

PARK COUNTY, COLORADO

**MULTI-JURISDICTIONAL
MULTI-HAZARD MITIGATION PLAN**

AUGUST, 2008

Revised February 2009

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EXECUTIVE SUMMARY

Section 1 Introduction

The Park County Multi-Jurisdictional All-Hazard Mitigation Plan demonstrates the current and future mitigation actions in an organized fashion similar to the guidance materials provided by FEMA. The Park County Multi-Jurisdictional All-Hazard Mitigation Plan is authorized by Public Law 106-390, Section 322, also known as the Disaster Mitigation Act of 2000. The Plan provides eligibility to the Town of Alma, the Town of Fairplay, and Park County for funding from state and federal hazard mitigation programs.

Plan Organization

Chapter one overviews Park County, provides a definition of mitigation planning and details the legal authority of the plan. Chapter two describes stakeholder involvement for Park County, the Town of Alma and the Town of Fairplay and defines the processes followed throughout the creation of this plan. Chapter three provides a physical and demographic profile of the county, looking at aspects such as geography, hydrography, development activity, land use patterns, and people. Chapter four evaluates the hazards likely to affect Park County, and quantifies the risk posed to the county and the two incorporated towns by those hazards. Chapter five analyzes each of the three local jurisdictions' policies, programs, plans, resources, and capabilities to reduce exposure to hazards in the community. Chapter six addresses the Park County jurisdictions' issues and concerns for hazards by establishing a framework for specific mitigation activities and policies. The strategy includes a single overarching county goal, a comprehensive set of goals and accompanying objectives, and a range of actions to achieve the goals. Chapter seven specifies how the plan will be monitored, evaluated, and updated, including a process for continuing stakeholder involvement once the plan is completed. Chapter eight includes a list of reports and data used to develop this plan. Chapter nine is the appendix containing supplemental reference materials, more detailed calculations, and methodologies used in the planning process. The appendices also provide a list of commonly used mitigation terms and acronyms.

Section 2 Planning Process

After receiving funding in 2007, Park County created a Mitigation Advisory Committee, composed of representatives from the three participating jurisdictions. The core leadership of the Mitigation Advisory Committee consisted of top administrative officials from Park County, local representatives, and others, some of which are listed in Table 2-1. Between May 2007 and March 2008, the MAC held ten meetings and supervised work on the area's mitigation plan. A summary of those meeting can be

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found in Table 2-2. The Mitigation Advisory Committee will continue meet annually to address issues in the plan.

Section 3 Community Profile

Park County is the 17th largest of Colorado's 64 counties, encompassing 2,211 square miles. Most of Park County is rangeland and the rest is mountainous. There is also roughly 1,300 square miles (832,000 acres) of recreational land within the county. All of the land in Park County falls within the Southern Rockies Level III ecoregion. The entire county population as of the 2000 Census was 14,523 persons, 13,734 of whom live in unincorporated areas. Park County was one of the three fastest-growing counties in Colorado during the 1990's, growing at a rate of 102%. Park County has a total of two school districts, divided between the north and the south portions of the county. The average 2005 wage paid in Park County was \$28,869.

Section 4 Hazard Identification and Risk Assessment

Park County is exposed to a variety of hazards. Potential hazards are wildfires, severe winter weather, hazardous materials spills, flooding, drought, severe thunderstorms, landslides, dam failures and earthquakes. Depending on the severity, location, and timing of the specific events, each of these hazards could have devastating effects. The probability that a potential hazard will affect the community and the potential impacts on the community were two factors used to prioritize potential hazards. A formula was developed to determine the probability and impact values for each of the nine potential hazards. Four distinct categories representing the level of consideration were created. These categories are *Significant*, *Moderate*, *Limited*, and *None*. The initial hazard rankings are identified in Tables 4-1-a, 4-1-b, 4-1-c and the final hazard rankings are located in Tables 4-2-a, 4-2-b, 4-2-c and 4-2-d.

Wildfires

Wildfires in Colorado are extremely active. Between the years 1978 and 2005 there were over 46,000 wildfires. Direct impacts from wildfires can include the loss of structures and infrastructure, injuries or loss of life to firefighters and to the public, health impacts from smoke, the immediate costs of fighting the fire, closure of public lands, highways, or other locations, temporary loss of business, and community disruptions, such as evacuation. The probability and potential impact of a wildfire are increased by ignition risk, fuels hazards, values at risk and available fire suppression resources. The wildfire season varies depending on the elevation, yearly cycles and long-term climate trends. The steep terrain and mountain vegetation areas are at the greatest risk.

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Severe Winter Storms

Severe winter storms and blizzards are extra tropical cyclones that originate as mid-latitude depressions. Park County has experienced many severe winter storms. These storms can isolate citizens by closing roadways and breaking electrical lines. Short term predictions of these events are accurate but no method has been developed which can predict long term severe winter storm occurrence.

HAZMAT

The Colorado Department of Transportation indicated that many vehicles traveling on Park County's major roadways have the potential to cause a hazardous material spill. A hazardous material spill has the potential to shut down a roadway for hours or days depending on the type of spill. There are no chemical facilities in Park County so a hazardous spill most likely will happen on one of the county's roadways.

Flooding

The portions of the county most susceptible to flooding are those directly adjacent to the area's major drainage ways and selected smaller tributaries throughout the area. The county has nine water basins. These basins face potential flooding from excessive rainfall, trans-basin diversions, snowmelt and post-wildfire flooding. Flooding events are rare in the Colorado basins but it is estimated over eleven billion dollars is exposed to this hazard. Also, Park County is prone to flash flooding from heavy rainfall events.

Droughts

Three types of drought affect Park County. These are meteorological, agricultural and hydrologic droughts. The onset of a significant drought cannot be accurately predicted. There are many different methods to measure drought but the most common measurement is the Palmer Drought Index.

Severe Thunderstorms

Park County experiences severe thunderstorms throughout the year. Most damage occurs from high winds, heavy rain, lightning and hail. Hail can cause extensive damage to personal property. Localized geography can increase damage by funneling winds which create gusts over one hundred mile per hour.

Landslides

Landslides are a visible threat in Park County. High risk areas for landslides are in mountainous terrain or areas that have destabilized soils. Landslides are caused by a number of factors both natural and artificial. It is very difficult to predict a landslide but

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certain factors such as topography and geology allow areas to be considered susceptible to landslides.

Dam Failure

Park County has no documented history of dam failures. In the event of a total dam failure, the most common failure would be liquefaction along the dam wall. It is likely that the failure of major dams would cause widespread loss of life downstream to humans and animals, as well as extreme environmental stress along the flood path. Park County has a total of twenty-three dams. A twenty-fourth dam which would affect Park County is located in Clear Creek County.

Earthquakes

Around 500 earthquakes of magnitude 2.5 or higher have occurred since 1867. Scientists are unable to predict the next earthquake in Colorado but believe a 6.0 or greater event could happen. The State of Colorado is subject to earthquakes occurring in one primary area – southwestern Colorado. This zone, however, does not have the potential to affect Park County.

Section 5 Capabilities

Park County's capabilities are assessed by a comprehensive examination of staff, organizational, technical, fiscal, policy and program capabilities along with an assessment of legal authority and political willpower. The capability assessment was conducted to identify potential hazard mitigation opportunities. Each town's capabilities are listed and described. Also, statewide and county safety programs are documented.

Section 6 Mitigation Strategy

Park County Mitigation Advisory Committee attended workshops to discuss the results of the hazard identification and risk assessments, review mitigation goals and objectives, discuss community strengths and weaknesses, and begin developing the mitigation strategy. Park County proceeded by setting mitigation goals which considered many different alternatives. Park County developed a prioritized list of mitigation actions using the STAPLE/E Criteria and then derived a comprehensive mitigation action plan which incorporated the risk map life cycle.

Section 7 Plan Maintenance Procedures

Three local governments in Park County, Colorado participated in this planning process and formally adopted The Park County Multi-Jurisdictional All-Hazard Mitigation Plan by resolution of their governing Board. These local governments are the Town of Alma, the

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Town of Fairplay, and Park County. The communities will work to implement the principles into other plans and mechanisms created. Also, the mitigation strategy in this plan includes six specific actions that will enhance Park County's commitment to the National Flood Insurance Program by strengthening the compliance of the three jurisdictions with the requirements of the National Flood Insurance Program and by promoting a more comprehensive program of floodplain management activities in the county. The county commissioners will be responsible for appointing one or more representatives from their jurisdiction to join the Mitigation Advisory Committee. The Mitigation Advisory Committee will be responsible for monitoring and updating the plan. The Mitigation Advisory Committee will annually review each of the three mitigation plans and recommend new mitigation initiatives. Also, every five years a written update will be submitted to the state of Colorado and FEMA Region VIII. The Park County Emergency Manager will initiate and coordinate the monitoring of the plan. For each mitigation action the Mitigation Advisory Committee will be responsible for setting annual measures of success and a five year measure of success. Public notice will be given and the public will be invited to attend the Mitigation Advisory Committee meetings.

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SECTION 1 INTRODUCTION

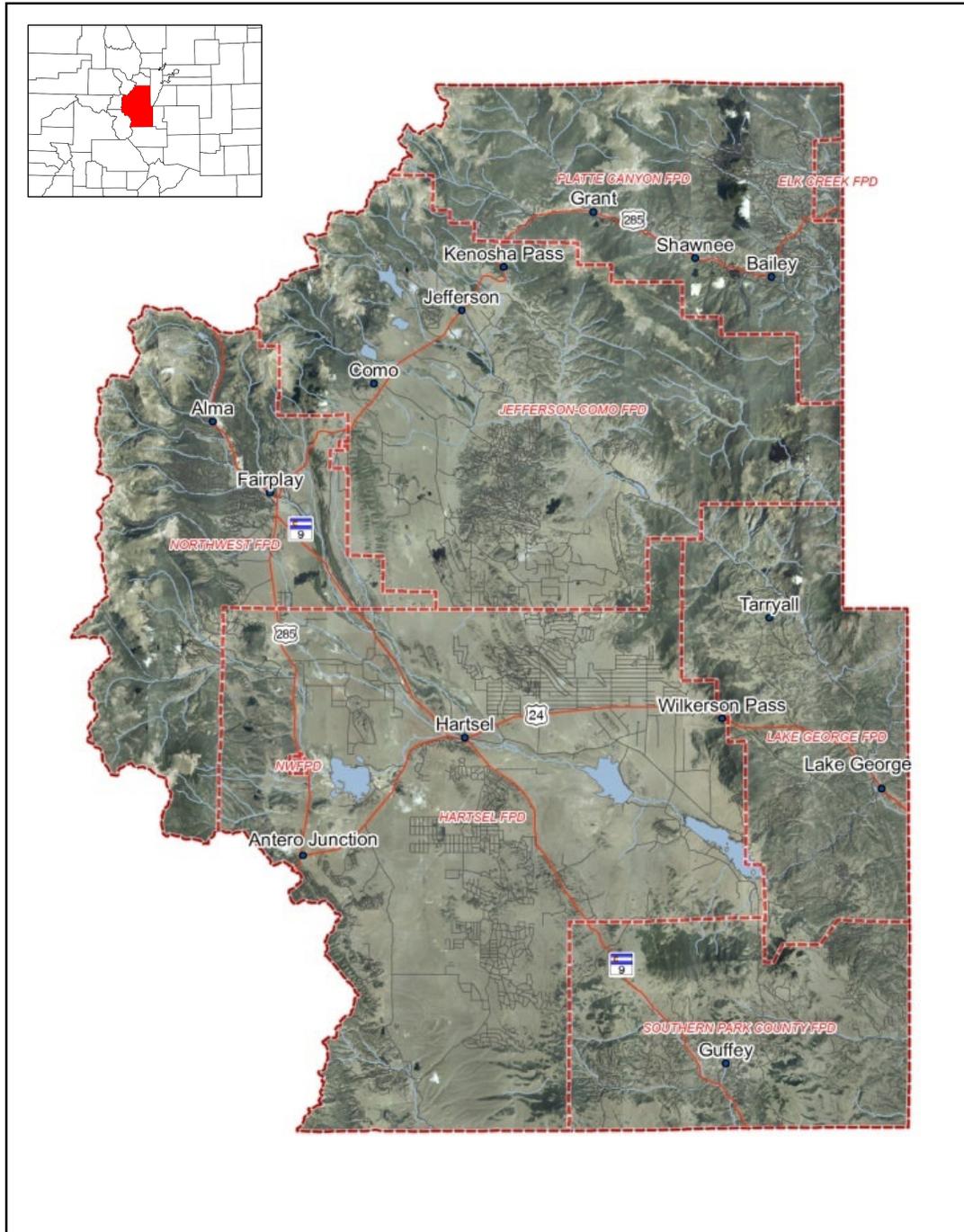
1.1 BACKGROUND

Park County is located in the central part of Colorado, southwest of Denver and northwest of Colorado Springs, in the foothills and the mountains west of the urban corridor. The county is approximately 45 miles wide from east to west, and 60 miles long from north to south. The perimeter of the county is defined by several mountain ranges, including the Mosquito Range above Fairplay and Alma, the Buffalo Peaks west of Hartsel, the Continental Divide north of Jefferson and Como, the Front Range and Kenosha Mountains above the unincorporated communities of Bailey and Grant, and the Thirtynine Mile Volcanic Area surrounding Guffey.

Park County can be divided roughly into six geographic portions. The northeastern portion of the county, the Platte Canyon Area, located in the Front Range and Kenosha Mountains, includes the unincorporated communities of Bailey, Shawnee and Grant. To the south and west of the Platte Canyon Area is the Continental Divide, a range of high mountains separating the Colorado River Basin in Summit County from the South Platte River Basin in Park County. The Continental Divide transitions directly into the third geographic area, the Mosquito Range, a north-south range that includes Park County's highest peaks. The southern portion of the county, the Thirtynine Mile Mountain Volcanic Area, slopes down southward from South Park toward the Arkansas River valley and includes the unincorporated community of Guffey. The eastern portion of the county, the Front Range, provides a rugged, hilly transition from the Thirtynine Mile Mountain Volcanic Area northward to the Platte Canyon Area. It includes the unincorporated communities of Lake George and Tarryall. Within the mountainous ring formed by the other five geographic areas is the central third of the county, South Park, a 900-square mile park (a large mountain valley) located in the geographic center of Colorado. Communities in South Park include the Town of Fairplay and the unincorporated communities of Como, Jefferson and Hartsel. The Town of Alma is located at the transition between the Continental Divide, the Mosquito Range, and South Park.

Park County is located in the geographic transition from the foothills of Colorado's Front Range to the high peaks of the Continental Divide and the equally high peaks of the basin divide between the South Platte River Basin headwaters and the Arkansas River Basin headwaters. The county is bordered to the east by Teller County and Jefferson County, to the north by Clear Creek County and Summit County, to the west by Lake County and Chaffee County, and to the south by Fremont County.

Figure 1-1



1.2 MITIGATION

Mitigation is commonly defined as sustained actions taken to reduce or eliminate long-term risk to people and property from hazards and their effects while protecting the natural environment. Hazard mitigation focuses attention and resources on community policies and actions that will produce successive benefits over time. A mitigation plan states the aspirations of a community and specific courses of action that the community intends to follow to reduce vulnerability and exposure to future hazard events. These plans are formulated through a systematic process centered on the participation of citizens, businesses, public officials, and other community stakeholders. A local mitigation plan is the physical representation of a jurisdiction's commitment to reduce risks from natural and human-caused hazards. Local officials can refer to the plan in their day-to-day activities and in decisions regarding regulations and ordinances, granting permits, and in funding capital improvements and other community initiatives. Additionally, these local plans will serve as the basis for states to prioritize future grant funding that is specific to mitigation, as it becomes available.

The Colorado Division of Emergency Management (CDEM), the Colorado Water Conservation Board (CWCB), and Region VIII of the Federal Emergency Management Agency (FEMA) would like all communities within Colorado to prepare local hazard mitigation plans to reduce and mitigate future losses from natural or human-caused hazard events. By completing and adopting these plans, communities throughout the State may be eligible for grants and other assistance in implementing them. To facilitate development of local plans throughout Colorado, CDEM has made available other community's plans as models. In preparing their All-Hazard Mitigation Plan, Park County and the Towns of Alma and Fairplay benefited from mitigation planning work already conducted in other Colorado communities.

It is hoped that the Park County Multi-Jurisdictional All-Hazard Mitigation Plan will be a useful tool for all community stakeholders by increasing public awareness about local hazards and risks, while at the same time providing information about options and resources available to reduce those risks. Teaching the public about potential hazards and potential strategies for addressing them will help each of the area's jurisdictions protect themselves against the effects of the hazards, and will enable informed decision making on where to live, purchase property, or locate businesses.

This plan covers all of Park County, including the incorporated towns of Alma and Fairplay. The Park County All-Hazard Mitigation Plan serves as a strategic planning tool for use by those three jurisdictions in their efforts to identify and mitigate the future impacts of natural and/or human-caused hazard events.

1.3 THE LOCAL MITIGATION PLANNING IMPETUS

On October 30, 2000, President Clinton signed into law the Disaster Mitigation Act of 2000 (DMA 2000), which established a national disaster hazard mitigation grant program that would help to reduce loss of life and property, human suffering, economic disruption, and disaster assistance costs resulting from natural disasters.

DMA 2000 amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act and added a new section to the law, Section 322 Mitigation Planning. Section 322 emphasizes the need for State, local and tribal entities to closely coordinate mitigation planning and implementation efforts. Section 322 requires local governments to prepare and adopt jurisdiction-wide hazard mitigation plans for disasters declared after November 1, 2003, (subsequently revised to November 1, 2004) as a condition of receiving Hazard Mitigation Grant Program (HMGP) project grants and other forms of non-emergency disaster assistance, and authorizes up to 7 percent of HMGP funds available to a State to be used for development of State, local and tribal mitigation plans. Local governments must review and, if necessary, update their mitigation plan every five years from the original date of the plan to continue program eligibility.

1.4 INTERIM FINAL RULE PLANNING CRITERIA

As part of the process of implementing DMA 2000, FEMA prepared an Interim Final Rule to define the mitigation planning criteria for States and communities. Published in the *Federal Register* on February 26, 2002, at 44 CFR Part 201, the Rule serves as the governing document for DMA 2000 planning implementation.

1.5 ADDITIONAL MITIGATION GUIDANCE AND RESOURCES

To help States, local, and tribal governments meet DMA planning requirements, FEMA has prepared guidance information, titled *State and Local Plan Interim Criteria Under the Disaster Mitigation Act of 2000*, for two purposes:

1. To help federal and State reviewers evaluate mitigation plans from different jurisdictions consistently; and
2. To help states and local jurisdictions develop new mitigation plans or modify existing ones to comply with the criteria of Section 322.

This guidance references planning tools that FEMA has made available to assist States and localities in developing a comprehensive, multi-hazard approach to mitigation

planning, and in preparing plans that will meet the requirements of the DMA. These planning tools include:

§ *State and Local Mitigation Planning How-to Guides* – intended to help States and communities plan and implement practical, meaningful hazard mitigation measures (FEMA 386-1 to FEMA 386-7)

§ *Planning for a Sustainable Future* (FEMA 364) and *Rebuilding for a More Sustainable Future* (FEMA 365) – two related volumes that provide guidance for integrating sustainable practices as part of pre- and post-disaster mitigation planning efforts; and

§ *FEMA Mitigation Resources for Success* (FEMA 372) – a compact disc with a compendium of FEMA resources related to mitigation practices and projects.

1.6 ORGANIZATION OF THE PLAN

The remaining chapters of this document follow the process enumerated in DMA 2000.

Chapter 2 – Planning Process describes stakeholder involvement for Park County, the Town of Alma and the Town of Fairplay and defines the processes followed throughout the creation of this plan.

Chapter 3 – Community Profile provides a physical and demographic profile of the county, looking at aspects such as geography, hydrography, development activity, land use patterns, and people.

Chapter 4 – Hazard Identification and Risk Assessment evaluates the hazards likely to affect Park County, and quantifies the risk posed to the county and the two incorporated towns by those hazards (whom, what, where, and how).

Chapter 5 – Capability Assessment analyzes each of the three local jurisdictions' policies, programs, plans, resources, and capabilities to reduce exposure to hazards in the community.

Chapter 6 – Mitigation Strategy addresses the Park County jurisdictions' issues and concerns for hazards by establishing a framework for specific mitigation activities and policies. The strategy includes a single overarching county goal, a comprehensive set of goals and accompanying objectives, and a range of actions to achieve the goals.

Chapter 7 – Plan Maintenance Procedures specifies how the plan will be monitored, evaluated, and updated, including a process for continuing stakeholder involvement once the plan is completed.

Chapter 8 – References include a list of reports and data used to develop this plan.

Chapter 9 – Appendices are included at the end of the plan, and contain supplemental reference materials and more detailed calculations and methodologies used in the planning process. The appendices also provide a list of commonly used mitigation terms and acronyms.

SECTION 2 PLANNING PROCESS

Due to the history of disasters in Park County, and the development of an emergency management department, the Board of Commissioners recognized the need to develop a multi-hazard mitigation plan. Therefore, the county contacted the State of Colorado, who provided assistance through the Division of Emergency Management, Mitigation Branch.

Mitigation plans, which are required by the Disaster Mitigation Act of 2000 (DMA 2000), help local governments determine vulnerabilities to hazards and risks associated with those vulnerabilities. These plans identify mitigation projects to reduce these risks. The Park County All-Hazards Mitigation Plan, developed under the auspices of Park County, includes the county and the incorporated towns of Alma and Fairplay.

After receiving funding in 2007, Park County contracted with the engineering consulting firm, Dewberry, to assist in the development of a multi-hazard mitigation plan including a Hazard Identification and Risk Assessment (HIRA) and a Mitigation Strategy. The Mitigation Advisory Committee worked with the consultants throughout the planning process to ensure that potential stakeholders participated in the planning process and had opportunities to provide guidance and input in the draft and final phases of the plan.

2.1 THE MITIGATION ADVISORY COMMITTEE

The county convened a Mitigation Advisory Committee (MAC) comprised of representatives of the three participating jurisdictions. The MAC included the existing Local Emergency Planning Commission team and additional members from federal and state agencies, county and town departments, fire departments, citizens' groups, and other entities. The MAC worked with the Dewberry team and provided guidance at key stages of the process. Efforts to involve town and county departments and community organizations that might have a role in the implementation of the mitigation actions or policies included invitations to attend meetings and serve on the MAC, access to the project website (<http://dewberry.com/PARKCNTYHMP>), e-mails updates, homeowners' association meetings, strategy development workshops, plus opportunities for input and comment on all draft deliverables.

