverthorne, CO 80498
468-7688

Other Departments/Agencies

Colorado Division of Emergency Management
Mitigation Division
15220 South Golden Road, Building 70
Golden, CO 80401
303-273-1734
Marilyn Gally, Marilyn.gally@state.co.us
Laura Nay, Laura.nay@state.co.us

Colorado Division of Water Resources
Division 5 – Colorado River
P.O. Box 396
Glenwood Springs, CO 81601

Colorado Division of Water Resources
Summit County Water Commissioner
P.O. Box 4741
Breckenridge, CO 80424
970-468-2442
Scott Hummer, Scott.hummer@state.co.us

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

Colorado Geological Survey
1313 Sherman Street, Room 721
Denver, CO
303-866-2611

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

Colorado State Forest Service
P.O. Box 69
Granby, CO 80446

FEMA Region VIII - Mitigation Office
Building 710
Denver Federal Center
P.O. Box 25267
Denver, CO 80225-0267

Middle Park Conservation District
P.O. Box 145
Granby, CO 80446

United States Forest Service
White River Forest – Dillon Ranger District
P.O. Box 620
Silverthorne, CO 80498

Bureau of Reclamation
Green Power Plant
County Road ,1813 Building 0170 BRR
Silverthorne, CO 80498
719-486-2325

Agenda

Summit County Multi-Hazard Mitigation Plan
Kickoff Meeting

February 15, 2008
9:00 AM-12:00 PM
County Commons - Buffalo Mountain Room
0037 Peak One Drive
Frisco, CO 80443

1. Opening Remarks (5 min)

2. Introductions (10 min)

3. Local Hazard Mitigation Plan Purpose and Requirements (45 min)

4. Multi-Jurisdictional Participation and the Hazard Mitigation Planning Committee (15 min)

5. Planning for Public Involvement (15 min)

Break (10:30-10:45)

6. Hazard Identification and Data Collection Needs (60 min)

7. Next Steps (15 min)

Sign-In Sheet
Summit County Multi-Hazard Mitigation Plan
Kickoff Meeting
February 15, 2008

Name	Jurisdiction/ Department	Address	Phone	E-Mail
Marilyn Gally	CDEM	15220 S. Golden Rd Golden, CO 80401	303 489 2291	marilyn.gally@state.co.us
Will Meyer	AMEC	357 S. Teller Lakewood CO 80226	720 220 2813	will.meyer@AMEC.com
Mark Hanschmiot	S.P.D	601 Center Cir Silverthorne, CO 80498	970-262-7332	mhanschmiot@silverthorne.org
John Main	SCSO	P.O. Box 210	970-453-2232	johnm@co.summit.co.us
Derek Woodman	SCSO	PO Box 210 Breck 80424	970 453-2232	dereku@co.summit.co.us
Rich Ferris	SC IS dept	PO Box 68 Breck 80424	970 668-4222	richf@co.summit.co.us
Joe Hoches	SC Emg	Box 5660 Frisco	668-4210	rhoe@co.summit.co.us
Gary Green	RWBFD	Box 710 Breckenridge 80424	453-2474	ggreen@rwbfire.org
Jack Taylor	LBFPD	7000 Scr 50 Heeney, CO 80498	389-1864	jackt@taylored solutions.net
Gary Dreschler	BMMD	PO B 2430 Silverthorne, CO 80498	468-6291 x 224	GARYD@WILDERNET.COM
Susan Fairweather	TOD	P.O. Box 8 Dillon	468-2403	SFAIRWEATHER@TOWNOFDILLON.com
Kevin McCormick	Snake River WWTP	4344 Summit Rd Dillon CO 80435	468-5794	KevinM@co.summit.co.us
Joe Wray	Dillon PD	275 Lake Dillon Dr. PO Box 35 Dillon 80435	(970) 262-3417	joew@townofdillon.com
Rich Hansen	CDEM	9195 E. Mineral Ave. Suite 200, Centennial, CO 80112	720-852-6618	rich.hansen@state.co.us

Sign-In Sheet
Summit County Multi-Hazard Mitigation Plan
Kickoff Meeting
February 15, 2008

Name	Jurisdiction/ Department	Address	Phone	E-Mail
Lindsay Hirsh	County Planning	County Commons	668-4266	Lindsayh@co.summit.co.us
Scott O'Brien	Town of Dillon	275 Lake Dillon Dr	262-3424	scotto@townofdillon.com
GREG MORRISON	BRECK PD	150 VALLY BRECK	453-3177	GREGM@BRECKGOV.COM
Ross Wilmore	USFS	POB 720 Eagle, CO 81631	(970) 328-5867	rwilmore@fs.fed.us
Dan Hendershott	Summit Co Envir Hlth	Box 5660 Frisco, CO 80443	668-4073	danh@co.summit.co.us
Keats Scott	Lower Blue Fire Protection Dist	1000 CR 30 Heaney CO 80498	485-0793	Keats@coloradodreams.com
GARY SEVERSON	NW Colo. Counc. of Govts.	PO 2308 SILVERTHORNE	468-0295	GJS@NWCCOG.CO.US
DAVE PARMLEY	LAKE DILLON FIRE PROTECTION DIST.	P.O. Box 4428 DILLON, CO 80435	513-4110	dparmley@ldfr.org

Agenda

Summit County Multi-Hazard Mitigation Plan
Meeting #2: Risk Assessment

May 9, 2008
9:00 am-12:00 pm
Ten Mile Room (second floor)
Medical Office Building
360 Peak One Drive
Frisco, CO 80443

1) Welcome and Introductions

2) Today's Agenda and Plan Purpose Review

3) Update on Jurisdictional Participation

4) Results of Risk Assessment
- Hazard Profiles
- Vulnerability Assessment
- Summary of Key Issues

Break (10:15-10:30)

5) Formation of Goals and Objectives

6) Planning for Public Involvement

7) Next Steps

Sign-In Sheet
Summit County Multi-Hazard Mitigation Plan
Meeting #2
May 9, 2008

Name	Jurisdiction/ Department	Address	Phone	E-Mail
Tim Faia	Summit City Planning	0037 Peak One Dr. Frisco	970 668-4200	timf@co.summit.co.us
John G. Minch	S.C.S.O.	501 N. Park Ave.	970-453-2232 Ext.	JohnM@co.summit.co.us
Derek Woodman	SCSO	"	"	derekw@co.summit.co.us
Mark Hanschmidt	Silverthorne P.D.	601 Center Cir	970-262-7332	mhanschmidt@silverthorne.org
Roberta Jacobs	Summit County Emer.	37 Peak One Dr	668-4212	robertj@co.summit.co.us
Rick Hocks	Summit City	Box 5660 Frisco	668-4210	rcp@co.summit.co.us
Marilyn Gally	CDEM	15220 S. Golden Rd Golden, CO 80401	303-273-1712	marilyn.gally@state.co.us
Joel Cochran	Summit OEM	PO Box 210 Breckenridge, CO 80424	970-453-2232	jcochran@co.summit.co.us
Gary Drescher	TBMMD	POB 2430 Silverthorne 80498	970-468-6291 x224	garyd@wildernest.com
Greg Morrison	Breckenridge Police	PO Box 5469 Breckenridge, Co 80424	970.453-3177	gregm@breckgov.com

Sign-In Sheet
Summit County Multi-Hazard Mitigation Plan
Meeting #2
May 9, 2008

Name	Jurisdiction/ Department	Address	Phone	E-Mail
Keats Scott	Lower Blue Fire Protect Dist	0011 CR 1793 Silverthorne	970-485-0793	Keats@coloradodreams.com
Kevin McCormick	Snake River WWTP	4344 Swan Mtn. Rd	970 468-5794	KevinM@co.summit.co.us
Jay Nelson	Red, White & Blue Fire	PO Box ~~[illegible]~~ 710 Breckenridge CO 80424	970 453 2474	jNelson@rwbfire.org
Joe Wray	Dillon PD	275 Lake Dillon Dr. PO Box 338 80435	970-262-3417	joew@townofdillon.com
ERIC HOLGERSON	TOWN OF DILLON PUBLIC WORKS	P.O. BOX 8 DILLON, CO 80435	970-262-3408	ERICH@TOWNOFDILLON.COM
JACK TAYLOR	LOWER BLUE FPD	P.O. Box 977 SILVERTHORNE	970-389-1864	jacct@taylorsolutions.net
Don Hendershott	Envir Health	Box 5660 Frisco	668-4073	danh@co.summit.co.us
Steve Hill	Summit County	Box 68 Brech	970 389 5933	steveh@co.summit.co.us

Agenda

Summit County Multi-Hazard Mitigation Plan
Meeting #3: Mitigation Actions

July 24, 2008
8:30 am-12:00 pm
Community and Senior Center
0151 County Road 1004
Frisco, CO 80443

1) Welcome and Introductions (8:30-8:45)

2) Today's Agenda and Plan Purpose Review (8:45-9:00)

3) Identification of Mitigation Actions (9:00-9:45)

Break (9:45-10:00)

4) Identification of Mitigation Actions Continued (10:00-11:00)

Break (11:00-11:15)

5) Prioritization of Mitigation Actions (11:15-11:30)

6) Plan Implementation and Maintenance (11:30-11:45)

7) Mitigation Action Implementation Worksheets and Next Steps (11:45-12:00)

Sign-In Sheet
Summit County Multi-Hazard Mitigation Plan
Meeting #3
July 24, 2008