Park County Emergency Management would like to thank and acknowledge the following persons who served on the MAC and their representative departments and organizations throughout the planning process:

Table 2-1. Park County Mitigation Advisory Committee (MAC) Members		
Name	Title and/or Department	Jurisdiction
Lori R. Hodges	Emergency Manager	Park County
Amy Flint	Human Services	Park County
Betty McLain	Public Health Nurse	Park County
Craig Barraclough	Mapping / GIS Director	Park County
Cyndi Burdick	Citizen / LEPC Member	Park County
Dutch Muetz	ARES District 6 President	Park County
Kathy Boyce	Finance Director	Park County
Kathy Curcio	Fairgrounds Mgr / CERT Coordinator	Park County
Lynn Ramey	Public Health Director	Park County
Mark Bond	Citizen / LEPC Member	Park County
Paul Mattson	South Park Ambulance Chief	All Three Jurisdictions
Sharon Morris	Coroner	All Three Jurisdictions
Sharon Schrage	Mountain Resource Center	Park County
Tom Eisenman	Environmental Health Director	Park County
Nancy Comer	Town Clerk	Town of Alma
Kat Brummett	Town Clerk	Town of Fairplay
Theresa Springer	Coalition for the Upper S. Platte	Park County
Mike Roll	Northwest Fire Chief	All Three Jurisdictions

Between May 2007 and March 2008, the MAC held ten meetings and supervised work on the area's mitigation plan. The MAC members coordinated and consulted with the Emergency Services Council, the Local Emergency Planning Commission, and other stakeholders to identify and delineate hazards within the three local jurisdictions and to assess the risks and vulnerability of public and private buildings, facilities, utilities, communications, transportation systems, and other potentially vulnerable infrastructure.

In developing the mitigation plan, a majority of necessary communication occurred through telephone calls and emails. The MAC and its consultant chose this avenue to best accommodate budgets and schedules and to minimize travel from various parts of the county to central meeting locations. A project website

(<http://projects.dewberry.com/PCColorado>) was established to facilitate the planning process. Table 2-2 documents formal meeting dates and their purposes.

Table 2-2. Mitigation Advisory Committee	
Meeting Dates	Summary of Discussions
May 22, 2007	Planning process was described. Commitment to the project and schedule was obtained. Discussion regarding the purpose of the plan was held. Hazard identification and prioritization exercise was conducted. Preliminary hazard history and problem spot information was collected. Preliminary goals were discussed.
September 12, 2007	Initial results of the HIRA were presented. Region-wide goals for the plan were discussed and debated. Mitigation alternatives were presented. A public meeting followed the committee meeting.
November 27, 2007	HIRA comments were presented. Planning process for preparing Mitigation Strategy was discussed.
January 8, 2008	MAC review of HIRA.
January 29, 2008	MAC Work Session – Develop and refine Goals and Objectives.
February 5, 2008	MAC Work Session – Develop initial list of Mitigation Actions.
February 26, 2008	MAC Work Session - Prioritization of Mitigation Actions utilizing S TAPLE/E prioritization process.
March 11, 2008	MAC Work Session – Initial revision Finalization of Mitigation Actions.
March 17, 2008	Fairplay Town Meeting to discuss Mitigation Strategy.
March 18, 2008	Alma Town Meeting to discuss Mitigation Strategy.
April 14, 2008	MAC Work Session – Final revision Finalization of Mitigation Actions.
April 22, 2008	Emergency Service Council Meeting for final draft Mitigation Plan presentation and discussion of adoption process

2.2 SUMMARY OF THE PLANNING PROCESS

The development of the Park County All-Hazard Mitigation Plan followed a 10-step planning process.

Step 1 – Establish the MAC

In May 2007, the MAC was established. The MAC immediately began the initial planning for the Park County All-Hazard Mitigation Plan. Electronic communication was established to facilitate discussion and review of draft documents.

Step 2 - Determine the Pertinent Hazards

MAC members identified those particular hazards that have caused damage in Park County in the past. They also identified hazards that do not have an extensive history of causing damage in the county but that could conceivably do so, based on scientific information. They determined areas where critical man-made facilities and other features may be at risk in the future. County GIS staff generated maps to illustrate those areas in the county where these hazards have historically caused damage.

Step 3 - Identify Hazard-Prone Areas and Critical Facilities

The MAC identified geographic areas facing future damage from hazards, combining historic information with scientific analysis. Facilities that were deemed to be important for emergency management purposes, for provision of utilities and community services, for evacuation routes, and for recreational and social value were identified. Once the vulnerable areas and the critical facilities were identified, the potential risk from the hazards selected in Step 2 was estimated.

Step 4 - Assess Current Mitigation Capabilities

The MAC assessed the County's existing strategies to reduce hazard losses. Existing capabilities to mitigate hazards were identified, including such mechanisms as the County and municipal land use codes and ordinances, various plans, and emergency services.

Step 5 - Identify Shortcomings of Current Mitigation Programs and Capabilities

The MAC evaluated existing mitigation strategies for their coverage and effectiveness, and examined the need for improvement to those strategies to better address the potential risks facing the County.

Step 6 - Develop Potential Mitigation Actions

From November 2007 to February 2008 the MAC held meetings to review the risk assessment, refine mitigation goals and objectives, and develop mitigation actions. The MAC was provided with an initial list of potential mitigation measures under the

categories of prevention, emergency services, property protection, structural protection, and public information. The MAC developed additional hazard mitigation actions and then further refined the goals, objectives, and mitigation actions.

Step 7 - Prioritize the Mitigation Actions and Prepare a Mitigation Strategy

The mitigation actions and strategies proposed by the MAC were reviewed and rated for their effectiveness according to the 7 STAPLE/E factors (Social acceptability, Technical and Administrative applicability, Political acceptability, Legal authority, Environmental impact, Economic feasibility). Effectiveness scores were totaled for each proposed action or strategy. The actions were grouped according to high, medium and low priority, and in March 2008 a comprehensive Mitigation Strategy was assembled.

Step 8 - Develop Implementation Plan

A plan was developed for the implementation of the Mitigation Strategy. It included person(s) responsible for implementation (*who*), a time line for completion (*when*), and a funding source and/or technical assistance source (*how*) for each hazard mitigation action.

Step 9 - Assemble the Draft Mitigation Plan and Revise and Finalize It Through Additional Public Input

The MAC consolidated the results of Steps 1 to 8 into a draft document. Each chapter had already been reviewed by the MAC and made available for public comment as it was individually prepared. Based on further electronic review of the consolidated version of the plan and additional public comment, the draft document was revised. Using their prior mitigation planning and hazards experience, the MAC's consultant (Dewberry) reviewed the revised draft to ensure that it met the Disaster Mitigation Act of 2000 (DMA) requirements. The final draft was presented by the MAC to the Park County Board of Commissioners and the Town Boards of Alma and Fairplay for adoption as a draft plan.

Step 10 – Formal Adoption

Following conditional approval by the Colorado Division of Emergency Management (DEM), submittal by DEM to FEMA Region VIII, and approval by FEMA Region VIII, the draft plan was finalized to address the agency review comments. After a public hearing, the final plan was adopted by Park County and the Town Boards of Alma and Fairplay.

2.3 PUBLIC PARTICIPATION AND CITIZEN INPUT

As shown in 2-2 above, the public was afforded several opportunities to provide input and to participate throughout the planning process. In addition to the MAC meetings listed above, the Emergency Manager met with the County Commissioners in a public meeting to describe the planning process and ask for input. Additionally, the MAC held an open meeting on May 22, 2007 to allow the general public an opportunity to meet with MAC members, ask questions, and provide comments and input on portions of the draft mitigation plan. Representatives from various agencies and organizations were invited to attend the Public Meeting. Table 2-3 lists these agencies and organizations.

Table 2-3. Interested Parties (EXAMPLE)	
Organization	Organization
Colorado Division of Emergency Management	Colorado Water Conservation Board
Park County Public Health	Park County Environmental Health
Chief of Police, Town of Alma	Chief of Police, Town of Fairplay
Park County Sheriff's Office	Park County School Districts 1 and 2
Park County Communications Center	Platte Canyon Fire Protection District
Elk Creek Fire Protection District	Jefferson/Como Fire Protection District
Northwest Fire Protection District	Hartsel Fire Protection District
Lake George Fire Protection District	Southern Park County Fire Protection District
North Park County Ambulance Service	South Park Ambulance District
Ute Pass Regional Ambulance District	Park County Emergency Management
Park County Mapping/GIS Department	Coalition for the Upper South Platte
Park County Board of Commissioners	American Red Cross
IREA	Xcel Energy
Park County Road and Bridge Department	United States Forest Service
Colorado Department of Transportation	Colorado State Forest Service
National Weather Service	Bureau of Land Management
Park County Water Commissioner	Colorado State Parks

The draft plan was made available on a public website created for the project (<http://projects.dewberry.com/PCColorado>). Hard copies were made available for review at the offices of each of the three participating jurisdictions. An advertisement was run in local newspapers and in the county newsletter, which is mailed out on a semi-annual basis to all Park County residents, to inform the public that the draft plan was available for review.

Neighboring jurisdictions were invited to review and provide input into the plan.

These jurisdictions included:

- Clear Creek County
- Jefferson County
- Teller County
- Fremont County
- Chaffee County
- Lake County
- Summit County
- South Central All-Hazards Region

Participating jurisdictions were encouraged to obtain formal acknowledgment of the MAC from their governing boards, and to appoint MAC members by resolution. A resolution for establishing the Mitigation Advisory Committee is included in Section 9. The resolution was formally adopted by the Park County Board of County Commissioners.

2.4 MULTI-JURISDICTIONAL INTEGRATION OF MITIGATION PLANNING

The multi-hazard mitigation plan included Park County, the Town of Alma and the Town of Fairplay. The Board of County Commissioners for Park County and the Town Boards for Alma and Fairplay each adopted the mitigation plan. Prior to submitting the draft plan for review and approval by the Colorado Water Conservation Board, the Colorado Division of Emergency Management, and FEMA Region VIII, the three Park County jurisdictions each adopted a formal resolution approving the draft plan. When the draft plan was revised and approved, the three jurisdictions each adopted a formal resolution approving the final plan. Copies of these resolutions are included in Appendix A.

To ensure multi-jurisdictional integration of mitigation planning in Park County, future local planning activities of any of the three jurisdictions, such as comprehensive plans, transportation and infrastructure plans, watershed plans and emergency management plans, and any updates of these plans, will be coordinated among the participating jurisdictions planning bodies. More importantly, the results of these planning activities will be incorporated into future updates of the Park County Hazard Mitigation Plan. An agreement will be formalized by the MAC and the respective governing bodies of each community (Board of County Commissioners and Town Boards) that ensures that any future planning activity in one community will be included as an information item on each of the others' board meeting agendas – at the appropriate time in the future. In each such instance the planning activity will be addressed by the MAC, which - as a body formally recognized by the three jurisdictions – will continue to meet periodically (at least yearly) to address these types of issues.



SECTION 3 COMMUNITY PROFILE

3.1 INTRODUCTION

Established in 1861, Park County is located in the central part of Colorado, with the unincorporated town of Hartsel as the geographic center of the state. Park County is the 17th largest of Colorado's 64 counties, encompassing 2,211 square miles. The county is approximately 45 miles wide from east to west, and 60 miles long from north to south. Several named mountain ranges define the perimeter of Park County, the highest in elevation being the Mosquito Range above Fairplay and Alma. This spectacular range includes four of Colorado's peaks higher than 14,000 feet, as well as 25 named summits above 13,000 feet. Starting in the northeastern quadrant and following a counterclockwise path, the mountain ranges in the county include the Front Range and Kenosha Mountains above the unincorporated communities of Bailey and Grant, the Continental Divide north of Jefferson and Como, the Mosquito Range, (including the Buffalo Peaks west of Hartsel), the Thirtynine Mile Volcanic Area surrounding the town of Guffey, the Puma Hills just west of Lake George (including Wilkerson Pass), and the Tarryall Mountains forming the divide between Tarryall Creek and the South Platte River north of Lake George.

Within this ring of mountain ranges is South Park, a 900-square mile park (large mountain valley) located in the geographic center of Colorado. With an average elevation of 9,000 feet, the short grass prairie of South Park supports herds of elk, deer, bighorn sheep and antelope, as well as beaver, raccoon, bobcat, mountain lion, black bear and waterfowl. Communities in South Park include Fairplay, Como, Jefferson and Hartsel. South Park forms one of six geographic regions of Park County.

The second region, the northeastern portion of Park County is known as the Platte Canyon Area. This densely forested area is bisected by the North Fork of the South Platte River that follows US Highway 285 through the communities of Bailey, Shawnee and Grant. This area of the county is lower, with an average elevation of 8,300 feet above sea level.

The third and fourth regions are formed by the highest mountains in the county. Immediately south and west of the Platte Canyon Area is the Continental Divide, separating the Colorado River Basin in Summit County from the South Platte River Basin in Park County. To the south of the Continental Divide is the fourth geographic area, the Mosquito Range. This north-south range includes Park County's highest peaks. The Town of Alma is located at the point where these two mountainous regions meet each other and transition into South Park.

The fifth region, the southern region of Park County is the Thirtynine Mile Mountain Volcanic Area. This region extends from the Kaufman Ridge, dividing Park County and Chaffee County, all the way across southern Park County to the Teller County boundary, sloping down southward from South Park toward the Arkansas River valley. It includes the community of Guffey. The entire region is characterized by rolling prairies and remnant volcanoes. The final region is the eastern region of the county, the Front Range, which is east of the Puma Hills and north of the Thirtynine Mile Volcanic Area. It includes the unincorporated communities of Lake George and Tarryall. The South Platte River and its tributaries have carved dramatic landforms such as Elevenmile and Tarryall River Canyons, providing a rugged, hilly transition from the Thirtynine Mile Mountain Volcanic Area northward to the Platte Canyon Area.

The majority of Park County is located within the South Platte River basin. Two forks of the South Platte, the Middle Fork and the South Fork, join near Hartsel to form the South Platte River. Farther downstream, near Lake George, the major tributary of Tarryall Creek joins the South Platte just before it exits Park County. The third fork of the South Platte in Park County, the North Fork, along with its two major tributaries, Elk Creek and Deer Creek, does not meet the South Platte until the community of South Platte, downstream of Park County in Jefferson County. A small part of Park County, in the south and just upstream of Fremont County and Teller County, is formed by three major headwaters tributaries of the Arkansas River. Those tributaries are Badger Creek, Currant Creek, and West Fourmile Creek.

The entire county population as of the 2000 Census was 14,523 persons, 13,734 of whom live in unincorporated areas. In the past, Park County's economy was based on mining and ranching. Currently, the Park County economy is dependent upon summer tourism and construction and on residents in the Platte Canyon Area around Bailey who commute to work in the Denver metropolitan area and on residents in the Alma/Fairplay Area who commute to work in Summit County.

The county encompasses approximately 2,211 square miles in land area and 10 square miles in water area. The county contains the headwaters of the South Platte River. Dams and reservoirs have been constructed to provide water for Front Range municipalities, and they also serve as fishing and recreation sites for Park County residents and visitors.

The county is bordered by Chaffee County and Lake County to the west, Summit County and Clear Creek County to the north, Jefferson County and Teller County to the east, and Fremont County to the south. There are two incorporated towns within the county, the Town of Fairplay (the county seat) and the Town of Alma.

Figure 3-1

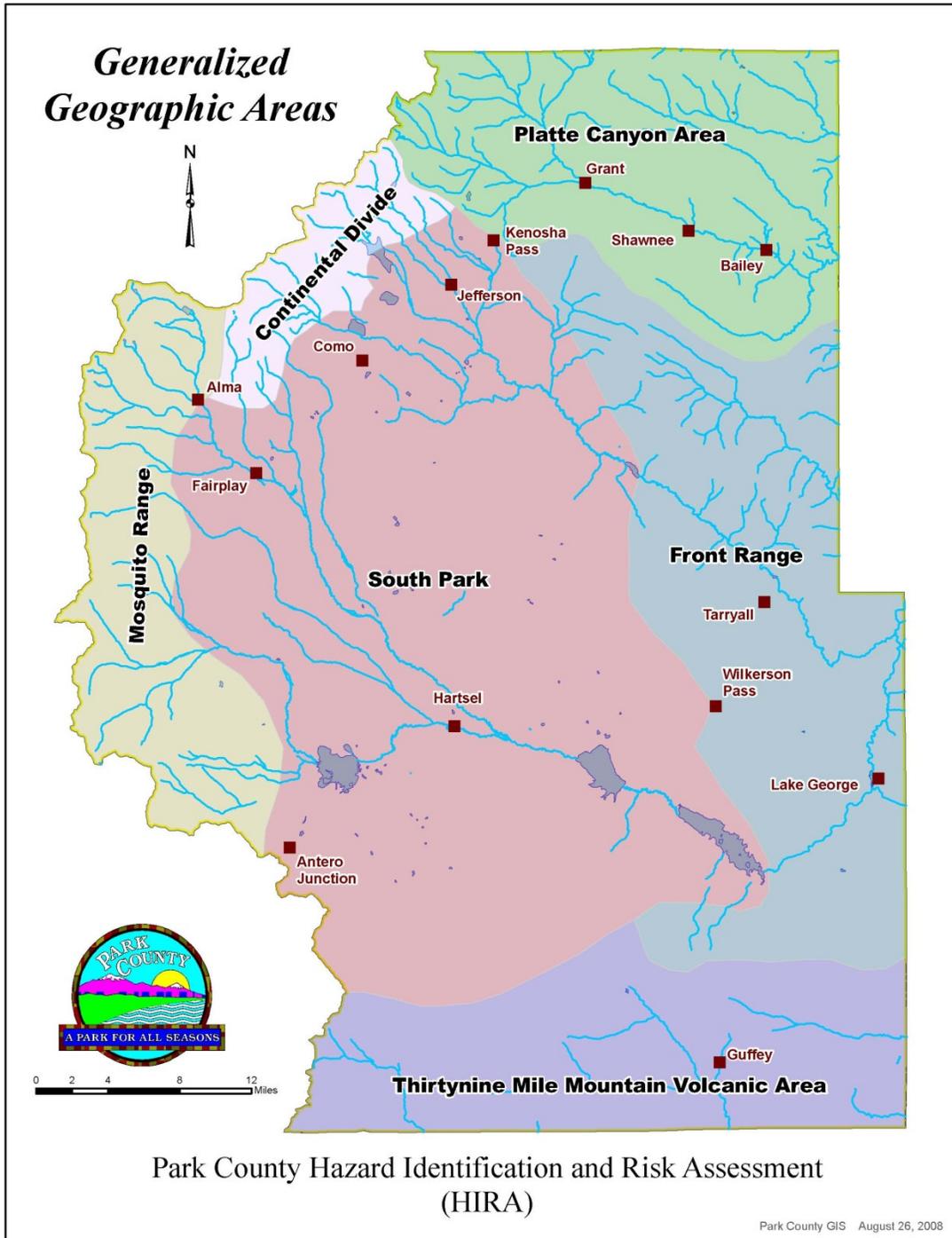
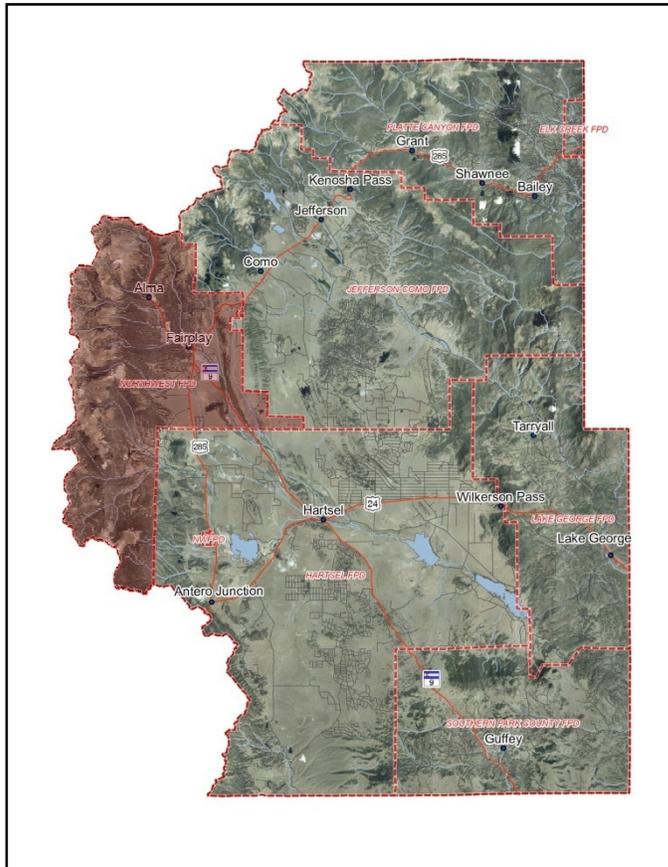


Figure 3-2



3.1.1 Fairplay

9,957 feet above sea level.
 Founded in 1867.

As the incorporated seat of Park County, Fairplay is the center of county government. According to the State Demographer, about 700 people now reside within the Fairplay town limits. It is estimated that about 2,000 more reside in outlying areas.

3.1.2 Alma

10,350 feet above sea level.
 Founded in 1873.

Located on Colorado Highway 9 six miles northwest of Fairplay, Alma is the highest incorporated town in North America. The population estimate for Alma is

250, with an estimated 1,000 residents in nearby subdivisions. Historically, Alma was the center for the local mining industry. With continued development of residential subdivisions around Alma, the area is predominantly a bedroom community for several ski resorts in Summit County, 25-40 miles to the north, beyond Hoosier Pass. Unincorporated communities in the county include Bailey, Grant, Jefferson, Hartsel, Tarryall, Lake George, and Guffey. General information about Park County is depicted in Table 3-1.

**Table 3-1
General Information, Park County**

Location	Central Colorado
County	Park
Population Park County 2000	14,523
Park County Estimated Population 2010	25,000
Elevation	8,000 – 14,000+
Park County Land Area (sq. miles)	2,211
Time Zone	Mountain
Area Code	719
Per Capita Income Park County 2000	\$25,019
Median Household Income Park County U.S. Census Bureau, 2000	\$51,899
Median Home Value Park County U.S. Census Bureau, 2000	\$172,100
Median Rent Park County U.S. Census Bureau, 2000	\$806/month

3.2 CLIMATE

All of the land in Park County falls within the Southern Rockies Level III ecoregion. That ecoregion encompasses very diverse terrain and experiences very diverse weather. There are ten sub-regions within the Southern Rockies ecoregion. Park County spans the full range of those sub-regions, from the alpine zone to grassland parks. Average annual rainfall in the county is 13.6 inches/year, and annual snowfall is 80.0 inches as depicted in Table 3-2.

**Table 3-2
Climate**

January Average High Temperature	30.7 degrees F
January Average Low Temperature	-5.0 degrees F
July Average High Temperature	75.2 degrees F
July Average Low Temperature	39.7 degrees F
Annual Rainfall	13.6 inches
Annual Snowfall	80.0 inches

3.3 POPULATION

Park County’s rate of population growth was above the state average during the booming 1990’s. The 2000 U.S. Census estimated that Park County’s total population was 14,523. The Town of Fairplay’s 2000 population was 610. The Town of Alma’s 2000 population was 179. Park County was the third fastest growing county in Colorado during the 1990’s, behind Douglas and Elbert Counties. A significant amount of the growth can be traced to new residents who commute to Summit, Jefferson or Denver Counties for employment.

For those years between the U.S. Census Bureau’s population measurements, the office of the State Demographer, located in the Colorado Division of Local Government, develops annual population estimates for all Colorado counties and municipalities. Those estimates show that the Park County communities continued to grow, at least through 2006, but at a slower rate than in the 1990’s. Table 3-3 below illustrates that trend. The estimates also show that while Alma and Fairplay are currently growing at a faster rate than unincorporated Park County, the vast majority of new residents live in unincorporated Park County.



Table 3-3 Population Growth in Park County – 2000 to 2006			
Community	2000 Census	2006 State Estimate	Rate of Growth
Park County	14,523	16,802	15.7%
Unincorporated Park County	13,734	15,867	15.5%
Alma	179	229	27.9%
Fairplay	610	706	15.7%

48.5% of Park County residents are female and 51.5% are male. The median age is 40 years. People from the ages of 20 to 64 comprise 70.2% of the population. Approximately 21.5% of the population is below the age of 18, while 8.3% of the population is 65 years or older.

5.8% of the population identifies itself as Hispanic, 96.6% identifies itself as White non-Hispanic, 0.8% are American Indian, 0.6% are Asian and 0.8% are African-American. 95.8% of the population speaks English at home, while 4.2% of the population speaks a language other than English at home.

3.4 LAND COVER

The total land area of Park County is approximately 1,415,040 acres or 2,211 square miles. Federal and State lands comprise 59% of the total land. Approximately 41% of the land in the county is private, although 78% of that private land remains undeveloped. The Town of Fairplay is approximately 704 acres (1.1 square mile) in size, and the Town of Alma is approximately 192 acres (0.3 square miles).

Most of Park County is rangeland and the rest is mountainous, which makes it susceptible to both forest fires and range fires. Dry rangeland is often used as grazing grounds for agricultural animals. According to the Colorado State Forest Service, in 2000 there were 20 subdivisions, totaling 400 acres, in the wildland/urban interface.



3.5 HOUSING

According to the 2000 U.S. Census, Park County had a total of 10,697 housing units. 5,894 households were occupied, 4,803 were vacant. Of the “vacant” units, 4,329 were used for seasonal use. Owner occupied housing units totaled 5,166, while rental units totaled 728. Since 12% of the county’s occupied housing units are rented, efforts should be made to target both homeowner and renter demographics in future educational and outreach efforts about hazards and disasters. The median home value in Park County is \$172,100.00 while the median rent is \$806/month (U.S. Census Bureau, 2000).

The average number of persons per household in Park County is 2.45 persons.

Table 3-4 2007 PARK COUNTY PROPERTY TAX ROLL			
<u>Property Classification</u>	<u>Number of Parcels</u>	<u>Assessed Valuation</u>	<u>Percent of Tax Role</u>
Residential Properties	11,292	\$ 184,205,770.00	51
Vacant Land	24,607	\$ 131,803,510.00	37
Commercial Properties	294	\$ 19,980,976.00	6
State Assessed Public Utilities	27	\$ 11,154,000.00	3
Agricultural Properties	2,261	\$ 5,003,020.00	1
Personal Property	416	\$ 2,124,527.00	<1
Natural Resources Properties	1,825	\$ 2,777,260.00	1
Industrial Properties	6	\$ 535,040.00	<1
Exempt Properties	821	\$ 78,849,390.00	0
County Total	40,728	\$ 357,584,103.00	100

3.6 SCHOOLS

Park County has a total of two school districts, divided between the north and the south portions of the county. RE-1 District Schools in Bailey serve the northeastern part of the county from Kenosha Pass to Conifer. RE-2 District Schools serve the entire South Park region from Kenosha Pass south and west to the Chaffee County line, including Alma and Fairplay. There are two charter schools in Park County. One is in Lake George and the other is in Guffey. There are no colleges or technical schools within Park County. The nearest colleges are in Summit County or in Chaffee County.

3.7 RECREATION

There are roughly 1,300 square miles (832,000 acres) of recreational land within the county. Five major water storage reservoirs (Antero, Elevenmile, Tarryall, Spinney and Montgomery) have become important wildlife and aquatic recreation areas, attracting over a half-million people to the region each year for boating, hunting, fishing and camping.

Park County is graced with dozens of headwater lakes and streams, many working ranches, and literally hundreds of historic structures built by miners and settlers. In recent years the area has gained notoriety as a high-altitude proving ground for mountaineers, fly fishermen and OHV enthusiasts. The unique opportunity to cross-country ski, hike, view wildlife, visit mining attractions and fish all in the same weekend in Park County's twelve state wildlife areas, three national wildlife areas, five reservoirs, two state parks, and streams with over 50 miles of Gold Medal trout waters draws visitors from around the world.

Thirty-one public campgrounds are distributed throughout the county with recreation trails, fishing waters and historic sites nearby. In addition, there are nine ranch-style guest resorts, two historic hotels and five motels that provide accommodation for area visitors.

The Mosquito Range above Fairplay contains four peaks higher than 14,000 feet. Traversing this range is Mosquito Pass (13,186 feet), the highest automobile pass in North America. Numerous other mountain byways, jeep roads and OHV routes throughout the county provide self-guided auto tours to old mining camps, ghost towns and backcountry areas.

Eleven Mile and Spinney Mountain State Parks near Lake George provide facilities (seasonal) for fly and lure fishing, boating, sailing, camping and hunting.

3.8 TRANSPORTATION

❖ Highways

- There are three highways that pass through Park County. They are US Highway 285, US Highway 24, and Colorado State Highway (SH) 9. US Highway 285 is considered by the Colorado Department of Transportation as a "Primary Arterial." It transects the county running east to west through Bailey and then north to south through the county, exiting into Chaffee County.

- US Highway 24, an east to west highway, travels from Teller County to Lake George and on to Hartsel, continuing from Hartsel to Chaffee County.
- SH 9, a southeast to northwest highway, runs from Fremont County through Guffey and Hartsel to Fairplay and then from Fairplay to Alma and into Summit County.
- County roads provide access to many of the county’s unincorporated areas. Most of the roads in Park County are unpaved and many are not maintained by the County.

❖ **Bus**

- The County does not have a public transportation service.

❖ **Rail**

- There are no rail lines currently active within Park County.

❖ **Air**

- The county does not currently have an airstrip or airport.
- The closest commercial service is available in Buena Vista at the Buena Vista-Central Colorado Regional Airport.

3.9 CRITICAL INFRASTRUCTURE

Town/County Services

❖ **Utilities**

- Water
 - The Towns of Fairplay and Alma provide central water systems that store and distribute water to their residents.
 - Several subdivisions have water treatment plants, while many other residents get potable water from well systems.
- Sewage Treatment
 - Sewage for Alma and Fairplay is processed by treatment facilities.
 - Sewage treatment from individual sewage disposal systems in Park County, usually consisting of septic tanks and leachfields, is controlled through a permit system that requires soil samples, test holes, percolation tests and the availability of sufficient space. The County’s Environmental Health Office issues septic tank permits to ensure compliance with state guidelines.
- Electricity
 - IREA and Xcel Energy supply electricity to portions of Park County.

❖ Police and Fire

- The Park County Sheriff's Office patrols unincorporated portions of the county.
- The Town of Alma and the Town of Fairplay are both served by their own police departments.
- The Colorado State Patrol enforces traffic law along US Highway 285, US Highway 24, and SH 9.
- There are seven fire protection districts within Park County. These vary from fully volunteer to paid fire districts. The following is a list of the fire protection districts and the areas they serve:
 - **Elk Creek Fire Protection District** – parts of Bailey and Conifer
 - **Platte Canyon Fire Protection District** – Bailey and land up to the top of Kenosha Pass.
 - **Jefferson/Como Fire Protection District** – South of Kenosha Pass through the Town of Como.
 - **Northwest Fire Protection District** – East of Hoosier Pass including the Towns of Fairplay and Alma and south to the Chaffee county line.
 - **Hartsel Fire Protection District** – The Town of Hartsel and all surrounding area in the center of Park County.
 - **Lake George Fire Protection District** – East of Wilkerson Pass and the community of Lake George.
 - **Southern Park County Fire Protection District** – The community of Guffey and the southeast corner of Park County.

❖ Communications

- Park County is served by one Public Safety Answering Point (PSAP) which is located in the Town of Fairplay. All responding agencies are dispatched through the Park County Communications Center.
 - **Telephone Companies:**
 - ❖ Qwest
 - **Long-Distance Companies:**
 - ❖ Qwest
 - **Cellular Companies:**
 - ❖ Verizon Wireless
 - ❖ T-Mobile
 - ❖ Cingular / AT&T
 - ❖ Sprint

There are multiple providers of telecommunication services in Park County who are ready and able to provide Internet, E-Mail, inbound 800 numbers, outbound WATTS Systems and dedicated telephone lines for computer systems.

3.10 LAND USE AND DEVELOPMENT

As one of the three fastest-growing counties in Colorado during the 1990's, Park County has been undergoing a significant transition in its land use patterns and its economic base. There are still numerous historic mines and there are still many large ranches, but they no longer play as significant a role in the local economy as they once did. Residential subdivisions serving commuters to the Denver area and to Summit County and recreational subdivisions serving second-home owners are now becoming an important part of the landscape. Park County has been responding to these demographic changes through its planning efforts.

Park County last updated its Strategic Master Plan in 2001. Recommendations and policies contained in the Master Plan largely reflect the results of a community survey that was mailed to all 7,588 households. In addition, several workshops were held in every area in the county, with hundreds of residents participating in crafting "preferred development scenarios" for their communities and areas. From the survey, workshops, interviews and other public forums, several guiding principles emerged for Park County Government:

- Ensure that growth is sustainable (i.e. consistent with existing resources and carrying capabilities).
- Encourage new commercial development that will add value to each community.
- Protect the rights of private property owners.
- Ensure the rate of development allows the county and others to provide adequate levels of service.
- Protect surface water and ground water resources.
- Preserve and enhance critical natural areas.
- Mitigate existing and human-caused hazards.
- Preserve and protect cultural resources and structures.
- Target high density residential and commercial uses to areas around towns and rural population centers.
- Maintain the rural character of the county and rural areas through conservation of open space.
- Encourage heritage tourism and entrepreneurial business development to diversify the economy.

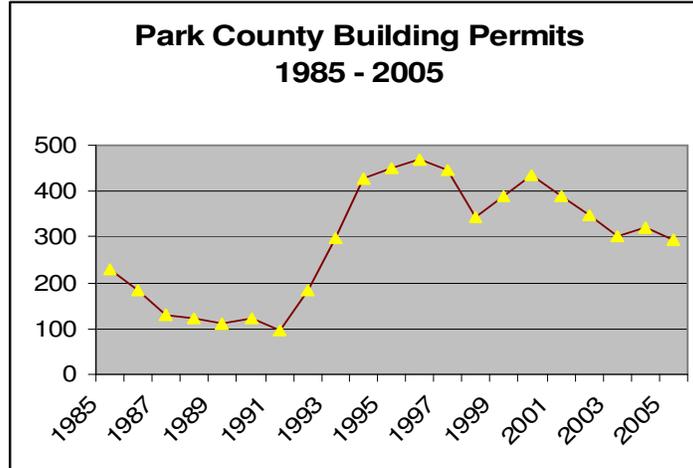
- Encourage site planning that minimizes the fragmentation of undeveloped lands, habitat, etc.
- Protect and preserve access routes to public lands.
- Promote new recreation opportunities for residents.
- Require new development to pay its fair share of the cost of providing services to such development.

In accordance with state subdivision enabling authority, Park County regulations establish two categories of subdivisions: subdivisions with individual parcels smaller than 35 acres and subdivisions with individual parcels equal to or larger than 35 acres. The land use requirements for smaller parcel subdivisions are more stringent than those for 35 acre parcel subdivisions.

The unincorporated areas of Park County are zoned through the county's zoning regulations. The incorporated towns within the county have enacted zoning and other land use regulations for development within their respective jurisdictions.

While there is significant growth within Park County, the County is managing growth so as not to increase vulnerability to hazards. The Master Plan discourages development in fire prone areas, wetlands, areas subject to erosion and other geologic hazards, and in floodplains. Because many of the areas of the county that are hazard-prone are on land that is publicly owned, the fact that a large percentage of land in Park County is controlled by federal and state agencies serves as an additional constraint to increased vulnerability.

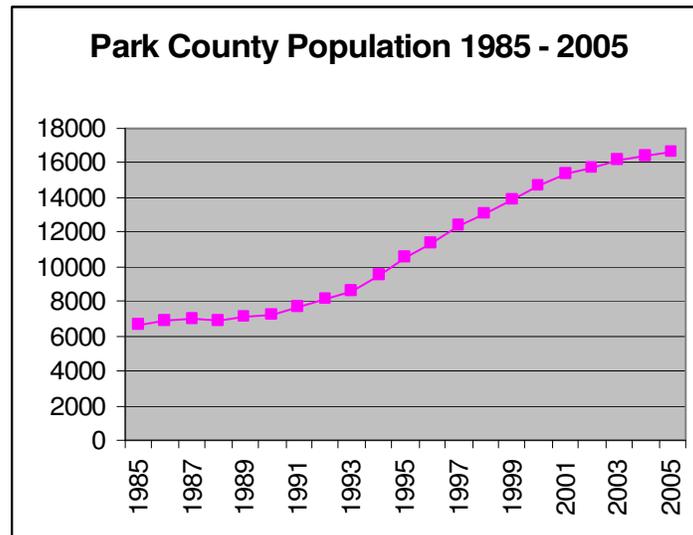
The following graphs of building permits and population trends illustrate the county's overall growth since the mid 1980s.



Source: <http://dola.colorado.gov/demog/mule1.cfm>

Figure 3-3

Figure 3-3 represents building permit data trends that are tracked by the Colorado Department of Local Affairs. Residential building permits are obtained mainly from the annual survey reports by the Housing Division of the U.S. Census Bureau. The permits include both private and public new housing units. Data prior to 1995 included the subtraction of demolitions. In most cases the permits do not cover mobile homes or trailers.



Source: <http://dola.colorado.gov/demog/mule1.cfm>

Figure 3-4

Figure 3-4 represents population trends that are tracked by the Colorado Department of Local Affairs. Estimates of the total population at July 1 of each calendar year are prepared by the Demographic Section in cooperation with the U. S. Bureau of the Census, after consultation with each local government. Park County's population grew at a rate of 102% from 1990 to 2000, and projections predict continued growth, although at a significantly slower rate than during the 1990's.

As its population has grown, the Town of Fairplay has made efforts to attract more businesses to the community. The new market and the new bowling alley are examples of such businesses. These new businesses help Fairplay and the county economically and provide an increased sense of community.

Park County has large, though mostly untapped, natural resources, including mineral deposits such as gold, silver, uranium, rhodochrosite and several others. Most of these minerals are located on privately held patented mining claims.

**Table 3-5
Government and Taxes**

Type of Government (Park County)	County Commissioners
Type of Government (Town of Alma)	Mayor/Town Board
Type of Government (Town of Fairplay)	Mayor/Town Board
Planning Commission	Yes
Zoning Regulations	Yes
2007 General Operating Property Tax Revenue Town of Alma	\$56,002.00
2007 General Operating Property Tax Revenue Town of Fairplay	\$144,328.00
2007 General Operating Property Tax Revenue Park County	\$5,691,436.00
Town of Alma Sales Tax	\$48,000.00 (3%)
Town of Fairplay Sales Tax	\$320,467.00 (4%)
County Sales Tax (water and sewer)	\$550,000.00 (1%)
State Sales Tax	2.9%
Full-time Firefighters	10
Volunteer Firefighters	200+
Fire Insurance Rating	Fire District Dependant
Enforcement Officers	70
Enforcement Vehicles	55

3.11 LABOR STATISTICS

According to the Colorado Department of Labor and Employment, there were 2,229 individuals employed in Park County during 2005. Of these 1,426 workers were employed in the private sector. This represents a ten percent increase over the previous year. The largest private-sector employer is the construction trade (341 workers), followed by food and lodging places (320), the retail trade (184), professional and technical services (129), administrative services (67), manufacturing (60), health care (50), and the wholesale trade (48).

Construction and food/lodging establishments have been the two largest private employers for several consecutive years. In recent years the retail trade has surpassed professional services in terms of the number employed. Ranching, mining and entertainment, once significant employment sectors in the county, have provided negligible employment for many years.

Because the Park County economy is largely dependent upon summer tourism and construction, employment data reflect seasonal fluctuations in these industries. In contrast, employment in government, manufacturing, and communications remain relatively constant throughout the year.

The average 2005 wage paid in Park County was \$28,869. Industries paying the highest average wages include finance and insurance (\$66,332) and the wholesale trade (\$50,041), followed by information services (\$49,427), professional and technical services (\$49,027), mining (\$42,715), transportation (\$41,723), educational services (\$35,447), and manufacturing (\$30,527). On average, the lowest wages in Park County are paid to lodging and food service workers (\$10,427).

It is estimated that a majority (85%) of the adult work force now commutes daily to locations of employment outside Park County for three reasons:

1. The majority of Park County's adult population has relocated here while retaining employment in neighboring counties or cities (i.e. Denver);
2. The higher wage scale in neighboring areas; and
3. The lack of industry in the county as a whole.

Park County is a place where the quality of life does not equate to the convenience of suburban amenities. In many areas, the allure of mountain living may be tempered by the reality of driving 50 miles daily to work, the grocery store or a hospital. While community infrastructure development has not kept pace with population growth, "basic" services and amenities are gradually being established in the Bailey and Fairplay areas of Park County.



SECTION 4 HAZARD IDENTIFICATION AND RISK ASSESSMENT

In accordance with the requirements of the Disaster Mitigation Act of 2000, an all-hazards mitigation plan has been prepared for Park County and the Towns of Fairplay and Alma. This document represents the Hazard Identification and Risk Assessment (HIRA) portion of the hazard mitigation plan. Having the mitigation plan in place, the County and Towns will be able to:

- Better understand local hazards and risks;
- Build support for mitigation activities;
- Develop more effective community hazard-reduction policies and integrate mitigation concepts into other community processes;
- Incorporate mitigation into post-disaster recovery activities; and
- Obtain disaster-related grants in the aftermath of a disaster.

The Park County Commission, on behalf of all jurisdictions within the County, has developed this HIRA to serve as a guide to all communities in the County when assessing potential vulnerabilities to natural hazards. When developing this plan, every effort was made to gather input from all aspects of the project area communities to assure that the results of this analysis will be as accurate as possible.

The area for this study includes Town of Fairplay, Town of Alma and the unincorporated areas of Park County. All jurisdictions located throughout the county have also been included in this portion of the study, as this analysis has been completed on a county-wide basis. It should be noted, however that a local jurisdiction's inclusion in the full Mitigation Plan is dependent on that community's participation in the remainder of the planning process.

A Mitigation Advisory Committee (MAC) made up of public representatives, private citizens, businesses, and organizations was brought together to provide input at key stages of the process. Efforts to involve local and county departments, as well as other regional and community organizations that might have a role in the implementation of the mitigation actions or policies, included invitations to attend meetings and serve on the MAC, e-mails of minutes and updates, and opportunities for input and comment on all draft deliverables.

The purpose of this HIRA is to:

1. Identify all the natural and human-caused hazards that could affect Park County;
2. Assess the extent to which the area is vulnerable to the effects of these hazards;
and
3. Prioritize the potential risks to the community.

The first step, identifying hazards, will assess and rank all the potential natural and human-caused hazards, in terms of probability of occurrence and potential impacts. It will also identify those hazards with the highest likelihood of significantly impacting the community. This chapter will be completed based on a detailed review of the Park County's hazard history. The hazards determined to be of the highest risk will be analyzed further to determine the magnitude of potential events, and to characterize the location, type, and extent of potential impacts. This will include an assessment of what types of development are at risk, including critical facilities and community infrastructure.

As Park County initiated the process of preparing this plan, FEMA was simultaneously beginning to examine opportunities for strengthening the relationship between flood maps, and mitigation plans. On June 1, 2007 the agency issued its concept paper, ***FEMA's Flood Map Modernization – Preparing for FY09 and Beyond: Integrated Flood Data Update, Risk Assessment, and Mitigation Planning***. Park County examined that concept paper and began to consider making use of it in completing this plan.

When FEMA released the February 20, 2008 draft document entitled, ***FEMA's Risk MAP Strategy - Integrating Mapping, Assessment, and Mitigation Planning***, Park County took note that, as had been stated several months earlier in the concept paper, FEMA's intent is to integrate the preparation and utilization of flood maps with all-hazards mitigation planning. To help in the pursuit of that integration, Park County has incorporated in this plan a watershed-based approach to hazard identification and risk assessment along with the Risk MAP Lifecycle concept. Details of Park County's Risk MAP approach are provided later in Chapter 4, the **Hazard Identification and Risk Assessment (HIRA)**, and in Chapter 6, the **Mitigation Strategy**.

4.1 HAZARD IDENTIFICATION

While there are many different natural and human-caused hazards that could potentially affect the communities within Park County, some hazards are more likely to cause significant impacts and damages than others. Although reducing the community's vulnerabilities to all hazards is ideal, the highest level of consideration must be given to those hazards that pose the greatest possible risk. This analysis will attempt to quantify these potential impacts for all possible hazard events, and identify those which could most significantly impact the communities involved. Once these hazards have been identified, further analysis will be conducted to profile potential hazard events and to assess vulnerability to such events.

4.1.1 Types of Hazards

While nearly all disasters are possible for any given area in the United States, the most likely hazards that could potentially affect the communities in Park County generally include:

- Wildfires
- Severe Winter Weather
- HAZMAT
- Flooding
- Drought
- Severe Thunderstorms/Hail Storms/Wind Events
- Landslides
- Dam Failure
- Earthquakes

Depending on the severity, location, and timing of the specific events, each of these hazards could have devastating effects on homes, business, agricultural lands, infrastructure, forest lands and ultimately citizens.

In order to gain a full understanding of the hazards, an extensive search of historic hazard data was completed. This data collection effort utilized meetings with local community officials, existing reports and studies, state and national data sets, and other sources. A comprehensive list of sources utilized for this plan can be found at the conclusion of this document.