Name	Jurisdiction/ Department	Address	Phone	E-Mail
Joe Wray	Dillon PD	275 Lake Dillon Dr PO Box 335 80435	(970) 468-6078	joew@townofdillon.com
Mark Hanschmidt	Silverthorne	PO Box 1167 Silv. CO 80498	262-7320	mhanschmidt@silverthorne.org
Tom Hill	Blue River Trustee	PO Box 25733 Breckenridge, CO	547-1752	thiloperaa@peoplepc.com
Kim Green	Breck PD	POB 5469 Breck 80424	453-2941	kimg@townofbreckenridge.com
Mark Hemingway	Frisco PD	PO Box 4100 Frisco, CO 80443	668-3579	markh@townoffrisco.com
Tim Faia	Summit Cty	POB 5660 Frisco 80443	668-4243	timf@co.summit.co.us
Gary Drescher	BMMD	POB 2430 - Silverthorne 80498	468-6291 + 224	GaryD@wildernest.com

Sign-In Sheet
Summit County Multi-Hazard Mitigation Plan
Meeting #3
July 24, 2008

Name	Jurisdiction/ Department	Address	Phone	E-Mail
Robert Jacobs	Summit County Engineering Dep't	P.O. Box 5660 37 Peak One Dr, Frisco, 80443	970.668.4212	robertj@co.summit.co.us
Kevin McCormick	Summit County Snake River WWTP	4344 Swan Mtn. Rd Dillon, CO. 80435	970-468-5794	KevinM@co.summit.co.us
Rich Ferris	Summit County IS	PO Box 5660, Frisco, Co 80443	(970)668-4222	richf@co.summit.co.us
Dan Hendershott	County Envir (Public) Hlth	Box 5660 Frisco 80443	970 668-4073	danh@co.summit.co.us

EMERGENCY MANAGEMENT

970-453-2232
fax 970-453-7329
Post Office Box 210
501 N. Park Street
Breckenridge, Colorado 80424

July 3, 2008

RE: Summit County Natural Hazards Planning Open House

Summit County Government; the Town Governments; and Special Districts are working together to develop the Summit County Multi-Hazard Mitigation Plan reduce the vulnerability of people and property to the impacts of natural hazards **before they occur** and to obtain eligibility for mitigation funding from the Federal Emergency Management Agency (FEMA).

The Summit County Hazard Mitigation Planning Committee, which was formed to support this project, has identified you and/or your organization as an important stakeholder in this plan. We invite you to attend a Natural Hazards Planning Open House on **Thursday, July 24 at 5:30 pm at the Community and Senior Center, Hoosier Room,** located at 0151 County Road 1004 in Frisco**.** The meeting will be an open house format from 5:30 to 6:00 pm with a presentation beginning at 6:00 pm.

The purpose of the Natural Hazards Planning Open House is to:

- Inform stakeholders in the hazard mitigation plan of its purpose and benefits,
- Present the results of the Summit County Risk Assessment, and
- Discuss community issues, concerns, and priorities for reducing our risk to natural disasters.

The multi-hazard mitigation plan addresses a comprehensive list of natural hazards—ranging from flooding to wildfire, severe winter weather, and drought—and assesses the likely impacts of these hazards to communities in Summit County. It also sets goals and prioritizes projects to reduce the impacts of future disasters on people and property in the County. Examples of projects that we hope to pursue as a result of this plan include reducing vulnerability of critical facilities to hazard events and increasing public education and awareness of hazards and risk.

We encourage you to attend the open house to learn more about this important project and to provide us with input on your concerns and priorities. Your feedback will be used to inform the draft plan, which will be available for public review and comment in late August.

If you would like more information about this project, please contact me at (970) 453-2232 x336 or jcochran@co.summit.co.us.

Sincerely,

Joel Cochran

11. Invitation List to Natural Hazards Planning Open House

Our Future Summit email distribution list

Friends of the Lower Blue email distribution list

Town of Blue River
P.O. Box 1784
Breckenridge, CO 80424

Town of Breckenridge
P.O. Box 168
Breckenridge, CO 80424

Town of Dillon
P.O. Box 8
Dillon, CO 80435

Town of Frisco
P.O. Box 4100
Frisco, CO 80443

Town of Montezuma
Steve Hornback
P.O. Box
Dillon, CO 80435

Town of Silverthorne
P.O. Box 1309
Silverthorne, CO 80498

Breckenridge Sanitation District
P.O. Box 1216
Breckenridge, CO 80424

Buffalo Mountain Metro District
P.O. Box 2430
Silverthorne, CO 80498

Copper Mountain Consolidated Metropolitan District
P.O. Box 3002
Copper Mountain, CO 80443