Unfortunately, extensive local historical data is not currently available for many of the potential hazards. In some cases, the precise number of events that have affected the

Section 4

Hazard Identification and Risk Assessment

County and the subsequent level of impact to the local communities are not known. In these cases, state and regional hazard information was collected and referenced whenever possible.

4.1.2 Probability of Hazards

The historical data collected includes accounts of all the hazard types listed above. However, some hazards have occurred much more frequently than others with a wide range of impacts. By analyzing the historical frequency of each hazard, along with the associated impacts, the hazards that pose the most significant risks to Park County can be identified. This analysis will allow the local communities to focus the Mitigation Strategy of those hazards that are most likely to cause significant impacts.

Prioritizing the potential hazards that can threaten the County will be based on two separate factors:

- the probability that a potential hazard will affect the community,
- the potential impacts on the community in the event such a hazard occurs.

The probability of a hazard event occurring is largely based on the historical recurrence interval of the hazard. For instance, if flood damage occurs every 5 years versus an earthquake event causing damage every 50 years, the flood probability would score much higher than the earthquake.

The hazard's impact on the community is made up of three separate factors: **1) the extent of the potentially affected geographic area, 2) the primary impacts of the hazard event, and 3) any related secondary impacts.** While primary impacts are a direct result of the hazard, secondary impacts can only arise subsequent to a primary impact. For example, a primary impact of a flood event may be road closures due to submerged pavement. A possible secondary impact in these circumstances would be restricted access of emergency vehicles to citizens in a portion of the community due to the road closure.

4.1.3 Level of Hazard

A formula has been developed to assign a value for probability and impact for each of the hazards considered. That formula was used by members of the MAC and the Park County Emergency Manager as they assigned probability and impact values to each of the nine hazards. At the meeting when these probability and impact values were initially assigned by MAC members, and at the later meeting when the values were updated, the

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Park County Emergency Manager arranged a list for all to see, with the scores assigned by the meeting attendees, and ensured that a consensus about the ranking for each hazard was reached. A *Hazard Analysis Worksheet*, as well as a detailed description of all the calculations and formulas utilized, is included in Appendix 1 of this document. As a result of this analysis, the hazards were broken down into four distinct categories which represent the level of consideration they will receive throughout the planning process. These categories are *Significant*, *Moderate*, *Limited*, and *None*.

In order to focus on the most critical hazards that may affect the County, the hazards assigned a level of *Significant* or *Moderate* will receive the most extensive attention in the remainder of this analysis, while those with a *Limited* planning level will be discussed in more general terms. Those hazards with a planning level of *None* have not been addressed in this plan. The level of *None* should be interpreted as *not* being critical enough to warrant further evaluation; however, these hazards should not be interpreted as having zero probability or impact. Table 4-1 summarizes the initial results of the hazard level analysis following Workshop 1 which was held on May 22nd, 2007 in Fairplay, CO. Results are provided for unincorporated Park County, Alma, and Fairplay.

Table 4-1-a: Initial Hazard Identification Results for Unincorporated Park County

Hazard Type	Hazard Level
Wildfire	Significant
Severe Winter Weather	Significant
Drought	Moderate
Flooding	Moderate
Severe Thunderstorm/Hail Storms/Wind Events	Limited
HAZMAT	Limited
Dam Failure	Limited
Landslides	Limited
Earthquakes	None

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Table 4-1-b: Initial Hazard Identification Results for the Town of Alma

Hazard Type	Hazard Level
Severe Winter Weather	Significant
Wildfire	Moderate
Flooding	Limited
Dam Failure	Limited
Severe Thunderstorm/ Hail Storms/Wind Events	Limited
Drought	Limited
HAZMAT	Limited
Landslides	None
Earthquakes	None

Table 4-1-c: Initial Hazard Identification Results for the Town of Fairplay

Hazard Type	Hazard Level
Severe Winter Weather	Significant
Wildfire	Limited
Severe Thunderstorm/ Hail Storms/Wind Events	Limited
HAZMAT	Limited
Flooding	Limited
Drought	Limited
Dam Failure	Limited
Earthquakes	None
Landslides	None

As the work on the Mitigation Plan proceeded, especially the work on the Hazard Identification and Risk Assessment, members of the MAC expressed concern about the initial hazard level analysis, which had been conducted at the very beginning of the planning process. They decided to revisit, and potentially update, their initial hazard rankings, taking advantage of the information and awareness they had acquired during the intervening months. The Local Emergency Planning Committee (LEPC) contacted the Emergency Services Council (ES Council) and asked them to review the hazard rankings for accuracy. The ES Council consists of all emergency services providers in the county, public health officials, county administration, United States Forest Service, Colorado State Parks, and other subject matter experts who could provide historical knowledge

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and expertise. The ES Council provided the LEPC with their recommendations for changes to the hazard rankings for unincorporated Park County, the Town of Alma and the Town of Fairplay. In addition, the ES Council recommended that the LEPC include the Bailey area as a separate entity, due to the unique hazards within that portion of the county and also due to the fact that a majority of the county's population lives in the Bailey area. The LEPC later reviewed these recommendations with the full MAC and the Town Boards for both Fairplay and Alma. Table 4-2 summarizes the results of the final hazard level analysis following the MAC work session which was held on January 29, 2008 in Fairplay, CO. Revised results are provided for unincorporated Park County, Alma, Fairplay, and the Bailey area.

Table 4-2-a: Final Hazard Identification Results for Unincorporated Park County

Hazard Type	Hazard Level
Wildfire	Significant
Severe Winter Weather	Significant
HAZMAT	Significant
Flooding	Moderate
Drought	Moderate
Severe Thunderstorm/ Hail Storms/Wind Events	Limited
Landslides	Limited
Dam Failure	Limited
Earthquakes	Limited

Table 4-2-b: Final Hazard Identification Results for the Town of Alma

Hazard Type	Hazard Level
Severe Winter Weather	Significant
Wildfire	Significant
HAZMAT	Significant
Flooding	Moderate
Dam Failure	Moderate
Landslides	Moderate
Drought	Limited
Severe Thunderstorms/ Hail Storms/Wind Events	None
Earthquakes	None

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Table 4-2-c: Final Hazard Identification Results for the Town of Fairplay	
Hazard Type	Hazard Level
Severe Winter Weather	Significant
Wildfire	Significant
HAZMAT	Significant
Flooding	Moderate
Severe Thunderstorms/ Hail Storms/Wind Events	Limited
Drought	Limited
Dam Failure	Limited
Earthquakes	Limited
Landslides	Limited

Table 4-2-d: Final Hazard Identification Results for the Bailey Area	
Hazard Type	Hazard Level
Wildfire	Significant
Severe Winter Weather	Significant
HAZMAT	Significant
Flooding	Moderate
Drought	Moderate
Severe Thunderstorm/ Hail Storms/Wind Events	Limited
Landslides	Limited
Earthquakes	None
Dam Failure	None

Because the types of the hazards discussed above are similar, some hazards will be discussed simultaneously later in this introductory analysis. A more detailed discussion of the potential hazards that have been identified as Significant and Moderate level events will be provided in the sections that follow.

4.1.4 Vulnerability

The geographical size of Park County is approximately 2,211 square miles and the county contains two (2) census tracts. There are over one 5,894 households with a total population of 17,283 people (2005 ESRI Business Solutions Market Profile data).

4.1.5 Hazard Impacts

Nine natural and human-caused hazards have been identified in the plan. The impact of each hazard varies by type of hazard. For instance, landslides occurrences are isolated events, for the most part, and therefore have limited effects on the County as a whole.

The same can be said for the dam failure hazard, severe thunderstorm hazard and earthquake hazard, such that, the effects are usually area-specific and not usually widespread, based on historical occurrences. It should be noted, however, that several of the reservoirs in Park County are quite large. If the dams that contain them were to fail, the impacts of the dam failure flooding would be extensive and widespread.

However, the remaining five hazards that affect the county can have extensive and far-reaching consequences. Each one, can impact hundreds of square miles while causing property damage/loss, business interruption and loss of life.

Typically, flooding accounts for 75% of all natural disasters. Wildfires, severe Winter Weather, drought, and severe thunderstorms/hail storms can cause extensive property and agricultural losses throughout the County. Hazardous materials transport incidents are the only human-caused hazard to be given consideration in the planning process. They pose significant risk to life, property and watercourses along the US Highway 285 corridor, the US Highway 24 corridor and the State Highway 9 corridor. The extent of these impacts is best expressed when compared to the total number of square miles in the County and its total population. Therefore, 2,211 square miles and 17,283 residents have the potential of being impacted to some degree by five of the nine natural and human-caused hazards that have been identified in Park County.

4.1.6 General Hazard History

SHELDUS - is a county-level hazard data set for the U.S. for 18 different natural hazard events types such thunderstorms, hurricanes, floods, wildfires, and tornados. SHELDUS does not address human-caused hazards such as hazardous materials transport. For each event the database includes the beginning date, location (county and state), property losses, crop losses, injuries, and fatalities that affected each county. The data set does not include Puerto Rico, Guam, or other U.S. territories.

The data were derived from several existing national data sources such as National Climatic Data Center's monthly Storm Data publications and NGDC's Tsunami Event Database. Only those events that generated more than \$50,000 in damages were included in SHELDUS. Since 1995, SHELDUS additionally includes all events that are

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reported in NCDC's Storm Data with a specific dollar amount. Data and maps were compiled and geo-referenced by the Hazards Research Lab at the University of South Carolina.

SHELDUS has not kept records for all hazards that affect Park County. However, there are records that relate to winter weather, wind, flooding, drought, and severe thunderstorms and lightning. SHELDUS has not recorded wildfire incidents that have taken place in the county. The hazards that have been taken into account by SHELDUS have caused more than \$6 million in property damage and \$1 million in crop damage.

4.2 INCORPORATING THE RISK MAP CONCEPT INTO HAZARD IDENTIFICATION AND RISK ANALYSIS

Park County has examined FEMA's June 1, 2007 concept paper, *FEMA's Flood Map Modernization – Preparing for FY09 and Beyond: Integrated Flood Data Update, Risk Assessment, and Mitigation Planning*, and the subsequent February 20, 2008 draft document entitled, *FEMA's Risk MAP Strategy - Integrating Mapping, Assessment, and Mitigation Planning*. Both papers provide initial explanations of the Risk MAP concept, the guiding concept for Phase II of FEMA's Flood Map Modernization program. FEMA intends to integrate the preparation and utilization of flood maps with all-hazards mitigation planning.

Park County is incorporating two components of the Risk MAP concept in preparing this plan. First, the Park County All-Hazard Mitigation Plan includes a watershed-based approach to hazard identification and risk assessment. Second, it identifies a Risk MAP Lifecycle approach for tying together the three elements of Risk MAP: 1) hazard mapping, 2) risk assessment, and 3) implementation of mitigation planning.

4.2.1 A Watershed Approach to Hazard Identification and Risk Assessment

In its concept paper, *FEMA's Flood Map Modernization – Preparing for FY09 and Beyond: Integrated Flood Data Update, Risk Assessment, and Mitigation Planning*, FEMA identified four objectives for the integrated flood risk management approach the agency called for in Phase II of Flood Map Modernization. Objective # 2 says:

2. *Conduct informative watershed based flood risk assessments for all watersheds in the Nation opening the door for more effective risk communication, flood mitigation planning, and flood risk reduction performance tracking;*

To address that objective, Park County can establish a watershed-based floodplain information system:

- Build a countywide flood risk information system (including consideration of dam failure flood risk) that is watershed-centered, utilizing a GIS database framework for the creation, adoption, communication, and maintenance of floodplain information;
- Develop a comprehensive flood risk assessment for each watershed; and
- Integrate the floodplain information directly to mitigation needs and opportunities.

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This integrated flood risk management approach is being developed from a comprehensive multi-hazard perspective. First, Park County is focusing on incorporating GIS-based data analysis and presentation capabilities for hazards that are directly water-related (*flooding, dam failure*). Next, Park County can address other hazards that are less directly water-related (*wildfire, drought, landslides/debris flows*) taking a watershed perspective. Those hazards that are not easily related to a watershed framework (*severe winter weather, HAZMAT, severe thunderstorms/hail storms/wind events, earthquakes*) will initially be addressed within a conventional framework.

The table below summarizes the analyses conducted in the Park County Hazard Identification and Risk Assessment as part of the county's effort to move toward FEMA's proposed integrated flood risk management approach.

Table 4-3: Hazard Identification & Risk Assessment According to Watershed

Hazard	Full Analysis According to Watershed	Map Current Risk According to Watershed	Propose Mapping Available Data Sources to Identify Current Risk According to Watershed	No Analysis According to Watershed
Wildfire		X		
Severe Winter Weather				X
HAZMAT				X
Flooding	X	X		
Drought			X	
Severe Thunderstorm/Hail Storms/Wind Events				X
Landslide		X		
Dam Failure	X	X		
Earthquake				X



4.2.2 Applying the Watershed Framework to Hazards Beyond Flooding and Dam Failure

Applying the watershed framework to the analysis of flooding and dam failure is relatively straightforward. With additional effort, this framework can also be applied to wildfire, drought, and landslide/debris flows. The following table provides an indication of how the watershed framework can be used to analyze hazards beyond flooding and dam failure. Table 4-4 is a summary of the watersheds in Park County that were affected by wildfires over the past decade. Wildfires have been shown to substantially increase flood and debris flow risk in the watershed where they occur. Similar analyses can be conducted for drought, and landslide/debris flows.

Table 4-4 Park County Recent Wildfires

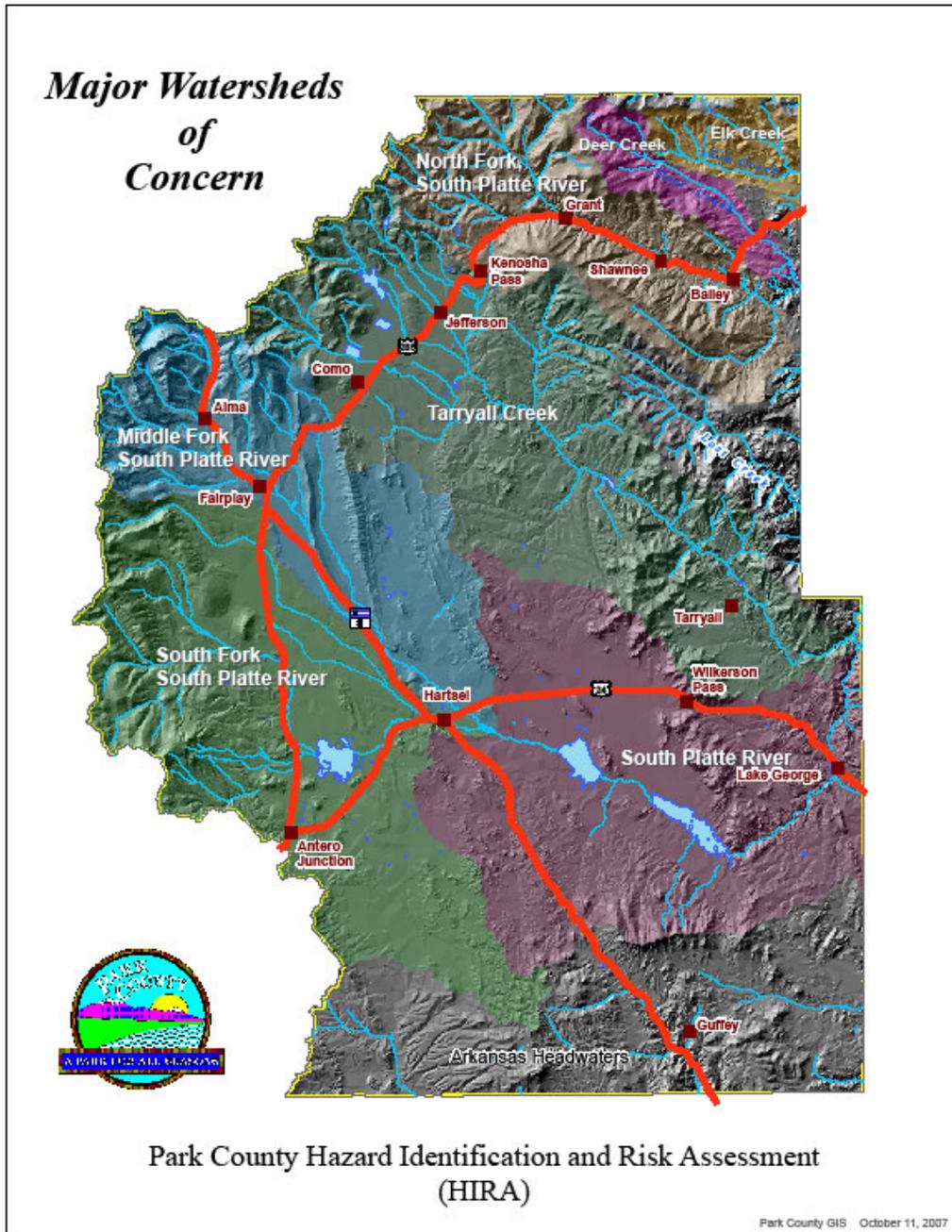
Year of Fire	Name of Fire	Watersheds Affected
2000	High Meadow Fire	Deer Creek
2002	Snaking Fire	North Fork South Platte River
2002	Black Mountain Fire	Elk Creek
2002	Hayman Fire	Tarryall Creek, South Platte River
2003	Campbell Fire	Arkansas Headwaters Basin

4.2.3 Watershed Descriptions

For the purposes of this plan, the county has been divided into eight different watersheds or drainage basins. They are, from north to south, Elk Creek, Deer Creek, the North Fork of the South Platte River, Tarryall Creek, the Middle Fork of the South Platte River, the South Fork of the South Platte River, the South Platte River, and the Arkansas River Headwaters. A very small portion of the county lies in a ninth watershed, the Bear Creek watershed. Bear Creek flows from the Mt. Evans Wilderness Area into Clear Creek County. No further consideration will be given to the Bear Creek watershed in this section of the planning analysis.



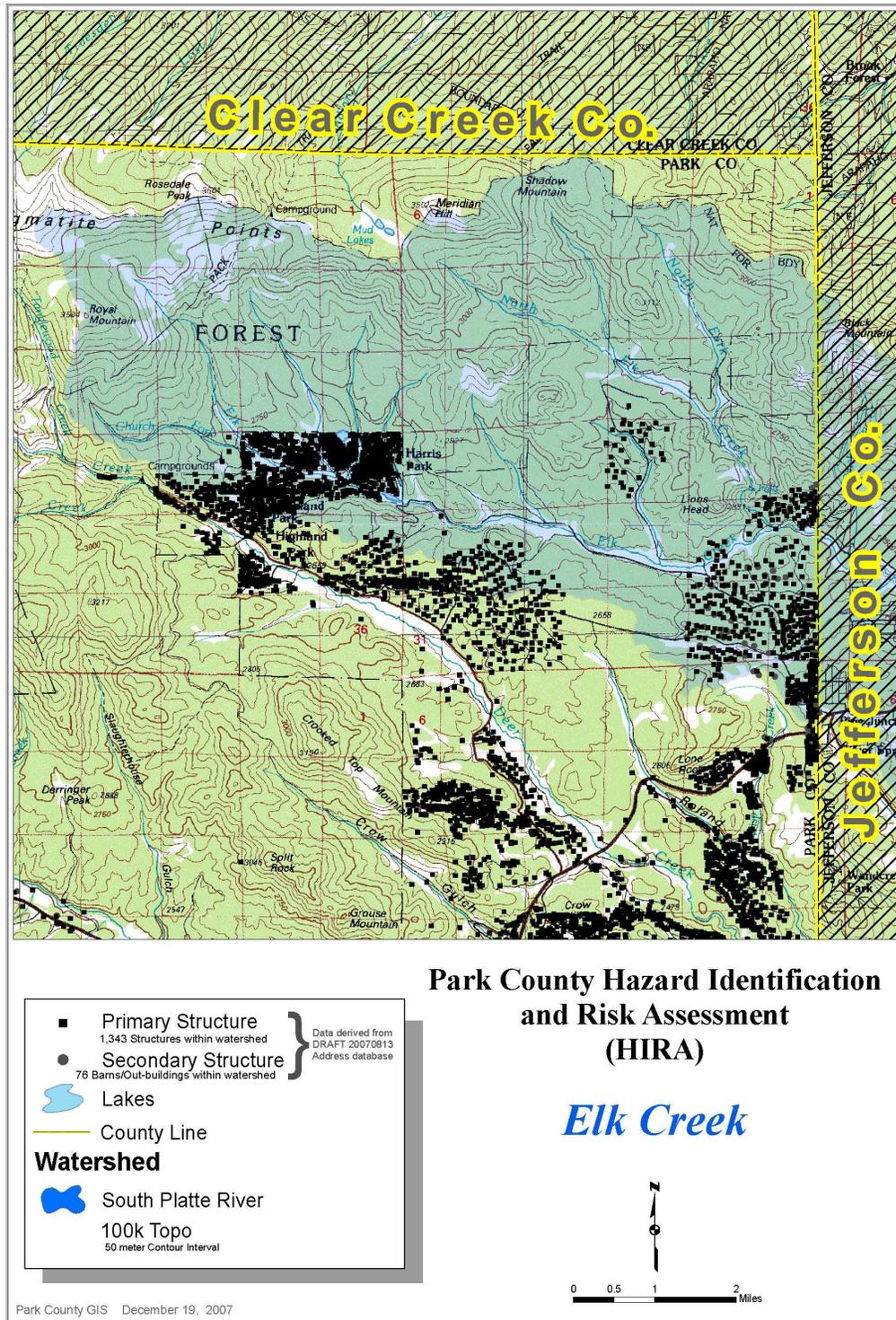
Figure 4-1



4.2.3.1 Elk Creek Basin

Elk Creek is a major tributary to the North Fork of the South Platte. The headwaters of Elk Creek are located in the Mt. Evans Wilderness Area. It flows through the northeast corner of the county from west-northwest to east-southeast, crossing into Jefferson County about halfway between Pine Junction and the boundary between Park County and Clear Creek County. Numerous subdivisions near Pine Junction and Bailey, including Harris Park, are located along or near Elk Creek and its tributaries. Due to the number of properties in the proximity of these streams, and the potential threat to property and life that they could pose during a flood event, they warrant significant planning considerations as well as considerations for a Colorado Water Conservation Board (CWCB) Map Modernization project.

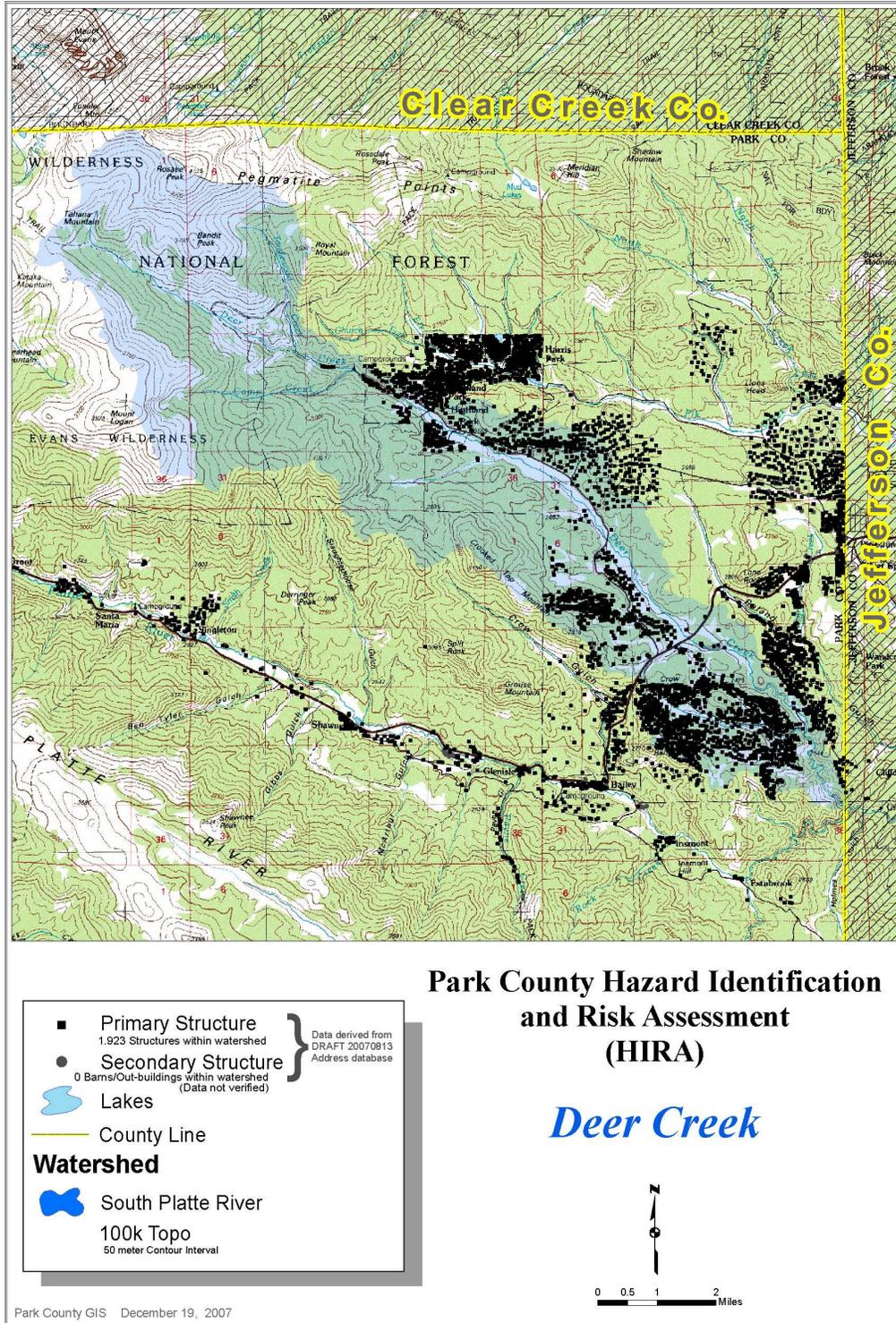
Figure 4-2



4.2.3.2 Deer Creek Basin

Deer Creek is another major tributary to the North Fork of the South Platte River. The headwaters of Deer Creek and its tributaries are located in the Mt. Evans Wilderness Area. The Deer Creek watershed is parallel and just south of the Elk Creek watershed. Deer Creek and its tributaries pass through several subdivisions, including Highland Park. Deer Creek crosses Highway 285 about half way between Pine Junction and Bailey and continues to the east/southeast, joining the North Fork of the South Platte River approximately at the Park County-Jefferson County boundary, roughly four to five miles south of Pine Junction. As is the case with Elk Creek the large number of properties in the proximity of Deer Creek and its tributaries merit significant planning considerations as well as considerations for a Map Modernization project with the CWCB.

Figure 4-3



4.2.3.3 North Fork South Platte River Basin

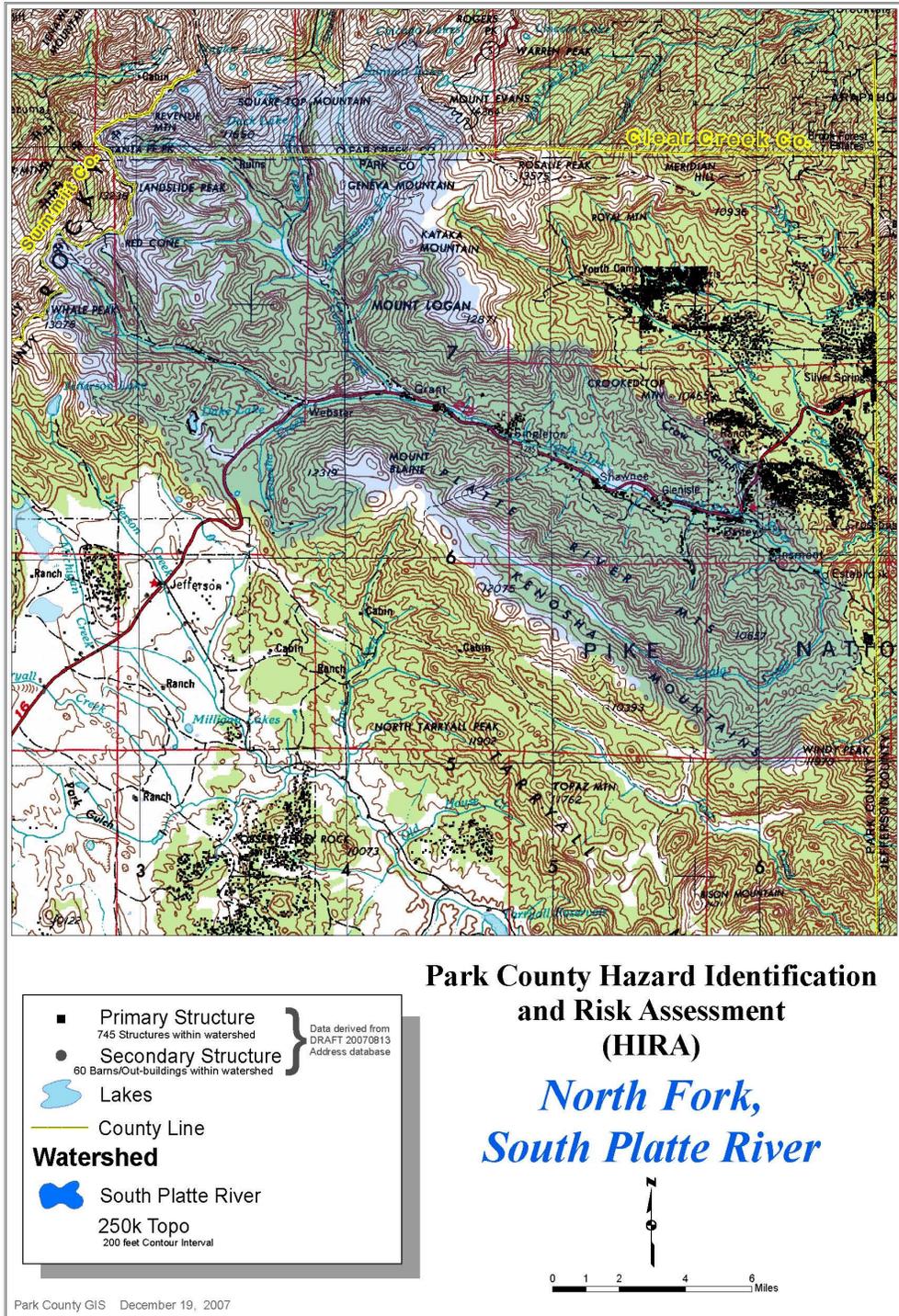
The North Fork of the South Platte River basin is the major drainage way for northern Park County. A major portion of the headwaters of the North Fork of the South Platte River are located on the Continental Divide near Webster Pass along the county's border with Summit County. There are also headwater streams on the southwestern flanks of Mt. Evans in Clear Creek County. One of the North Fork's primary tributary watersheds, the Geneva Creek watershed, originates near Guanella Pass in Clear Creek County. Geneva Creek joins the North Fork at Grant. Another tributary to the North Fork, Kenosha Gulch flows down from Kenosha Pass and joins the North Fork in Webster. Immediately upstream of Grant, the Roberts Tunnel, a Denver Water diversion facility, empties into the North Fork and substantially alters the hydrology of the watershed.

The river flows along US 285 between Webster and Bailey. It poses a threat to infrastructure and property in the Platte Canyon portion of the county, including the Bailey area. Downstream of Bailey, the river continues in a generally eastward direction, crossing into Jefferson County roughly four to five miles south of Pine Junction. Due to steep mountainous terrain in the headwaters of the river's drainage area, the potential for rapid flooding following a moderate to significant rain event or spring snowmelt is high. Selected sections of the North Fork between Grant and Bailey may need to be considered for a Map Modernization project in conjunction with the CWCB.

As mentioned above, a significant hydrologic feature in the North Fork of the South Platte watershed comes from Dillon Reservoir, through the Roberts Tunnel, which conveys water by gravity from Dillon Reservoir into Park County. The Denver Water Board operates Dillon Reservoir and the Roberts Tunnel. Thousands of cubic-feet-per-second are added to the North Fork, dramatically altering the North Fork's channel and the hydrology of the entire watershed below Grant.

The North Fork of the South Platte River watershed was impacted by the Hayman, Snaking and Hi Meadow fires. Wildfires substantially increase the risk of flooding and debris flows due to loss of vegetative cover, increased vulnerability to erosion and fire-induced soil impermeability. Post-wildfire floods and debris have occurred in nearby burn areas. Perhaps the closest such event occurred in Buffalo Creek (in adjoining Jefferson County), in 1995, resulting in two fatalities and substantial property and infrastructure damage.

Figure 4-4

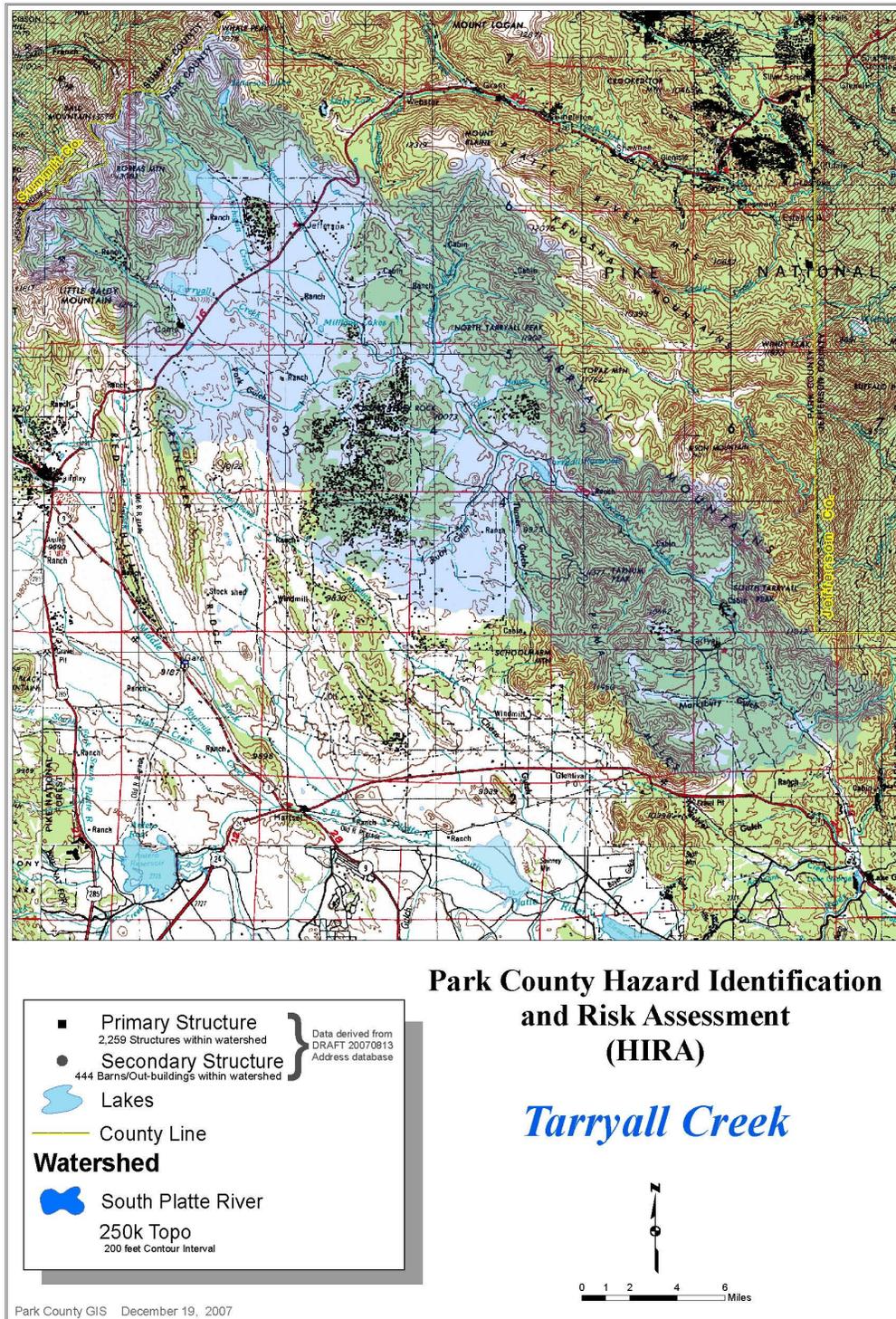


4.2.3.4 *Tarryall Creek Basin*

The Tarryall Creek basin's headwaters are located in the mountains of the Continental Divide, which is the county's border with Summit County. The mainstream of Tarryall Creek begins near Boreas Pass, while several major tributaries begin near Georgia Pass. Tarryall Creek flows east/southeast, crossing US Highway 285 between Jefferson and Como, and eventually joining the South Platte River roughly 6 miles downstream of Lake George. Tarryall Reservoir, a Division of Wildlife facility, is located between Jefferson and Tarryall Creek's confluence with the South Platte River. Some of the primary tributaries to Tarryall Creek are Jefferson Creek and Michigan Creek. Jefferson Lake, a storage reservoir owned by the city of Aurora, lies upstream of Jefferson on the Jefferson Lake Fork of Jefferson Creek.

The Tarryall Creek watershed, including the mainstream of the creek, was impacted by the Hayman Fire. This watershed has an elevated risk to post-wildfire flash flooding and debris flows.

Figure 4-5



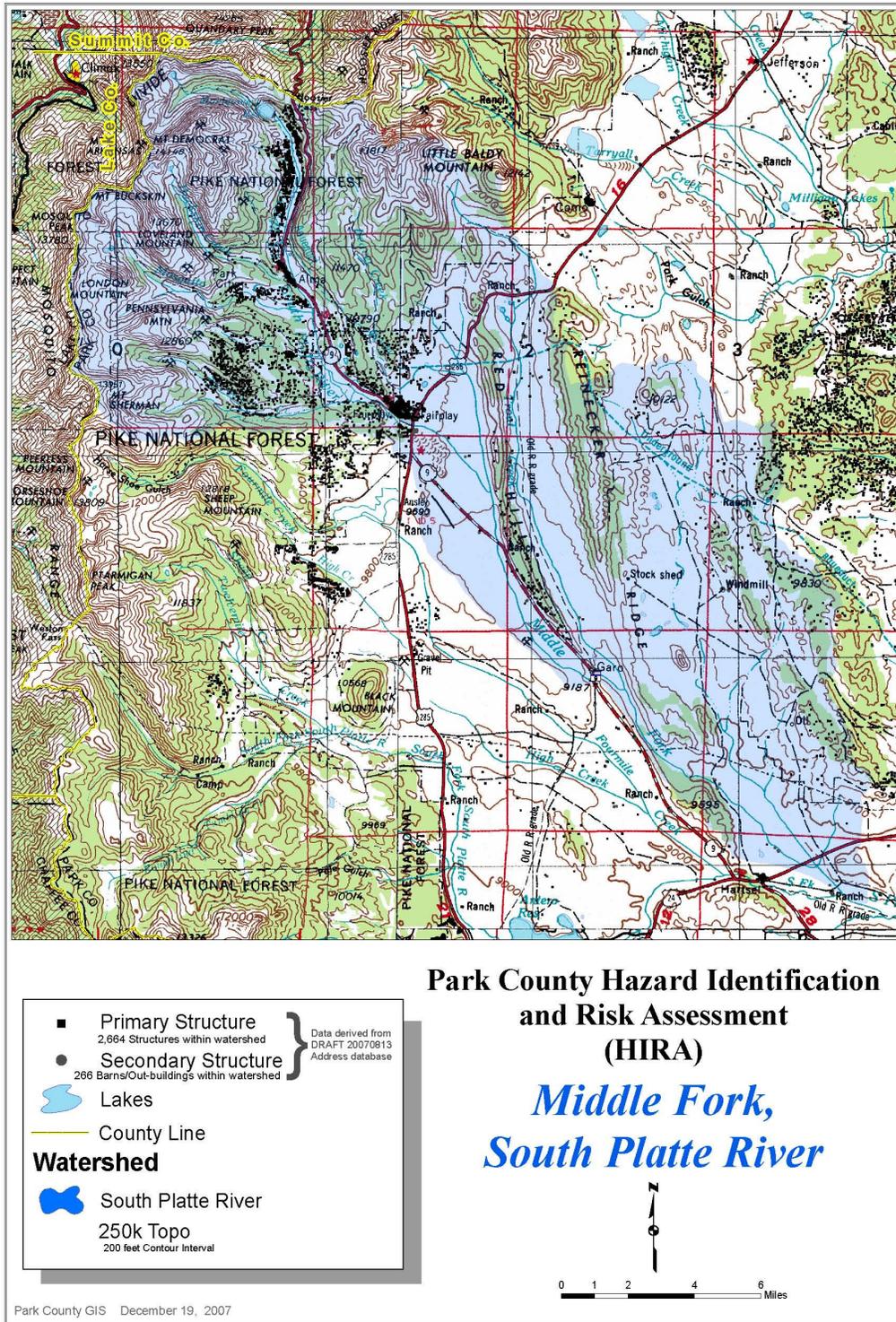
4.2.3.5 Middle Fork South Platte River Basin

The headwaters of the Middle Fork of the South Platte River are located along the Continental Divide near Hoosier Pass and the Mosquito Range. The Mosquito Range serves as the boundary between the South Platte Basin and the Arkansas Basin. Colorado Springs Utility's Montgomery Reservoir stores water that flows down from the Divide in the northern portion of this watershed. The river then flows south toward the town of Alma.

The Middle Fork passes along the eastern side of Alma as it flows south towards Fairplay. Buckskin Creek, a major tributary to the Middle Fork, originates in the Mosquito Range, flows from west to east through Alma and crosses State Highway 9 in the center of town. It joins the Middle Fork of the South Platte on the east side of Alma.

The Middle Fork flows along the west side of Fairplay in an incised valley well below most urban development in town. Beaver Creek flows to the east of Fairplay and joins the Middle Fork south of town. The primary flooding risk in Fairplay from the Middle Fork and Beaver Creek is to US Highway 285 and State Highway 9. There are dry gulches in town that could also pose a flood threat in the event of heavy precipitation. After the Middle Fork crosses US 285, it continues to the southeast and eventually has its confluence with the South Fork of the South Platte River upstream of Hartsel to form the South Platte River.

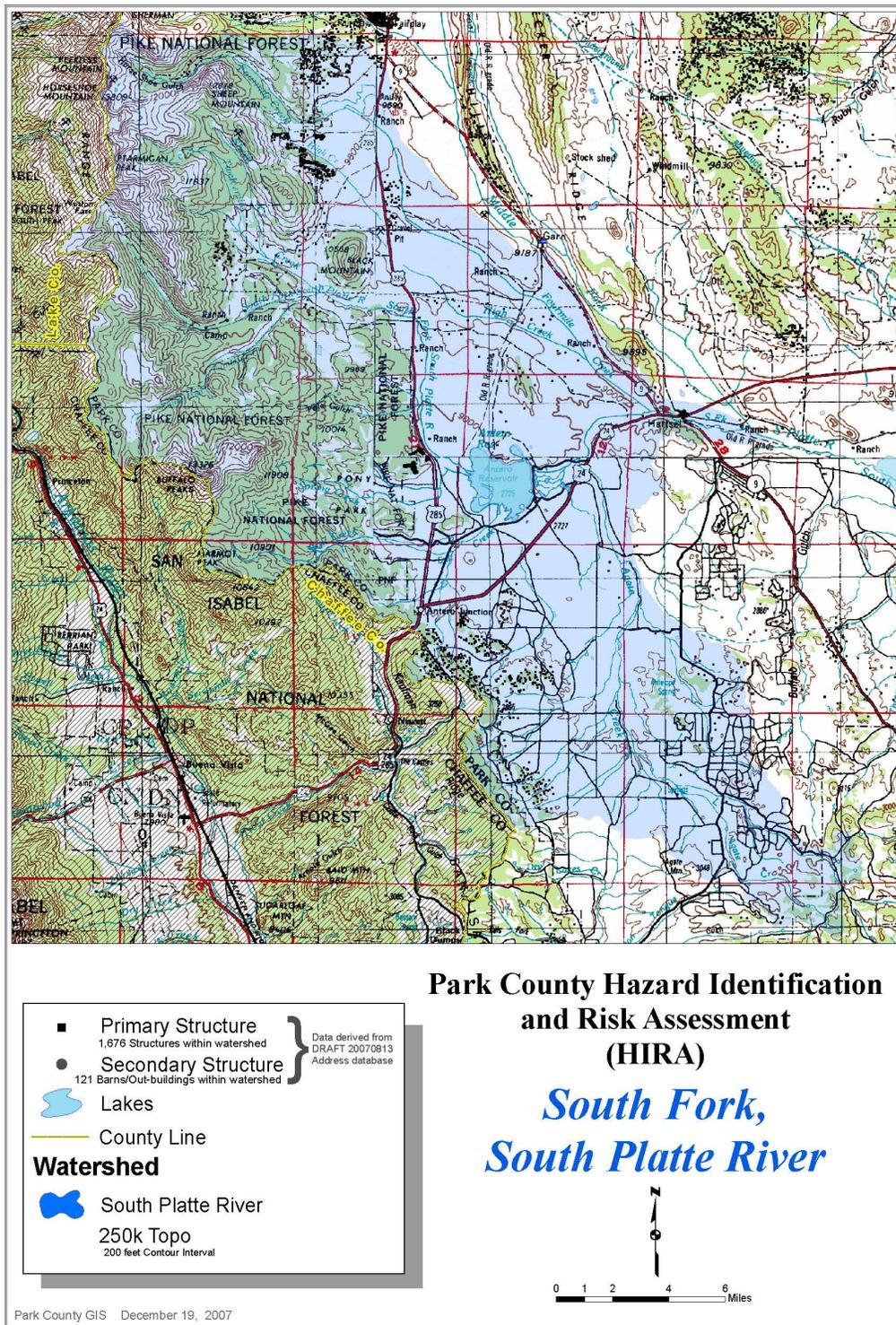
Figure 4-6



4.2.3.6 South Fork South Platte River Basin

The headwaters of the South Fork of the South Platte River are in the Mosquito Range and the mountains south of the Mosquito Range on the County's border with Lake County and Chaffee County. From its headwaters, the South Fork flows toward the southeast and into the Denver Water Board's Antero Reservoir. Downstream of Antero Reservoir, the river flows northeast before joining the Middle Fork of the South Platte River upstream of Hartsel to form the South Platte River.