Dillon Valley Metropolitan District
P.O. Box 192
Silverthorne, CO 80498

Water Solutions, Inc

Matt Willitts
P.O. Box 192
Silverthorne, CO 80498

East Dillon Water District
P.O. Box 627
970-668-5655

Hamilton Creek Metropolitan District
P.O. Box 627
Frisco, CO 80443

Lake Dillon Fire Protection District
P.O. Box 4428
Dillon, CO 80435

Lower Blue Fire Protection District
7000 County Road 30
Heeney, CO 80498

Red, White and Blue Fire Protection District
P.O. Box 710
Breckenridge, CO 80424

Snake River Sanitation District
4344 Swan Mountain Road
Dillon, CO 80435

Summit School District - Administration
P.O. Box 7
Frisco, CO 80443

Willowbrook Metropolitan District
Metro Services
P.O. Box 1337
Silverthorne, CO 80498

Colorado Division of Emergency Management
Mitigation Division
15220 South Golden Road, Building 70
Golden, CO 80401

Colorado Division of Water Resources
Division 5 – Colorado River
P.O. Box 396
Glenwood Springs, CO 81601

Colorado Division of Water Resources
Summit County Water Commissioner
P.O. Box 4741

Breckenridge, CO 80424

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

Colorado Geological Survey
1313 Sherman Street, Room 721
Denver, CO
303-866-2611

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

Colorado State Forest Service
P.O. Box 69
Granby, CO 80446

FEMA Region VIII - Mitigation Office
Building 710
Denver Federal Center
P.O. Box 25267
Denver, CO 80225-0267

Middle Park Conservation District
P.O. Box 145
Granby, CO 80446

United States Forest Service
White River Forest – Dillon Ranger District
P.O. Box 620
Silverthorne, CO 80498

Bureau of Reclamation
Green Power Plant
County Road ,1813 Building 0170 BRR
Silverthorne, CO 80498

Denver Water Board
1600 West 12th Avenue
Denver, CO 80204

Colorado Department of Transportation
Region 1, Transportation Director
18500 East Colfax Avenue
Aurora, CO 80011-1337

Vail Resorts Management Company
390 Interlocken Crescent, Suite 1000

Broomfield, CO 80021

Arapahoe Basin Ski Area
PO Box 5808
Dillon, CO 80435

American Red Cross
Egon Gerson Service Center
PO Box 120
Dillon, CO 80435

Summit County Government
Board of County Commissioners
PO Box 68
Breckenridge, CO 80424

St. Anthony Summit Medical Center
Attn: Julie Zangari
340 Peak One Drive
Frisco, CO 80443

Colorado Mountain College
PO Box 2208
Breckenridge, CO 80424

Xcel Energy
414 Nicollet Mall
Minneapolis, MN 55401-1993

Clear Creek County Office of Emergency Management
PO Box 2000
Georgetown, CO 80444

Eagle County Office of Emergency Management
PO Box 850
Eagle, CO 81631

Grand County Office of Emergency Management
PO Box 264
Hot Sulphur Springs, CO 80451

Lake County Office of Emergency Management
PO Box 255
Leadville, CO 80461

Park County Office of Emergency Management
PO Box 27
Fairplay, CO 80440

Your Input Is Needed on the Summit County Multi-Hazard Mitigation Plan

Summit County; the towns of Breckenridge, Dillon, and Silverthorne; and other special districts are developing a comprehensive Multi-Hazard Mitigation Plan to reduce the vulnerability of people and property to the impacts of natural hazards **BEFORE THEY OCCUR** and to become eligible for mitigation funding programs from the Federal Emergency Management Agency (FEMA).

We would like **YOUR** input on this important plan, which must be approved by the Summit County Commissioners; the governing entity of every participating jurisdiction; the State of Colorado; and FEMA.

The plan will address a comprehensive list of natural hazards—ranging from wildfire to flooding, severe winter weather, and drought—and will assess the potential impacts of these hazards to communities in Summit County. The plan will also set goals and prioritize projects to reduce the impacts of future disasters on people and property in the County. Examples of projects that may result from this plan include reducing vulnerability of critical facilities to hazard events and increasing public education and awareness.

Your comments and ideas are invited and encouraged at the upcoming Natural Hazards Planning Open House on **Thursday, July 24 at 5:30 pm** at the **Community and Senior Center (Hoosier Room) in Frisco** located at 0151 County Road 1004. The meeting will be an open house format from 5:30 to 6:00 pm with a presentation beginning at 6:00. The purpose of the open house is to:

- Inform the public and other interested parties of the hazard mitigation plan and its purpose and benefits,
- Present the results of the Summit County Risk Assessment, and
- Discuss community concerns and priorities for reducing our risk to natural disasters.