Figure 4-7



4.2.3.7 South Platte River Basin

The Middle Fork enters the area just upstream of Hartsel from the north/northwest, while the South Fork enters the area just upstream of Hartsel from due west. When the Middle Fork and the South Fork of the South Platte River join upstream of Hartsel, they form the South Platte River. The Middle Fork, the South Fork, and the South Platte all pose a potential flooding threat to buildings and infrastructure, including US Highway 24 and State Highway 9, in and around Hartsel. Consideration may need to be given to a Map Modernization project in conjunction with the CWCB for the Hartsel area.

Downstream of Hartsel, the river flows southeast into the City of Aurora's Spinney Mountain Reservoir. Shortly thereafter, the river enters Eleven Mile Canyon and flows into the Denver Water Board's Eleven Mile Reservoir. Eleven Mile Reservoir is the largest reservoir in the county with 3,405 surface acres and a capacity of 97,779 acre-feet when full. From the outlet of Eleven Mile Reservoir, the river turns to the northeast and eventually flows through the community of Lake George. It continues in a northeasterly direction before flowing briefly through Teller County, and then becoming the boundary between Jefferson and Douglas Counties.

The presence of two major reservoirs on the South Platte (Spinney Mountain and Eleven Mile Reservoirs) heavily influences the hydrology of the entire watershed. The Otero Pipeline, a facility owned by the City of Aurora, conveys water from the Arkansas Basin, via a pipeline and pump system, over Trout Creek Pass and into Spinney Mountain Reservoir. As mentioned above, Antero Reservoir is upstream of Hartsel on the South Fork of the South Platte and it has an effect on the hydrology of the South Fork, which, in turn, has an effect on the hydrology of the South Platte. While none of these three major storage reservoirs is designed or operated as a flood control facility, each of them can provide inadvertent flood protection when conditions permit. Even with this inadvertent flood protection, residual flooding threats do still exist on the South Platte River downstream of the reservoirs in the community of Lake George and other subdivisions in the vicinity.

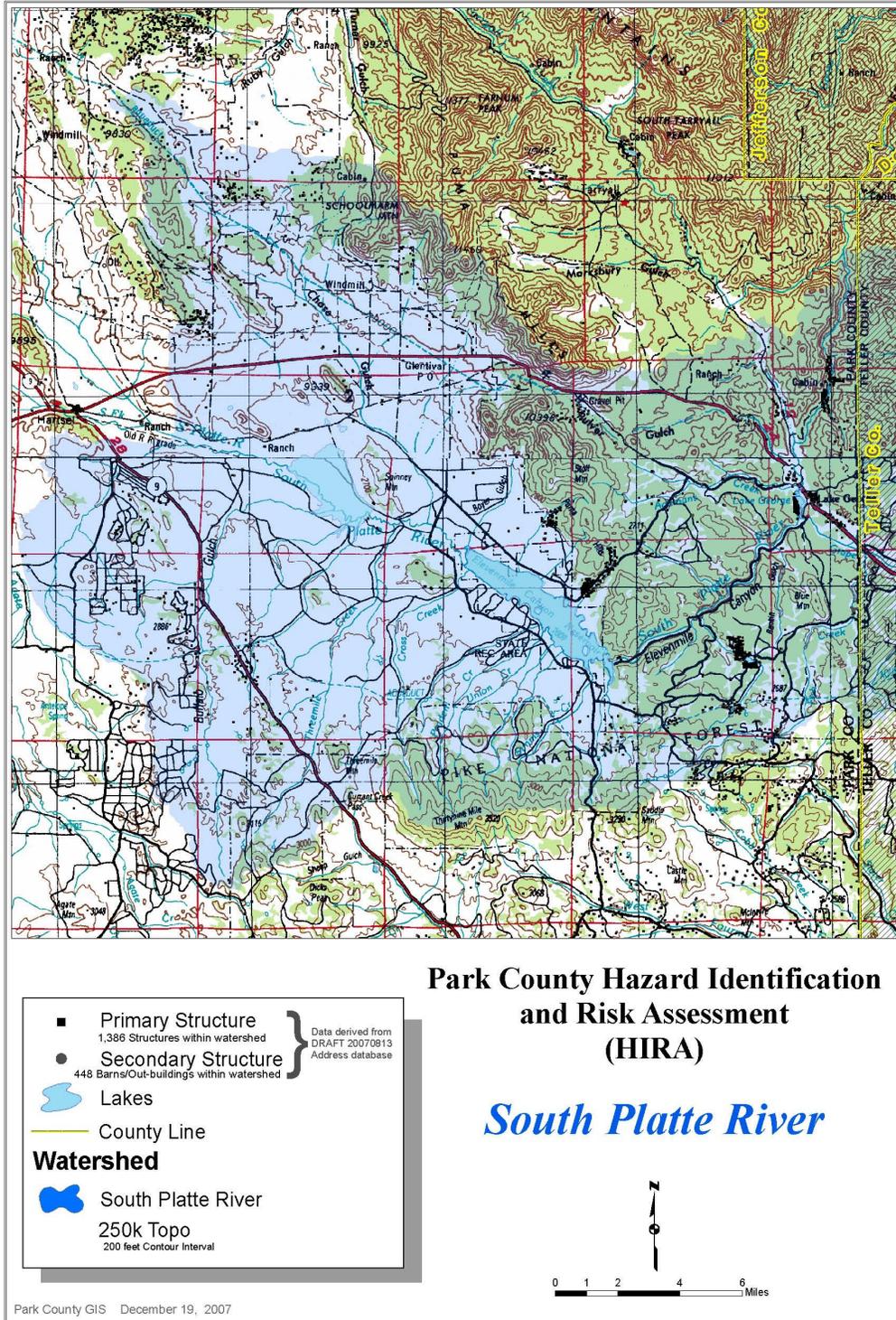
Quantitatively defining the 100-year water elevations in Spinney Mountain and Eleven Mile Reservoirs and the 100-year outflow rates below reservoirs would require technical discussions and coordination with Denver Water and the City of Aurora and an understanding of their technical guidelines. Generally, these reservoirs do control the amount of water flowing in the South Platte River at any given time, but without such technical discussions it would be difficult to understand their specific effect during a 100-year event.

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While there is a residual threat of flooding on the main stem of the river below these reservoirs, of particular concern for flooding in the vicinity of Lake George are tributaries to the South Platte. Of the two watersheds affected by the Hayman Fire in Park County (Tarryall Creek, South Platte), the South Platte Watershed was the watershed that was most severely impacted. There have not been any post-wildfire floods recorded on the main stem of the South Platte in Park County. However, tributaries to the South Platte that flow through the burn area have experienced flash floods and debris flows in subdivisions such as Sportsman's Paradise.

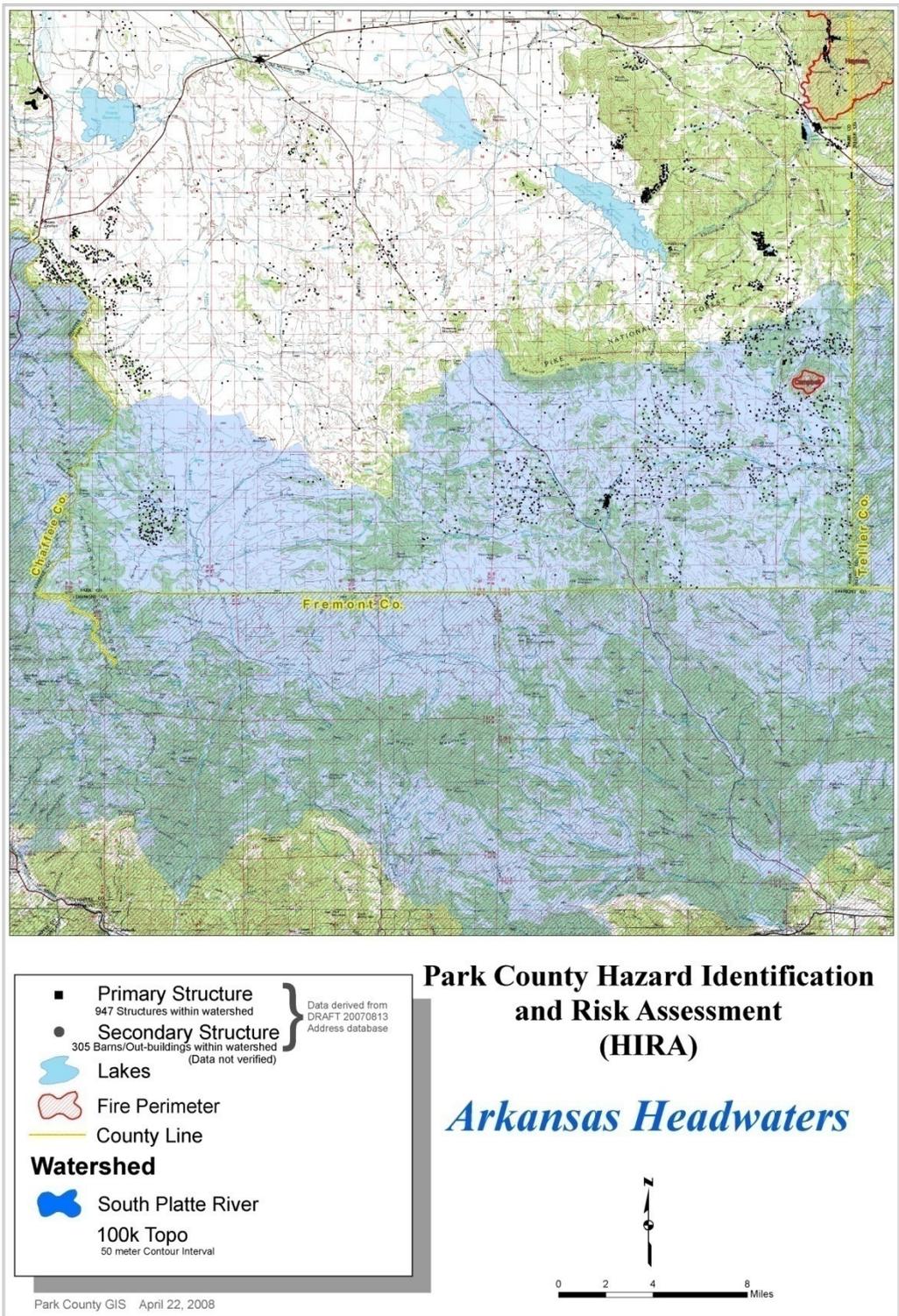
Figure 4-8



4.2.3.8 Arkansas River Headwaters Basin

The Arkansas River originates in the high mountains above Leadville in Lake County. However there are three major sub-basins in southern Park County that can be considered part of the headwaters of the Arkansas River. Those three sub-basins are the Badger Creek sub-basin, the Currant Creek sub-basin and the Four Mile Creek sub-basin. Badger Creek, the westernmost of these tributaries flows due south into Fremont County eventually joining the Arkansas River in the canyon below Salida, near the community of Howard. Currant Creek flows from northwest to southeast along State Highway 9, crosses into Fremont County, and flows towards the Royal Gorge. A tributary to Currant Creek, Freshwater Creek, flows through the community of Guffey. Due to its proximity to infrastructure and to Guffey, the Currant Creek sub-basin presents a more elevated risk of flooding than the other two Arkansas Headwaters sub-basins in Park County. While the main stem of Four Mile Creek does not flow through Park County, several of its tributaries flow through the southeastern corner of Park County. Three of those tributaries to Four Mile Creek are, from north to south, Slater Creek, Cobb Creek, and West Four Mile Creek.

Figure 4-9



4.2.4 RISK MAP Lifecycle Concept in Hazard Identification and Risk Assessment

In FEMA's Risk MAP Strategy - Integrating Mapping, Assessment, and Mitigation Planning" the agency described its Risk MAP Lifecycle concept:

The Risk MAP (Mapping, Assessment, and Planning) Lifecycle

... a lifecycle with the purpose of constantly reducing losses to life and property. Flood mapping is used for risk assessments which are incorporated into mitigation plans where risk reduction measures are identified for future action. Future hazard identification requirements are developed and the cycle starts anew.

Mapping – *This component of the lifecycle is centered on the flood hazard data identification By improving the data as well as the means of maintaining and delivering it, FEMA ensures that assessments and plans have the right information at the right time.*

Assessment – *FEMA will describe the effects of the hazard on people and the built environment Using the National Flood Hazard Layer, a National flood-risk-assessment baseline will be provided FEMA will encourage more detailed, multi-hazard assessments from Federal, State, and local partners. Additionally, FEMA will improve the ability to assess future conditions and built environments (through State/local plans) to help measure the potential reduction in risk*

Planning – *Show demonstrated progress in State, Tribal, and local mitigation plans Mitigation plans rely on risk assessments information for communities to analyze, incorporate into plan updates, and to identify actionable strategies that reduce risks. There needs to be effective risk communications, incentives, and guidance ... to encourage effective action on the mitigation plan that result in true risk reduction.*

The "**Mapping**" component of the Risk MAP Lifecycle roughly corresponds to the Hazard Identification portion of the HIRA. The "**Assessment**" component corresponds to the Risk Assessment portion of the HIRA. The "**Planning**" component corresponds to the Mitigation Strategy chapter (chapter 6) of this plan.

In order to make the connection to the Risk MAP Lifecycle more explicit, the Park County HIRA has been split into its two component parts: 1) Hazard Identification, 2) Risk Assessment. The Hazard Identification part provides data for all nine hazards in Park County, including the five hazards that lend themselves to mapping approaches and the four hazards that do not readily lend themselves to mapping approaches. Likewise,

the Risk Assessment part of the HIRA provides analyses for all nine hazards in one part of the HIRA. The Mitigation Strategy chapter includes direct connections back to the HIRA chapter to ensure, as appropriate, that “**Mapping**” data and “**Assessment**” analyses are updated when “**Planning**” mitigation compliance measurements dictate such an update, and to ensure that specific mitigation projects called for in “**Planning**” are actually implemented so that risks identified in “**Assessment**” are ultimately reduced.

4.3 ADDRESSING THE RISK MAP LIFECYCLE CONCEPT

FEMA’s Risk MAP Lifecycle concept consists of three components:

***Mapping** – This component of the lifecycle is centered on the flood hazard data identification....*

***Assessment** –FEMA will describe the effects of the hazard on people and the built environment Using the National Flood Hazard Layer, a National flood-risk-assessment baseline will be provided FEMA will encourage more detailed, multi-hazard assessments from Federal, State, and local partners...*

***Planning** – Show demonstrated progress in State, Tribal, and local mitigation plans Mitigation plans rely on risk assessments information for communities to analyze, incorporate into plan updates, and to identify actionable strategies that reduce risks...*

The Park County HIRA (which addresses the “M” and the “A” of Risk MAP) has been split into its two component parts: 1) Hazard Identification for all nine hazards, 2) Risk Assessment for all nine hazards. The Planning component of Risk MAP (the letter “P”) is addressed in the Mitigation Strategy portion of this plan.

4.3.1 Wildfire

The Hazard Identification part of the Wildfire information provides data to address the “**Mapping**” portion of the Risk MAP Lifecycle. The Risk Assessment part of the Wildfire information provides analyses already performed for the “**Assessment**” portion of the Risk MAP Lifecycle.

4.3.2 Severe Winter Weather

The Hazard Identification part of the Severe Winter Weather information states that there is currently a small amount of initially mapped severe winter weather data to address the “**Mapping**” portion of the Risk MAP Lifecycle, and it indicates additional severe winter weather data which could be mapped in the future. The Risk Assessment part of the Severe Winter Weather information states that there are currently no severe

winter weather analyses anticipated for the “**Assessment**” portion of the Risk MAP Lifecycle, but it indicates initial analyses which could be performed in the future.

4.3.3 HAZMAT

The Hazard Identification part of the HAZMAT information states that there are currently no mapped HAZMAT data to address the “**Mapping**” portion of the Risk MAP Lifecycle, but it indicates initial HAZMAT data which could be mapped in the future. Likewise, the Risk Assessment part of the HAZMAT information states that there are currently no HAZMAT analyses anticipated for the “**Assessment**” portion of the Risk MAP Lifecycle, but it indicates initial analyses which could be performed in the future.

4.3.4 Flooding

The Hazard Identification part of the Flooding information provides data to address the “**Mapping**” portion of the Risk MAP Lifecycle. Likewise, the Risk Assessment part of the Flooding information provides analyses for the “**Assessment**” portion of the Risk MAP Lifecycle.

4.3.5 Drought

The Hazard Identification part of the Drought information states that there are currently no mapped drought data to address the “**Mapping**” portion of the Risk MAP Lifecycle, but it suggests data which might be collected in future. The Risk Assessment part of the Drought information describes analyses which have not yet been performed but which could be performed for the “**Assessment**” portion of the Risk MAP Lifecycle, presuming the implementation of future data collection efforts.

4.3.6 Severe Thunderstorm/Hail Storm/Wind Event

The Hazard Identification part of the Severe Thunderstorm/Hail Storm/Wind Event information states that there are currently no mapped thunderstorm/hail storm/wind event data to address the “**Mapping**” portion of the Risk MAP Lifecycle. Likewise, the Risk Assessment part of the Severe Thunderstorm/Hail Storm/Wind Event information states that there are currently no thunderstorm/hail storm/wind event analyses anticipated for the “**Assessment**” portion of the Risk MAP Lifecycle.

4.3.7 Landslide

The Hazard Identification part of the Landslide information provides data to address the “**Mapping**” portion of the Risk MAP Lifecycle. The Risk Assessment part of the Landslide

information provides initial analyses already performed for the “**Assessment**” portion of the Risk MAP Lifecycle and indicates additional analyses which have not yet been performed but which could be performed to supplement the initial analyses.

4.3.8 Dam Failure

The Hazard Identification part of the Dam Failure information provides data to address the “**Mapping**” portion of the Risk MAP Lifecycle. Likewise, the Risk Assessment part of the Dam Failure information indicates analyses which have not yet been performed but which could be performed in the future for the “**Assessment**” portion of the Risk MAP Lifecycle.

4.3.9 Earthquake

The Hazard Identification part of the Earthquake information provides data to address the “**Mapping**” portion of the Risk MAP Lifecycle. The Risk Assessment part of the Earthquake information states that there are currently no further earthquake analyses anticipated for the “**Assessment**” portion of the Risk MAP Lifecycle.

4.4 HAZARD IDENTIFICATION

4.4.1 Wildfire

“A wildfire is an uncontrolled fire spreading through vegetative fuels, exposing and possibly consuming structures” (FEMA 386-2, 2001). Wildfires play a significant role in almost all vegetative ecosystems or landscapes, including those in Park County. They become a hazard when they impact or threaten to impact human developments, infrastructure, and/or lives, or otherwise affect people indirectly, such as economically.

Direct impacts from wildfires can include the loss of structures and infrastructure, injuries or loss of life to firefighters and to the public, health impacts from smoke, the immediate costs of fighting the fire, closure of public lands, highways, or other locations, temporary loss of business, and community disruptions, such as evacuation. Longer-term impacts include impacts on tourism and recreation, loss of jobs or businesses, loss of community water supplies and/or storage/purification facilities, devaluation of property or businesses, and other long-term disruptions to the communities.

Fires result from two primary causes, lightning and people. “Human-caused” fires include fires ignited through a wide variety of mechanisms, including arson, campfires,

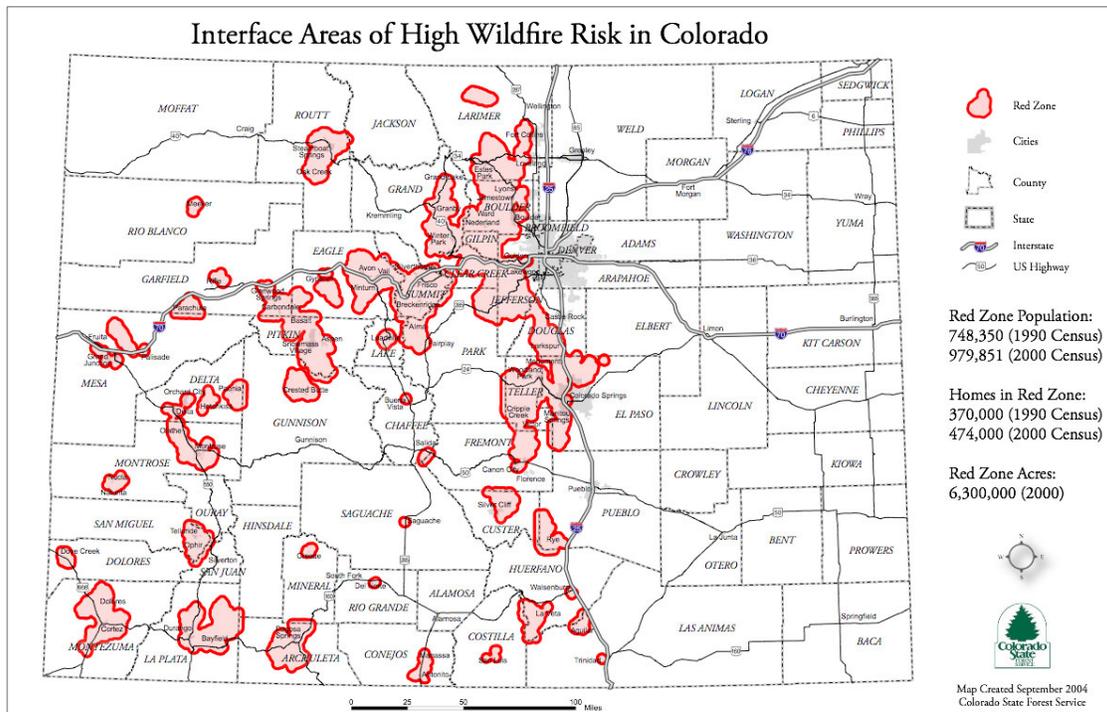
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smoking, equipment, fireworks, etc. Most fires in Park County have been started by lightning. However, historically many of the worst fires in Park County have been human caused, primarily because of the timing and the location of those starts.