Feedback from the open house will be incorporated in the draft plan, as appropriate, which will be available for public comment in August. For more information, contact:

Joel Cochran
Emergency Manager
Summit County
Phone: (970) 453-2232 x336
E-mail: jcochran@co.summit.co.us

Julie Baxter
Project Manager
AMEC Earth and Environmental
Phone: (303) 742-5332
E-mail: julie.baxter@amec.com

Sign-In Sheet
Natural Hazards Planning Open House
Summit County Multi-Hazard Mitigation Plan
July 24, 2008

Name	Jurisdiction/ Organization/Citizen	Address	Phone	E-Mail
Kathryn Grohusky	Summit County	POB 5475 Frisco, CO	668-5707	
Don Parsons	Dillon	POB 272 Dillon 80435	406-1341	
Jack Taylor	Lower Blue Fire Protection District	7000 SCR 30 Heeney, CO 80498	389-1864	
John Snook	Colorado Avalanche Information Center	2017 Soda Ridge Rd 1942 Keystone, CO 80435	513-0482	john.snook@state.co.us
Gary Green	Red White & Blue Fire District	Box 710 Breckenridge, CO 80424	453-2474	ggreen@rwbfire.org
Kim Green	Breckenridge PD	POB 5469 Breck, 80424	453-2941	kimg@townofbreckenridge.com
★ Matt Willis	Hamilton Creek Metro District, Dillon Valley District, Water Solutions, Inc.	P.O. Box 192 Silverthorne, CO 80498	262-0217	watersolutionsems@msn.com
Gary Roberts	Town of Breckenridge Water	PO Box 168 Breck 80424	453-3173	garyr@townofbreckenridge.com
Chris Kulick	Breck Comm Dev		453-3371	chrisk@Townofbreckenridge.com
Katie Larson	MPB Private-Survey Business	PO Box 1770 Dillon	485 3235	KTLW@earthlink.net
Gary Grady	Boulder Creek	8005 Hickory St Omaha NE 68124	262 0532	GDGRADY@MSN.COM
Renee Rogers	Town of Silverthorne	PO 1309 Silverthorne, Co	262-7374	reneerogers@silverthorne.org
Lindsay Ishman	American Red Cross	PO Box 120, Dillon	262-0530	Lishman@denver-redcross.org
Eileen Davies	Frisco	Box 2150 Frisco 80443	668-8775	egdavies@q.com
Dave Parmley	Lake Dillon Fire	PO Box 4428 Dillon 80435	513-4100	dparmley@ldfr.org
Jaime FitzSimons	SCSO	PO Box 210 Breckenridge, CO 80424	970 453-2232	JaimeF@co.summit.co.us

Sign-In Sheet
Natural Hazards Planning Open House
Summit County Multi-Hazard Mitigation Plan
July 24, 2008

Name	Jurisdiction/ Organization/Citizen	Address	Phone	E-Mail
PAUL SEMMER	US FOREST SERVICE	PO BOX 620 SILVERTHORNE	262-3478	psemmer@fs.fed.us

From: JCochran [JCochran@co.summit.co.us]
Sent: Monday, September 22, 2008 5:49 PM
To: Baxter, Julie E
Subject: FW: Public Comment Period on Multi-Hazards Planning
This is the email regarding review of our plan. I send it to all who have been involved at the County end, including the Managers Office and BOCC. Jc

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From: JCochran
Sent: Thursday, September 11, 2008 11:44 AM
To: JohnM; DerekW; SteveH; RichF; RicP; RobertJ; LindsayH; TimF; DanH; KevinM
Cc: ThadN; ScottV; ThomasD; TomL; BobF; GaryM; GleniceB; 'Zangari, Julie'
Subject: Public Comment Period on Multi-Hazards Planning

Good Morning,
I know many of you have spent many hours working on parts of this planning document and attending meetings. Thank you all for your time and energy.
The near final version has been released for public comment and review. The files are big therefore the document can be viewed as a completed product at these locations:

I have posted the document on the Emergency Management page on the County Website: http://www.co.summit.co.us/emergencymanagement/

I have placed the files on the FTZ drive under Emergency Management 2007 and in the folder MultiHazards Plan

The plan is divided into three files, one for the cover page, one of the base plan, and one for the jurisdictional annex documents. The additional file is the introduction letter regarding the plan being available for public review.

After the public review period the plan is off to FEMA and the State for review and comment.

Please send me any comments regarding the plan. Thank you.

Joel

_____

Joel Cochran
Emergency Manager
Summit County Sheriff's Office
501 N Park Street, PO Box 210
Breckenridge, CO 80424
O: 970-453-2232 x336
F: 970-453-7329
jcochran@co.summit.co.us

Your Input Is Needed on the Summit County Multi-Hazard Mitigation Plan

Summit County Government; the Town Governments; and several Special Districts worked together to develop the Summit County Multi-Hazard Mitigation Plan to reduce the vulnerability of the people and property of the County to the impacts of natural hazards and to obtain eligibility for mitigation funding from the Federal Emergency Management Agency (FEMA).