In 2003, the Colorado State Forest Service (CSFS) completed a statewide *Wildfire Risk Assessment* (WRA) in an attempt to quantify the varying levels of risk throughout the state. The data gathered in this risk assessment were grouped for the years of 1995 through 2005. The CSFS identified areas with high potential for wildfire as “red zones”. The CSFS has identified three red zones affecting portions of Park County. One is in the northeast corner of the county; one is along the county’s northwestern border; and another is along the county’s southeastern border. See Figure 4-1. Because the data utilized in this statewide risk assessment is current, and the overall analysis is comprehensive, the CSFS risk assessment served as the initial basis for this section of the plan. In 2007, the *Park County Community Wildfire Protection Plan* (CWPP) was completed. The US Forest Service, the Colorado State Forest Service, the US Bureau of Land Management and the Coalition for the Upper South Platte all participated in its preparation. Because it focused only on Park County instead of the entire state of Colorado, the CWPP provided a more detailed view of wildfire risk in Park County than did the WRA. The CWPP identified a number of locations outside of the “red zones” that also have high potential for wildfire. Some of the key findings of CWPP the will be discussed later in this chapter.

Figure 4-10



4.4.1.1 Hazard History

During a “typical” year, about 1,600 wildfires consume a total of 8,000 to 10,000 acres of forest and grassland in the State of Colorado. Some years are not “typical”. In 2002 Colorado saw the worst wildfire season in its history, with 3,072 wildfires burning over 600,000 acres – the most acreage in the nation following Alaska, and Oregon. 380 houses and 624 outbuildings were lost. Insurance claims reached \$79.3 million and firefighting and emergency rehabilitation efforts exceeded \$200 million.

Based on the data obtained from the CSFS, between 1978 and 2005 there were over 46,000 wildfire incidents in Colorado.

Table 4-5

COLORADO WILDFIRES
STATE AND PRIVATE LANDS

Calendar Year	Protected Acres	Number Wildfires	Acres Burned	Fires/MM Ac. Prot.	Ac. Burned/MM Ac. Prot.
1978	23,415,936	362	13,085	15.5	558.8
1979	23,415,936	869	3,139	37.1	134.1
1980	24,484,755	1,724	18,828	70.4	769.0
1981	25,958,109	1,537	9,835	59.2	378.9
1982	25,958,109	1,127	10,184	43.4	392.3
1983	25,958,109	831	11,752	32.0	452.7
1984	25,958,109	631	12,913	24.3	497.5
1985	25,958,109	985	25,343	37.8	976.3
1986	25,958,109	1,337	30,247	51.5	1,165.2
1987	25,958,109	1,194	24,208	46.0	932.6
1988	25,958,109	1,722	33,037	66.3	1,272.7
1989	25,958,109	1,767	56,732	68.1	2,185.5
1990	25,958,109	1,475	9,825	56.8	378.5
1991	25,958,109	1,449	6,576	55.8	253.3
1992	25,958,109	1,048	4,158	40.3	160.1
1993	25,958,109	1,267	3,526	48.8	135.8
1994	25,958,109	3,158	52,125	121.6	2,008.0
1995	25,958,109	2,224	32,011	85.7	1,233.2
1996	25,958,109	2,499	49,498	96.3	1,906.8
1997	25,958,109	1,605	16,703	61.8	643.5
1998	41,432,979	1,349	10,282	32.6	248.2
1999	41,432,979	1,987	33,256	48.0	802.6
2000	41,432,979	2,043	76,288	49.3	1841.2
2001	41,432,979	2,966	45,816	71.6	1105.8
2002	41,432,979	3,409	244,252	82.3	5895.1
2003	41,432,979	2,471	23,308	59.6	562.5
2004	41,432,979	1,826	15,239	44.1	368.1
2005	41,432,979	2,014	14,446	48.6	348.7

Over the last 30 years more than 770 fires have occurred on National Forest and BLM lands in Park County, or an average of 25 per year. During this same time period 23,500 acres have burned on National Forest and other public lands within Park County. The most recent fires to affect Park County were the High Meadow Fire of 2000, The Snaking, Black Mountain and Hayman Fires of 2002 and the Campbell Fire of 2003. The table below lists those fires, the dates they ignited, and their location.

Table 4-6 Wildfires

Name of Fire	Ignition Date	Location	Total Acres Burned
High Meadow Fire	June 12, 2000	Northeast Park County and Jefferson County	11,000
Snaking Fire	April 23, 2002	Behind Platte Canyon High School	2,590
Black Mountain Fire	May 5, 2002	Northeast corner of Park County	345
Hayman Fire	June 8 th , 2002	Ignited 4 miles Northwest of Lake George (in Park County), burned in Park, Teller, Douglas and Jefferson Counties	137,760
Campbell Fire	July 8 th , 2003	15 miles northeast of Guffey	505

One of the worst wildfires in Colorado history, the Hayman Fire, ignited in eastern Park County and burned nearly 138,000 acres from June 8th-28th, 2002, (including 60,000 acres on June 9th alone) in Park, Teller, Jefferson and Douglas Counties. It thrived in dry forests that had become overpopulated with trees and undergrowth. Some of the greatest challenges in fighting this particular fire were the acute drought conditions existing in 2002, extreme weather events at the beginning of the fire, (winds of 20-50 mph coupled with 5% relative humidity) and the prevalence of crown fire and long-range spotting. These factors led to numerous breaches of firebreaks and treatments during the Hayman Fire.

4.4.1.2 Hazard Profile

A generic wildfire hazard profile makes it easier to assess the risk of the occurrence of wildfires at a given location, and the risk of those wildfires causing adverse impacts at that location. This profile assesses the **ignition risk** (likelihood of fire starts), **fuels hazard** (fire behavior parameters, primarily intensity and rate of spread), **values at risk** (what might burn), and the **likelihood of values at risk being impacted by a wildfire** (availability of fire suppression resources and response times, accessibility to homes, construction and defensible space of homes, and other factors to evaluate the wildfire hazard to identified communities, subdivisions, or other developments).

Ignition Risk is the likelihood of a fire actually starting in a given area. This is a function of many items, including lightning occurrence, weather patterns, population and amount of human activity, access to wildland areas, vegetation types, arson occurrence, and others. Increased development and population in the wildlands, as well as the amount of human activity in those wildlands are also increasing the risk of fires occurring. While historical wildfire data may be an indication of how likely a wildfire occurrence may be, it is not a factor that causes a fire.

Ignition risk can be broken into two categories of factors, natural factors and manmade factors.

- Natural Factors
 - Weather factors – These include drought conditions and the likelihood of a thunderstorm occurring. Wildfire ignition risk increases significantly in times of drought.
 - Vegetation types and conditions – Vegetation types and conditions such as forest infestation from beetle kill or other diseases influence ignition risk.
- Manmade Factors
 - Population density - An overwhelming majority of wildfires. As population increases, the more opportunities for wildfire ignition exist. There has been an increase in people living in the wildland-urban interface, as well as an increase in

use of the forest for recreational purposes, due to the population growth in Colorado. Human Behavior – Humans intentionally or unintentionally start most wildfires. Human actions could be smoking, campfires, arson, or careless use of equipment.

- Distance to Roads – Travel corridors increase the probability of human presence, which in turn can result in increased potential for wildfire ignition. Hence, areas of the County that are in close proximity to roadways have a higher probability of wildfire.
- Railroad Buffer – Railroad operations can produce sparks that may ignite a wildfire.

Fuels Hazard is based on the type of fire behavior that could result if a fire occurs and spreads in the vegetation type or “fuel bed” that exists at a given location. The primary characteristics that define fire behavior are flame lengths (fire intensity), rate of spread (how fast it moves), and what type of general fire behavior (surface fire only, surface fire with torching, or crown fire). These characteristics are a function of the type of fuels, weather that can occur, and the topography in the areas of concern. They are important because they indicate how quickly a fire could reach areas of concern, how difficult it will be to fight and what type of equipment is needed, and what kind of damage and effects it can cause.

Defining the fuels hazard and the resultant fire behavior that would be anticipated from that fuels hazard is important because it indicates how quickly a fire could reach areas of concern, how difficult it will be to fight and what type of equipment is needed, and what kind of damage and effects it can cause. Fire behavior is affected by a number of attributes of area being burned and conditions at the time of the fire.

- Land Cover – The potential fuels covering the land at risk (e.g. grasses, crops, forest, urban development, etc.) determine the ease of ignition, as well as the burn intensity and advancement opportunities.
- Vegetative Conditions – The health of the forest and the specific mixture of species will have an effect on how the fire burns and how rapidly it spreads. Alterations in vegetation composition and structure caused by fire suppression, land use changes, long duration droughts, and insect and disease epidemics generally create a greater risk of high intensity and damaging fires.
- Topography – Through convective pre-heating, wildfires generally advance uphill. In general, the steeper the slope, the greater the ease of wildfire advancement. The mountainous terrain (i.e. steep slopes) of the County is conducive to the advancement of wildfires.
- Slope Orientation – Slopes that generally face south receive more direct sunlight, thereby drying fuels and creating conditions more conducive to wildfire ignition.
- Weather Conditions – Wildfire risk increases significantly in times of drought. In the

case of a wet spring followed by a dry summer, dense, dry forest undergrowth can contribute to increased fire intensity as well. Temperature, wind, atmospheric humidity and precipitation conditions greatly influence fire behavior.

- Triangle Factors - Wildfires require three components to ignite and burn; fuel to burn, oxygen and heat to bring any fuel up to an ignition temperature. The fire triangle is the combination of these three factors. The basis for effective fire-fighting consists of eliminating one or more of these factors.

Values-at-risk is an assessment of which items that are important to people and communities, as well as natural resources, could be lost or negatively impacted by a wildfire. These include many items, such as homes, businesses, and other developments, infrastructure, air sheds, watersheds, recreation areas, utilities, wildlife habitat, etc. The more of these values there are, and the greater their importance to people and communities, the more the potential risk.

- Infrastructure – This includes roads, utility lines, and railroads
- Property – This includes homes, private land, livestock and agriculture holdings.
- Critical Facilities – This includes important government facilities including hospitals, police and fire facilities, schools, and any other facilities deemed essential by the County
- Watersheds – Wildfires can affect water quality and will significantly increase the risk of flooding and debris flows in the wake of a wildfire event.

Likelihood of Values at Risk Being Affected by Wildfire – Given that a fire has started, that it is behaving dangerously, that there are values at risk, it is possible to determine the likelihood that those values will actually be affected by the fire. Characteristics such as local firefighting capacity, response times, accessibility to subdivisions or other values, structure design, defensible space, fuel treatments, etc. define this likelihood.

- Availability of Suppression Resources – Suppression resources include manpower, hand equipment, vehicles, and aircraft with fire retardant or water.
- Response Times – How quickly people and equipment can get to a fire. Wind and precipitation conditions can affect the ability to combat fires with air tankers and helicopters.
- Construction Materials – The flammability of the materials used to build any values at risk will determine its risk of being affected by a wildfire.
- Water Sources – Helicopters, air tankers and tanker trucks depend on water sources such as streams, lakes and ponds.
- Accessibility to Values at Risk - Steep slopes are a detriment to fire fighting efforts because of the difficulty in accessing and transporting firefighting equipment to wildfire sites. A road's driving condition, its width, its grade and the radius of turns will all affect accessibility of vehicles to combat a fire.

Additional information about hazard profiles, as well as other items, is available in the Park County Community Wildfire Protection Plan (CWPP)

Wildfires can be described as either a wildland fire or a wildland-urban-interface (WUI) fire. The former involves situations where wildfire occurs in an area that is mostly undeveloped except for the possible existence of basic infrastructure such as roads and power lines. A wildland-urban interface fire is a wildfire that impacts an area that includes structures and other human developments. In WUI fires, the fire is fueled by both naturally occurring vegetation and the urban structural elements themselves. According to the National Fire Plan issued by the U.S. Departments of Agriculture and Interior, the wildland-urban interface is defined as "...the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildlands or vegetative fuels."

Over the years, many of Colorado's forests, primarily in the mid-elevation zones populated by ponderosa pine and Douglas Fir, have become denser, making them more susceptible to insect and disease infection and crown fires. In many locations they have also accumulated significantly greater levels of surface fuels.

Historically, these types of forests burned on a relatively short interval (10 to 40 years), with low to moderate intensities. Fire suppression has been the primary tool in combating past wildfires in Park County. As a result, forests have seen relatively unfettered growth of trees and underbrush. This has resulted in significant increases in fuels for fire. Fire suppression, historical logging and grazing practices, as well as many other changes in land use since the turn of the 19th century, have created conditions where there is a much greater potential for larger and higher intensity fires.

Drought conditions greatly increase the risk for wildfire in the arid Inter-Mountain West and specifically in Park County. A prolonged period of higher temperatures and decreased precipitation leads to adversely dry trees and forest undergrowth. Drought also exacerbates other problems like changing fuel conditions, beetle kill and other diseases. Oftentimes in years of drought, snowpack will melt away earlier than normal and leave forests dry and vulnerable for a longer period of time. Such conditions led to 2002 being one of the worst fire seasons in Park County and across Colorado on record. Such conditions will affect even the County's highest elevation areas that normally see low wildfire risk.

Another emerging risk for forests is pine-beetle. Many areas in Colorado, including the Arkansas Valley, as well as Jackson, Grand, Routt, Eagle and Summit Counties, have

experienced mountain pine beetle epidemics. Other insect or diseases are also occurring in many locations in Colorado. Though Park County has not seen beetle infestations to the same degree as the aforementioned areas, some beetle kill has begun to spread over the continental divide from Summit County as well as areas in and around Bailey. Trees killed by pine beetle are particularly susceptible to crown fires and add to surface fuel loading as they fall.

Fire Seasons

The Colorado wildfire season is highly variable depending on elevation. Low elevation grasslands, western valleys, and Front Range plains can have fires year round. The wildfire risk in the higher elevation areas that are forested is primarily driven by the summer monsoons. Those areas tend to have a split fire season. High fire danger can occur in the spring and early summer ahead of the monsoon, and then again in the fall as the summer rains end. The spring and fall also typically have the windiest conditions.

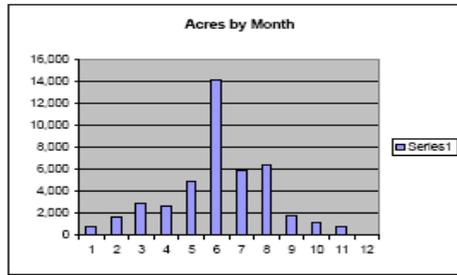
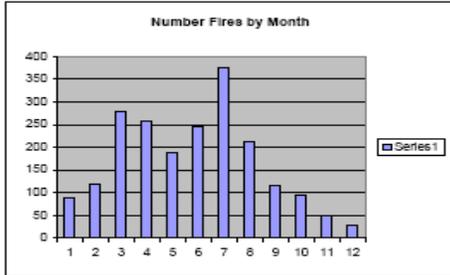
The highest elevations, such as those found in northwestern Park County, generally have a very minimal fire season. The forest doesn't have time to dry out between snow melt out and the monsoons. It normally takes a drought year with limited snowpack or a late or minimal monsoon to create conditions for high fire dangers at these elevations.

As fire activity fluctuates during the year from month to month, it also varies from year to year. Historically extended periods of drought and hot weather can increase the risk of wildfire. During years with adequate rain and snowfall amounts fire occurrences are generally low; during other years, when there are extended periods of warm, dry, windy days, increased fire activity is exhibited. Wet years can grow extensive amounts of grass fuels that can increase fire hazard later in the same year or during the next year.

Long-term climate trends as well as short-term weather patterns play a major role in the risk of wildfires occurring. Long-term droughts create conditions conducive to significant fires at the higher elevations and exacerbate conditions at lower elevations in the county. They make overall fire occurrence more likely, larger fires more likely, and make it more difficult to control and suppress fires. Short-term heat waves along with periods of low humidity can also increase the risk of fire, while high winds directed at a fire can cause it to spread rapidly. Particularly in the lower elevations, extended periods of hot, dry, windy weather can create the potential for problem fires. Some ongoing wildfire research has tried to establish a link between climate change and increased wildfire risk.

Table 4-7

COLORADO STATE AND PRIVATE LAND FIRES 1990 - 2003 YEARS												
	MONTH											
	1	2	3	4	5	6	7	8	9	10	11	12
14 year average number per Month	90	120	278	257	189	246	374	213	117	94	51	30
14 year average acres per month	801	1,609	2,874	2,711	4,853	14,164	5,913	6,420	1,809	1,189	826	42



4.4.1.3 Current Identification of Wildfire Hazards

Park County has considerable mapping showing which particular portions of the county have experienced historic wildfires. In addition, there are general maps and specific maps showing which portions of Park County face the greatest risk of being impacted by future wildfires. As part of the CSFS statewide *Wildfire Risk Assessment (WRA)*, the risk of wildfire in Park County was identified at a general level. In 2007 the county CWPP was completed, based on more detailed analyses focusing only on Park County. The CWPP process identified the specific areas of the county that are the most vulnerable to wildland fire. In some cases the results of the CWPP were similar to those of the WRA, while in other cases the CWPP indicated new hazard areas besides the “red zones” from the WRA. The county’s GIS department will soon use the mapping produced for the CWPP as a starting point and enhanced it to examine further the possibility of correlating the risk of future wildfires to particular locations in the county.

4.4.2 Severe Winter Storms

Severe winter storms and blizzards are extra-tropical cyclones that originate as mid-latitude depressions (FEMA, 1997). Snowstorms, blizzards, and ice storms are the most common examples. These storms can bring heavy snowfall, high winds, ice, and extreme cold with them. Historically, winter storms in south central Colorado have produced significant snowfall and high winds often causing blizzard or whiteout conditions.



4.4.2.1 Hazard History

Severe winter storms, including late spring snowstorms are common in Colorado. From January 1 to January 6, 1949, one of the most severe blizzards of record occurred in the Great Basin, middle Rockies, and northwestern Great Plains. Snowfall from 7 to more than 30 in. (41-in. state record at Chadron, Nebr.); winds 40 to 70 mi/h, snow drifted badly and reduced visibility to less than 5 feet most of 3rd and 4th in many areas, especially at Rapid City, South Dakota. Temperatures were below zero. Roads were blocked; farms, towns, and livestock isolated by deep snow and drifts 10 to 30 ft high. Airlift brought medical supplies and food to isolated communities and hay to starving livestock. Deaths: 12 in Wyoming, 7 in Colorado, and 20 in Nebraska. Expenditures were made for relief operations, and for opening and reopening roads ran to millions of dollars. Livestock losses were heavy -- in excess of \$9 million in Wyoming alone. Statewide, heavy snow/blizzards occurred on 11/17/75; 12/23/82; and 3/14/83 (SHELDUS).

In April 2001, a severe storm caused over \$4 million in damages to rural electric power lines and poles. Thousands of homes were without power for several days. The October 1997 blizzard dumped as much as 31 inches of snow on parts of metro Denver. (2001 *Colorado Hazard Mitigation Plan*). On May 3, 2001, a strong storm dumped snow on many parts of the state. Wind chill temperatures plunged below zero. Winds knocked out power compounding the effects of the cold.

Two of the past three Presidential disaster declarations in Colorado have been related to severe winter weather. Besides those two recent declarations, there have been other Presidential disaster declarations for severe winter weather in Colorado as well. In April 2001, the state experienced severe winter storms and received a Presidential disaster declaration. In 2003, the state received a Presidential declaration for snow emergency for the snowstorms of March 17 through 20. Twenty-nine counties requested assistance

and the state and local governments received \$6.2 million in federal funds through the public assistance program. On January 7, 2007, the State of Colorado received two winter weather-related Presidential emergency declarations. Although it did not result in a Presidential Disaster Declaration, in October 1997, the state declared an emergency for severe winter weather/snowfall.

The winters of 2006-2007 and 2007-2008 have been particularly harsh in Park County. On December 20th, 2006, an upslope snowstorm moved into Colorado's plains-foothills-mountains interface from the east and dropped more than a foot (in some areas more than 2 feet) of snow on the I-25 Front Range corridor, and on mountain areas of the state, including parts of Park County. On December 28th and 29th, 2006, another powerful front moved through Colorado, depositing more snow on the Front Range and the central mountains. The combination of heavy snowfall and high winds left residents in some portions of Park County stranded and unable get supplies such as food, essential medications and propane. Livestock was also affected as residents could not access some of their herds and get them food. The following are excerpts from letters written to the Park County Emergency Management office regarding citizens' experiences during the Holiday Blizzards of 2006.

"During our recent blizzard I was stranded in my home for 3 days. I made a phone call to road and bridge to ask them when they would be getting to our area to plow the road. I was told that they would not be coming back here because their equipment was not able to move the snow. I explained to the man that I was disabled, and it was imperative that I had access out of my home because I needed to get to my medication. He apologized and told me that he would not be able to help, but informed me that my rancher neighbor was using his backhoe to dig a path to county road 68. He also told me I could call the sheriff's office so they could find a way to get me my meds...If he can't get to me how did he figure the sheriff could? I hung up feeling dismayed and fearful."

-Citizen Letter 1

"Elk Falls Ranch had a number of problems... a number of residents were snow-bound for 3 to 4 days. Although the roads were plowed, driveways had up to 4-foot snowdrifts...After the snowstorm the following week, December 28, 2006, many of our residents were once again snowed in and had contracted to have their driveways plowed...Some of our residents had to leave their vehicles at the bottom of the mountain and walk as much as 3/4 mile back to their homes... The cost to Elk Falls Ranch property owners for snow plowing during these two storms was approximately \$10,977.50. Jefferson County is eligible for emergency federal financial assistance due to the extremely snows. Our residents on the Park County side of this development had the same problems as our Jefferson County property owners. It seems reasonable that Park County also be eligible for the same emergency assistance."

-Citizen Letter 2

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“One client was fortunate that a neighbor plowed her road several times so she could go to medical appointments, but even so she had to cancel her appointments several times when she really needed treatment. This client had to be Life-lighted out of her home and taken to Memorial Hospital in Colorado Springs as emergency services were unable to drive up her driveway due to severe weather conditions. Drifts were so high that the emergency personal (sic) had difficulty even walking up to answer the 911 call.”