The plan addresses a comprehensive list of natural hazards—ranging from flooding to wildfire, severe winter weather, and drought—and assesses the likely impacts of these hazards to communities in Summit County. It also sets goals and prioritizes projects to reduce the impacts of future disasters on people and property in the county.

We would like YOUR input on this important plan, which must be approved by the Summit County Board of County Commissioners, the governing bodies of each participating jurisdiction, the State of Colorado, and FEMA. Your comments will be considered by the Hazard Mitigation Planning Committee and incorporated into the plan, as appropriate.

The draft plan is available for your review at the following locations:

- Summit County Emergency Management website at http://www.co.summit.co.us/emergencymanagement/.

- Summit County Sheriff's Office
  501 N. Park St.
  Breckenridge, CO 80424
- Summit County Library
  Main Branch - Frisco
  County Commons Building
  0037 County Road 0005
  Frisco, CO 80443
- Summit County Library
  North Branch – Silverthorne
  651 Center Circle
  Silverthorne, CO 80498

The deadline for public comment on the draft plan is September 21, 2008. Written comments may be submitted by mail, email, or fax to:

Joel Cochran
Summit County
Office of Emergency Management
Post Office Box 210
Breckenridge, Colorado 80424
Fax: 970-453-7329
Email: jcochran@co.summit.co.us

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AMEC Earth and Environmental
355 South Teller Street, Suite 300
Lakewood, CO 80226
Tel: (303) 742-5324; Fax: (303) 935-6575
Email: julie.baxter@amec.com

If you have questions on this project, contact Joel Cochran, Summit County Emergency Manager at (970) 453-2232 or jcochran@co.summit.co.us.

County looks for input on disaster mitigation plan

BY BY ASHLEY DICKSON
SUMMIT DAILY NEWS
SUMMIT COUNTY, CO COLORADO,

SUMMIT COUNTY — The Summit County Government is looking to obtain public feedback on a county-wide disaster mitigation plan that identifies the area's most likely natural hazards and how to plan for them in advance.

Once the plan is finalized it will be sent to the Federal Emergency Management Agency (FEMA), which provides pre-disaster mitigation grants for those areas that qualify under the strict application process.

"FEMA has a lot of requirements for this plan and it has taken almost nine months to compile everything together," county emergency manager Joel Cochran said. "In the end, it's not just about chasing the grant money but rather having a plan the whole county can adopt."

In January, the county hired an engineering consultant firm, AMEC Earth and Environmental, for $40,000 to begin the process of categorizing potential natural hazards. The pre-disaster plan marks the first of its kind in Summit County, and funding was provided by the Colorado Water Conservancy Board, the State Division of Emergency Management and the county budget.

"This will be the first plan sent to FEMA where the pine beetle is listed as a top hazard," Cochran said. "The other main hazards we have placed at the top of the list are severe weather, wildfires and flooding."

Included in the plan are separate annexes for each town in the county, which helps narrow down specific projects that can be put in place in advance to protect at-risk communities.

"One project we would like to do would be re-mapping the county's flood plain, which is very out of date right now," Cochran said. "Then there's pine beetle mitigation, public education programs, and maybe someday being able to put a text-message emergency alert system in place."

Summit County residents will have two weeks to review the plan and make comments before it is sent to FEMA, and hard copies of the document can be found at the Frisco and Silverthorne Libraries, the Summit County Sheriff's Office, as well as online at the county's emergency management website.

"This is a chance for the public to comment on how we have identified our hazards," Cochran said. "They might be able to add to our project list and help us reprioritize or identify hazards we haven't thought of."

Once submitted, FEMA will have 60 days to review the plan. During that time the local Summit County government will decide whether to adopt it as the county's official pre-disaster mitigation plan.

In 2005, FEMA allocated $233 million in pre-disaster mitigation grants for those communities that implemented long-term plans to moderate their reliance on federal dollars following a natural disaster.

"Having a plan opens up funding," Cochran said. "But the grants are really geared towards the process of creating the plan, so in the end what we have already done is benefiting the community."

Ashley Dickson can be reached ▫at (970) 668-4629, or ▫at adickson@summitdaily.com.

http://www.summitdaily.com/apps/pbcs.dll/article?AID=/20080907/NEWS/809079980/1001&parentprofile=1055&template=printart

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APPENDIX C: MITIGATION ALTERNATIVES AND PRIORITIZATION

Mitigation Alternatives Considered by Hazard

Avalanche

- Implement avalanche hazard zones in master planning
- Minimize structures, infrastructure, and other conflicting uses in hazard areas
- Snow fences or sheds to protect critical road sections or structures
- Retrofits to existing property or infrastructure to withstand avalanches
- Expand educational programs and partnerships
- Improve data and information

Dam Failure

- Minimize new development in dam inundation areas
- Improved coordination with dam owners/operators
- Support updated and improved Emergency Action Plans

Drought

- Adopt water use ordinance to prioritize or control water use during emergency situations, such as firefighting or drought
- Develop a drought contingency plan to anticipate needs and actions
- Develop and adopt a tiered rate structure to encourage water savings measures by citizens
- Develop education and incentives programs to encourage responsible water use
- Incorporate consideration for drought in water delivery systems
- New or upgraded pipelines
- Lining ditches

Erosion and Deposition

- Revegetation of disturbed areas
- Drainage management
- Sediment catchment basins
- Riprap along erosion-prone streambanks
- Straight Creek Clean-Up Committee
- Coordination with CDOT

Flood

- Develop mitigation measures for critical facilities and infrastructure located in flood hazard areas

- Promote National Flood Insurance Program
- Join Community Rating System/Improve rating in Community Rating System
- Preserve open space in the floodplain through regulatory and nonregulatory methods/Develop acquisition and management strategies to preserve open space in floodplain
- Promote stormwater and urban design best management practices to reduce runoff and urban flooding
- Provide flood event education and outreach to households and businesses
- Create a regional partnership to reduce losses and promote education
- Enhance floodplain data and mapping
- Review and strengthen floodplain ordinance when adopting new DFIRMs
- Enhance early warning systems

Examples of flood mitigation projects implemented with FEMA mitigation funding in Colorado:

- La Junta built a lift station,
- Canon City built retention ponds,
- Crowley floodproofed a historic public building,
- Fort Collins floodproofed residences and one historic building,
- Fort Collins and Pueblo improved their early warning systems,
- Morgan County did improvements to a pre-school property to protect it from flood,
- Larimer County improved drainage in the West Vine area,
- Otero County improved drainage along a county road by an Aurora reservoir,
- Georgetown improved drainage in the creek through the Town,
- Delta built a flood protection structure around the treatment plan, and
- Jamestown buried pipelines under the creek.
- Fort Collins has done five drainage improvement projects including detention projects;
- Colorado Springs is implementing an erosion control project near a critical communications facility,
- Erie is rebuilding a culvert under an access road at the airport,
- Grand Junction is implementing drainage improvements through the city, and
- Denver is putting in a detention pond and improvements near a police substation

Hazardous Materials Release

- Improve design, routing, and traffic control at problem roadway areas
- Coordination with CDOT
- Local Emergency Planning Committee

Landslide

- Protect existing development in landslide hazard areas
- Limit activities in identified hazard areas through regulation
- Coordinate with property owners to reduce risk in landslide hazard areas
- Acquisition and demolition or relocation

- Maintain public and private drainage systems
- Retaining structures
- Slope/unstable rock stabilization

Lightning

- Install surge protection on critical electronic equipment
- Install lightning protection devices, such as lightning rods, on communications infrastructure
- Expand severe weather alert capabilities
- Increase public education

Wildfire

- Create and maintain wildfire defensible spaces around facilities in high fire hazard areas
- Coordinate WUI ordinances for property regulations
- Review and update wildfire mitigation ordinance/policies
- Maintain and enhance CWPP
- CWPP policies: Support neighborhood, subdivision and community efforts to reduce the risk of wildfires
- Conduct specific community-based demonstration projects of fire mitigation in WUI areas
- Wildfire Council

Winter Weather

- Distribute family and traveler emergency preparedness information related to severe winter weather hazards
- Use snow fences (also rows of trees) to limit blowing/drifting snow over critical road segments
- Weatherproof critical facilities
- Maintain tree trimming for above ground power lines
- Support underground utility construction

Multi-Hazard

- Review capital improvement plans for projects that could be included in mitigation plan
- Partner with lodging providers to make hazard and emergency information available for visitors
- Improve response and recovery timelines and efficiency
- Increase web-based public outreach and information
- Increase technical data on natural hazards to inform policies and programs
- Improve data sharing among agencies and communities for mitigation, response, and recovery
- Provide educational materials about natural hazards and risks to customers in utility bills

- Improve natural hazards review criteria for new development for long-term loss prevention
- Establish a regional emergency management and/or mitigation council to bring together resources for comprehensive planning, analysis, and decision making
- Develop continuity of operations/governance plans lifeline utilities, public health, water sewer, partnerships/contracts)
- Involve schools in education regarding local hazards and risk
- Develop a program or system for supporting vulnerable populations during periods of infrastructure failure or other emergency events
- Obtain backup power for critical facilities
- Promote NOAA weather radios
- Maintain updated building codes
- Integrate hazard mitigation plan with community master plans and other plans, including public health plan

Mitigation Actions Identified and Prioritized

Open House Votes	HMPC Votes	Total	Priority	Action
2	5	7	High	Continue to involve and educate public in mitigation activities
	1	1	Medium	Develop an educational partnership with lodging companies to inform guests of evacuation routes, availability of emergency services, and specific hazards such as lightning, avalanche, and winter weathers
		0	Low	Develop visitor information guide for what to do in case of fire, flood, winter storm, road closures, etc Combined with other item
5	3	8	High	Improve, publicize, and exercise evacuation plans
	2	2	High	Minimize development in hazard prone areas Objective
	2	2	Medium	Promote and assist with development of continuity of operations plans for businesses, particularly major employers
			Low	Create an intergovernmental model to share government function to improve continuity of operations for all governments
6	4	10	High	Conduct continuity of operations planning for critical infrastructure
7	2	9	High	Improve quality and coordination of the release of public information related to warning and emergency events
4		4	High	Conduct outreach to various groups to reach more segments of the public (combined with other item)
		0	Low	Create a special planning committee for conducting Homeland Security hazard and vulnerability analysis for critical infrastructure
		0	Low	Develop a hazard mitigation planning committee within each town to guide policy and implement the mitigation plan
7	2	9	High	Develop a formal committee, consolidated with Public Safety Council, or LEPC to facilitate interagency cooperation and consolidate the fragmented meetings.
		0	Low	Identify critical facilities in need of auxiliary power sources and prioritize projects
		0	Low	Remove of the North Fork lift station or install backup power supply

Open House Votes	HMPC Votes	Total	Priority	Action
		0	Low	Prevent a sewer overflow caused by flooding or another hazard event
		0	Low	Conduct a comprehensive critical infrastructure hazard and vulnerability analysis
		0	Low	Establish plan monitoring checklist to conduct during biannual reviews to preserve effectiveness of plan
3		3	Medium	Coordinate with CDOT to prevent accidents and road closures related to hazard events
7		7	High	Continue to update and enhance Summit County Community Wildfire Protection Plan
6		6	High	Integrate wildfire mitigation strategies identified in the CWPP into the hazard mitigation plan
1	9	10	High	Coordinate wildland-urban interface policies and programs for improved consistency between towns and County
	9	9	High	Support and participate in Wildfire Council
		0	Low	Identify and prioritize fuel reduction projects around critical facilities and infrastructure in wildfire threat areas
4		4	High	Continue to enhance hazard and vulnerability analysis for wildland-urban interface areas
		0	Low	Continue to actively promote forest management activities as related to recreational activities
4		4	High	Work with Summit County Pine Beetle Task force to develop appropriate mitigation actions
		0	Low	Install surge protection on critical electronic equipment
	1	1	Medium	Install lightning protection devices, such as lightning rods on communications infrastructure
	2	2	Medium	Encourage utility companies to protect infrastructure from lightning Removed by Joel
		0	Low	Promote NOAA weather radios
5	8	13	High	Improve coordination of emergency sheltering between communities, County, and Red Cross
		0	Low	Educate and be flexible in constructing kitch facilites to prevent frozen pipes
1		1	Medium	Improve capabilities of Local Emergency Planning Committee
		0	Low	Monitor proposed changes to hazardous materials routing
	1	1	Medium	Participate in CDOT hazardous materials retention work group and pre-positioning of supplies Included in other action
	2	2	High	Identify and map geologic hazard zones and incorporate into master planning
		0	Low	Improve coordination and education of homeowners in Heeney landslide area
	1	1	Meidum	Address hazard of post-fire landslides
		0	Low	Educate public on well construction to prevent flooding of well head
	2	2	High	Review and strengthen floodplain ordinance when adopting new digital flood insurance rate maps
	4	4	High	Mitigate critical facilities in the 100-year floodplain
		0	Low	Consider joining the Community Rating System when new digital flood insurance rate maps are adopted
		0	Low	Provide better education and information on the NFIP and flood hazard areas

Open House Votes	HMPC Votes	Total	Priority	Action
2	1	3	Medium	Encourage drought resistant landscaping in new developments
1	1	2	Medium	Develop education program to encourage responsible water use
	1	1	Medium	Reduce erosion and improve road maintenance in Blue River
		0	Low	Work with road and bridge department to identify actions to mitigate sanding issue
	3	3	Medium	Develop protection plan for roadside ditches to reduce erosion and flooding
	1	1	Medium	Improve coordination of different avalanche education and awareness programs
	9	9	High	Improve coordination and communication between dam operators and local governments
		0	Low	Minimize new dam development and dam changes
		0	Low	Require scaleable plans and planning with local emergency response agencies
		0	Low	Develop better procedures for emergency sheltering at the Breckenridge Recreation Center to prevent loss of service revenues