-Citizen Letter 3

“Unfortunately, the wind speeds in excess of 80 miles an hour took the snow and literally buried our roads making them impossible to clear with our normal equipment. We were not able to “dig ourselves” out until this week for total access to the facilities. Fortunately, there was no loss of life.”

-Citizen Letter 4

The Park County Emergency Director described the latter part of that winter as follows:

The remainder of the 2006-2007 winters was very wet with heavy snowfall. Due to the amount of snow during the blizzards in December and January, it was difficult to catch up the remainder of the season.

With the development of a La Nina in the fall of 2007, forecasters predicted a moderate to dry winter in 2007-2008 for the Southwestern United States, including Colorado. La Nina is a system of cool water in the tropics of the Pacific Ocean, which appears to influence weather in other places, including North America. The forecasters were relying on scientific research of historic climate data that has examined the potential correlation between the existence of a La Nina and climatic conditions in Colorado. Colorado’s climate history showed that generally the state experiences drier than normal winters during a La Nina. For example, during the last La Nina, in the winter of 2000-2001, snowpack levels in Park County were well below normal. Levels in the South Platte Basin in 2000-2001 were roughly 70% of normal and levels in the Arkansas River Basin were around 81% of normal. Snowpack levels across the state of Colorado were below normal that year, with most basins below 85% of normal.

Instead of the predicted “moderate to dry winter”, as the winter of 2007-2008 progressed, snowfall levels throughout the state were significantly above normal. Throughout the months of January and February 2008, Park County was subject to frequent heavy snowfall, coupled with hurricane force winds, sometimes in excess of 110 miles per hour. The Park County Emergency Director provided the following description:

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The winter of 2007-2008 was different than previous years because of the wind. We had heavy snow like the year before, but because of 100 mph winds that were constant for over 6 weeks, many roads were forced closed and could not be reopened. The wind did not settle until mid February and by then a large percentage of roads had been closed. Some citizens were snowed in or out of their homes for several weeks.

Because of the constant inclement weather, the county did not have sufficient equipment and manpower to plow all of its roads and provide access to stranded residents and motorists. On Monday, February 11th, 2008, after a third activation of the emergency operations center to deal with stranded motorists and residents, the Park County Emergency Manager, in conjunction with emergency responders and other county officials, declared a state of emergency.

By February 11th, more than 600 miles of road were buried. Roads that Park County Road and Bridge plowed would quickly be rendered inaccessible due to the sustained winds. Snowdrifts were reported as high as 24 feet in the Como area, and were between 8 and 12 feet in the Town of Fairplay. Some drifts were 25 feet wide and the sustained winds rendered some of them so hard that the county's equipment had difficulty plowing the snow/ice mixture. Many residents found themselves trapped in their homes, unable to get food, medication, propane and other essential items. A few residents were unable to get to their homes and needed emergency shelter. 911 dispatch informed the Emergency Manager that they were receiving 40-60 calls daily from stranded residents. After declaring a state of emergency, the county opened a phone bank to reach stranded citizens. It was quickly determined that nearly 250 residents were trapped in their homes.

To address the overwhelming needs, Park County requested and received aid from other counties in the immediate area and around the state, as well as from state agencies, including the Colorado Department of Transportation and the Colorado Department of Corrections. The Colorado Division of Emergency Management provided more comprehensive communications equipment to accommodate the added manpower and the large operation area. Two simultaneous operations took place; one to get food, medication and propane to stranded residents through search and rescue teams using snowmobiles, and the other to plow roads as quickly as possible.

On Friday, February 15th, feeding operations for stranded livestock took place. That day, wireless and landline telephone service malfunctioned due to a failure at a Qwest facility. Crews requested help from the Civil Air Patrol to determine locations of livestock in need of food. Communications service remained cut off throughout the weekend.

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Despite the communications failure, the county was able to begin demobilizing some crews on February 15th, due to the fact that most priority areas of the emergency had been addressed. Several crews stayed through the February 16th-17th weekend to continue Road and Bridge operations. When the state of emergency was lifted on February 19th, crews had managed to clear more than 90% of the 600 miles of roads. Even with the generous donations of equipment and manpower, the initial costs to the county are estimated at around \$225,000.

The Park County Emergency Director described problems that extended until May 2008:

After the end of the disaster declaration in February 2008, most roads were opened. But due to intense winds and blowing snow, some roads closed again for the winter. We continued to have heavy snow throughout the winter into April and May, but with spring came the melt that was needed to allow citizens access to all areas of the county.

Historic winter storm information for Park County is listed in below.

Table 4-8
(SHELDUS)

DATE
12/28/2006
12/20/2006
3/17/2003
2/8/1995
2/1/1989
10/15/1984
11/26/1983
5/16/1983
3/4/1983
12/23/1982
3/10/1977
11/17/1975

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Table 4-9: Average Monthly Total Snowfall (inches), Bailey CO

Month	Jan.	Feb	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov	Dec.	Annual
Avg. High Temp	39.5	42.3	47.2	54.8	64.0	74.8	79.6	77.2	71.3	61.3	47.2	40.3	58.3
Average Low Temp	8.7	10.4	15.9	23.0	31.0	37.9	43.8	42.3	34.0	24.7	16.1	9.8	24.8
Average Snowfall (In.)	7.3	9.1	16.5	14.8	3.8	0.3	0.0	0.0	1.6	6.6	10.1	9.0	79.2
Average Snow Depth (In.)	7	8	6	2	0	0	0	0	0	0	3	6	3

Table 4-10 Average Monthly Total Snowfall (inches), Lake George, CO

Month	Jan.	Feb	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov	Dec.	Annual
Avg. High Temp	32.3	35.9	42.5	50.7	60.8	71.0	76.3	73.5	67.3	57.4	42.7	33.4	53.6
Average Low Temp	-0.7	2.5	12.9	22.6	31.9	39.7	46.1	44.9	36.5	26.1	14.7	2.9	23.3
Average Snowfall (In.)	5.7	6.2	12.6	10.9	2.9	0.2	0.0	0.0	1.3	5.3	6.5	7.8	59.6
Average Snow Depth (In.)	2	2	2	1	0	0	0	0	0	0	1	2	1

4.4.2.2 Hazard Profile

The State of Colorado experiences severe winter storms each year and the mountainous areas of the state regularly experience several severe snowstorms each year. These storms can produce between 4 and 12 inches (or more) of snow from each event. Total average annual snowfall within the County varies from month to month and from region to region.

In addition to snow, winter storms can also bring sleet and freezing rain to the area. Sleet is generally described as frozen water particles that fall in the form of ice, while

freezing rain falls as super cooled water which can freeze on impact with the ground, trees, or roadways. In its most severe form, freezing rain can fall as part of an ice storm that can coat the area with a layer of ice up to 2" thick. Ice storms can cause significant damage by snapping tree limbs and bending trees to the ground. These fallen limbs and trees can completely block roadways, cut access to certain areas of the County for days, and interfere with and destroy overhead utility lines. The county is also prone to winter ground blizzards in which wind and snow combine to cause drifting, "whiteout" visibility conditions, dangerous or impassible driving conditions, and hazards to the safety of humans and livestock.

4.4.2.2.1 Predictability and Frequency

The National Weather Service tracks winter storms by radar. Based on this radar information, as well as models, the National Weather Service provides up-to-date weather information and issues winter storm watches to indicate when conditions are favorable for a winter storm and winter storm warnings if a storm is actually occurring or detected by radar. On average, south central Colorado will experience between one and two severe winter storms in a given year. Snowfalls amounts for these storms can vary from a few inches to more than a foot of snow in some cases. The higher elevations of the County can experience several feet of snow in a severe winter storm.

Longer-term forecasting of severe winter weather in Colorado has proven to be challenging. The winter of 2007-2008 is a good example of those challenges. According to the February 14th, 2008, issue of The Denver Post,

"Wolter and NOAA both forecast a drier-than-average winter in most Colorado. AccuWeather Inc. did the same, citing similar reasons: A La Nina weather system of cool, equatorial Pacific water had set up in the tropics last fall.

Generally La Nina years bring dry and warm weather to Colorado in the fall and spring, and variable winters tend to be close to average.

La Nina winters have almost always brought drought like conditions to the Southwest, as the jet stream ferries storms farther north."

Clearly the correlation between La Nina conditions and other ocean temperature conditions and winter weather in Colorado is a complicated matter and scientific research will need to continue. While long range forecasting should not be abandoned, it should be performed carefully and its findings should be utilized with appropriate awareness of its limitations and complications. Quoting again from February 14th issue of The Denver Post,

“...weather experts say they’re struggling to understand why the snow just keeps falling....

‘The polar jet stream has been on steroids. We don’t understand this. It’s pushing our limits, and it’s humbling,’ said Klaus Wolter, a meteorologist with the National Oceanic and Atmospheric Administration and the University of Colorado at Boulder.

‘Maybe global changes are pulling the rug out from underneath us. We may not know the answer for 10 years...but one pet answer is that you should get more variability with global change.’”

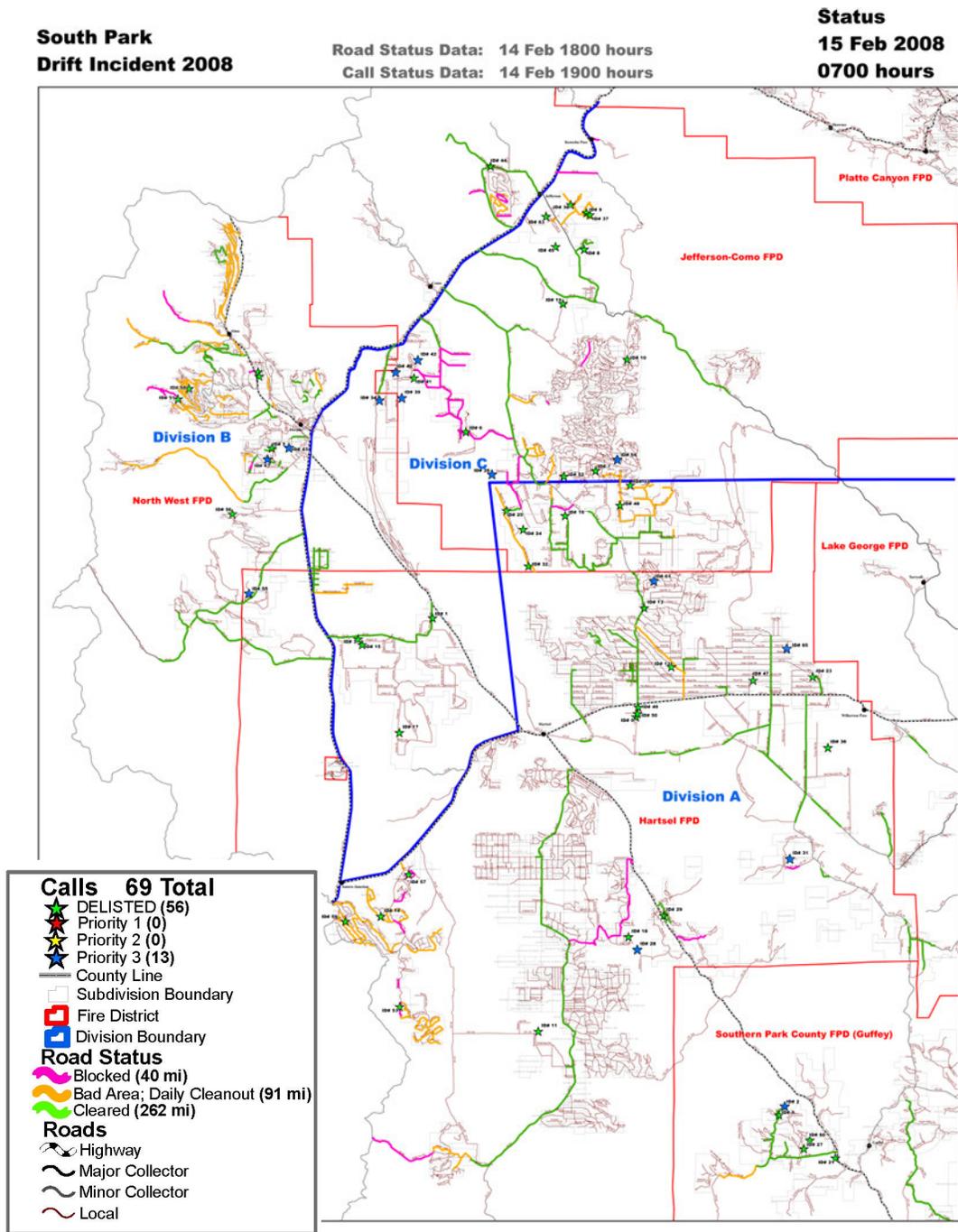
4.4.2.3 Current Identification of Severe Winter Weather Hazards

Park County has experienced historical severe winter weather events. The Park County GIS department mapped locations where drifting of snow was a significant problem during the winter of 2007-2008. This mapping is shown in *Figure 4-11* below. Aside from this initial mapping, there are currently no maps showing which specific portions of the county were affected by historic severe winter weather events in other years. Likewise, there are currently no detailed maps showing which portions of Park County could potentially be impacted at a future point in time by severe winter weather events.

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Figure 4-11



4.4.3 HAZMAT

Hazardous materials can include explosive, flammable, combustible, corrosive, oxidizing, toxic, infectious, and radioactive materials that are involved in an accidental or intentional release causing danger to the general public. However, a spill of benign materials can still be deemed hazardous if those benign materials (e.g. beverages or non-toxic materials) cause a danger to persons in the immediate area of the spill. Hazardous material events also can be caused by natural hazards such as earthquakes and floods.

4.4.3.1 Hazard History

The Colorado Department of Transportation indicates that roughly 10-15% of vehicles on Park County's major highways are single or combination axle trucks. While no major incidents were reported to the National Response Center from 2005- October of 2007, the county remains constantly vulnerable to hazardous materials spills. The most recent event recorded by the National Response Center was a tanker truck accident on May 20th, 2004. The accident occurred on US Highway 285 near Bailey. Nearly 7,000 gallons of petroleum product discharged onto the highway and ignited, closing both directions of 285 for a significant period of time. Park County EMS and Fire responded and reported the driver as a casualty. No waterways were affected in this incident, but the highway's proximity to the North Fork of the South Platte River means that similar incidents on that stretch of highway could have much more severe consequences.

4.4.3.2 Hazard Profile

A hazard material spill or release may come from either fixed facilities or mobile containers. The duration of the event can last for hours or even days. Chemicals may be corrosive or otherwise damaging over time. Explosion and/or fire may be subsequent. In addition, contamination may be carried out of the incident area by persons, vehicles, water, and wind.

The magnitude of a hazardous material event is directly related to the amount of materials released, and the speed and efficiency of which emergency and cleanup crews respond. Another important factor is what form the spill is in. Solid state spills are typically the easiest to clean up and control, followed by liquid and gaseous state spills. Liquid state spills require rapid response if they are to be contained, and if they infiltrate a watershed, steps must be taken to monitor the influence downstream. Gaseous state spills are almost impossible to contain, and depending on the volume, usually require evacuations down wind.

According to the United States Department of Transportation, highway incidents were responsible for 87% of the total United States hazardous material spills over the last 10 years. Damages from highway incidents alone accounted for \$365,677,814 over that period of time. Park County does not have any industrial chemical facilities meaning that all Hazardous Materials incidents would occur on the county's highways.

4.4.3.3 Current Identification of HAZMAT Hazards

While Park County has experienced historical HAZMAT events, there are currently no maps showing which specific portions of the county were affected by historic HAZMAT events. Likewise, there are currently no maps showing which specific corridors in Park County could potentially be impacted at a future point in time by HAZMAT events. The Park County Office of Emergency Management has identified the US Highway 285 Corridor, the US 24 Corridor and the State Highway 9 Corridor as the HAZMAT Corridors of concern in the county. Park County GIS has already created numerous maps that already display these corridors, so no specific "HAZMAT Corridor" mapping was created as part of this plan.

4.4.4 Flooding

While there is no official record of major flooding events in Park County, the County always faces significant potential for flooding hazards. The County is surrounded by mountains, with steep ridges and pronounced valleys and includes the headwaters of one of Colorado's most significant watersheds, the South Platte River, as well as two other significant watercourses. The county includes Front Range foothills in the northeast, mountains as high as more than 14,000 feet in and adjacent to the Continental Divide in the north and west. Flooding can be caused either by severe rainstorms or mountain snowmelt.

4.4.4.1 Flood Hazards of Individual Watersheds

The specific flood hazard areas in each of the major watersheds in Park County are described in more detail in the Risk Assessment (Section 4.5.4). A brief description is provided below.

4.4.4.1.1 Elk Creek Basin

Elk Creek and its tributaries are particularly susceptible to flooding between the Mt. Evans Wilderness and Harris Park, with residential development along the main stem of Elk Creek and several of its tributaries. The Elk Creek Basin has not been studied in detail as part of a FEMA Flood Insurance Study.

4.4.4.1.2 Deer Creek Basin

Deer Creek and its tributaries are particularly susceptible to flooding from Highland Park, beyond US Highway 285, all the way to the confluence of Deer Creek with the North Fork of the South Platte River near the Park County-Jefferson County line, with residential development along the main stem of Deer Creek and several of its tributaries. The Deer Creek Basin has not been studied in detail as part of a FEMA Flood Insurance Study.

4.4.4.1.3 North Fork South Platte Basin

The North Fork of the South Platte and its tributaries are particularly susceptible to flooding in the corridor between Grant and Bailey along US Highway 285, with residential and commercial development along the main stem of the North Fork and several of its tributaries. The North Fork Basin has not been studied in detail as part of a FEMA Flood Insurance Study.

4.4.4.1.4 Tarryall Creek Basin

Tarryall Creek and its tributaries are particularly susceptible to flooding in the corridor between the developments just north of US Highway 285 in the vicinity of Jefferson and Como all the way to Tarryall Reservoir, with development along the main stem of the Tarryall Creek and several of its tributaries. The Tarryall Creek Basin has not been studied in detail as part of a FEMA Flood Insurance Study.

4.4.4.1.5 Middle Fork South Platte Basin

The Town of Alma and the Town of Fairplay are both entirely contained within the Middle Fork of the South Platte Basin. The description for this basin has been split into three sections, one for unincorporated Park County, and one each for the two towns.

Middle Fork South Platte River (unincorporated Park County)

The Middle Fork of the South Platte and its tributaries within unincorporated Park County are particularly susceptible to flooding in the corridor between Hoosier Pass and the Town of Fairplay along State Highway 9 and several county roads, with residential and commercial development along the main stem of the Middle Fork and several of its tributaries. The Middle Fork Basin has not been studied in detail as part of a FEMA Flood Insurance Study.

Middle Fork South Platte River (Alma)

The Middle Fork of the South Platte and Buckskin Creek within the Town of Alma are susceptible to flooding, with residential and commercial development along the main stem of the Middle Fork and Buckskin Creek. The Middle Fork Basin has not been studied in detail as part of a FEMA Flood Insurance Study.

Middle Fork South Platte River (Fairplay)

The Middle Fork of the South Platte and various dry gulches within the Town of Fairplay are susceptible to flooding, with residential and commercial development along the main stem of the Middle Fork and various dry gulches. The Middle Fork Basin has not been studied in detail as part of a FEMA Flood Insurance Study.

4.4.4.1.6 South Fork South Platte Basin

The South Fork of the South Platte River and its tributaries are particularly susceptible to flooding in the corridor between the US Forest Service's boundary with private property and State Highway 9 and the corridor between Antero Reservoir and Hartsel, with a moderate amount of development along the main stem of the South Fork and some of its tributaries. The South Fork Basin has not been studied in detail as part of a FEMA Flood Insurance Study.

4.4.4.1.7 South Platte River Basin

The South Platte River and its tributaries are particularly susceptible to flooding in the Hartsel area and the Lake George area, with a moderate amount of development along the main stem of the South Platte and some of its tributaries. The South Platte Basin has not been studied in detail as part of a FEMA Flood Insurance Study.

4.4.4.1.8 Arkansas River Headwaters Basin

The Arkansas River Headwaters Basin and tributaries are particularly susceptible to flooding in the Guffey area, with a small amount of development along the main stems of two of the major tributaries, Badger Creek and Currant Creek, and tributaries to those streams and to Four Mile Creek. The Arkansas Headwaters Basin has not been studied in detail as part of a FEMA Flood Insurance Study.

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4.4.4.2 Hazard History

The descriptions of the eight individual watersheds in the county are provided in the previous section. Since the documented history of flood events in Park County is so limited, no basin-specific flood history has been provided to accompany the basin descriptions.

Floods are the most common and widespread of all natural hazards. Some floods develop slowly, but flash floods can happen in just minutes. Flood prone areas have been identified in 267 cities and towns and in all of the 64 counties in Colorado.

Over 250,000 people are living in Colorado's floodplains. There are estimated to be 65,000 homes and 15,000 commercial, industrial, and business structures in identified floodplains. There are likely many more structures located within unmapped flood hazard areas. The value of the property, structures, and contents located in the identified floodplains is estimated to be over 11 billion dollars (1996).

Average annual flood losses in Colorado are estimated to be \$17,600,000 in property damage based on data from 1896 to 1984.

Documented history of flood events in Park County is minimal. A summary of recorded flood events in Park County was compiled from the Spatial Hazard Events and Losses Database for the United States (SHELDUS), as follows:

Table 4-11 Flooding Events

Date	Hazard Type	Injuries	Deaths	Property Damage (\$)	Crop Damage
7/28/1982	"Flooding, Severe Storm/Thunder Storm"	0	0	7142.86	0
6/7/1979	Flooding	0	0	793.65	\$172,413

SHELDUS did not indicate the specific location of the two events listed above. The most recent flooding event to affect Park County came in August of 2007. The *Fairplay Flume* reported that heavy rains over the course of several days in early August resulted in upwards of \$150,000 of damage to 300 miles of county roads. The hardest hit areas were near Bailey and Highland Park.

4.4.4.3 Hazard Profile

Park County is subject both to the flash flooding that occurs following a period of intense or sustained rainfall and to snowmelt flooding during the spring/summer runoff. The highly mountainous terrain and associated steep slopes cause rainwater and snowmelt to runoff rapidly, quickly filling streambeds following an event. Snowmelt typically occurs in May or June. Flood producing rainstorms can occur throughout the year. Historically the most common months for significant flooding have been May through September. These months, along with March and April, have the highest average precipitation and the highest frequency of intense rain events. Occasionally, rainstorms can occur during snowmelt runoff, resulting in rain-on-snow flooding.

Because of the mountainous terrain of the drainage area, flooding occurs rapidly. When the flood event is a result of a rainstorm, flooding often occurs before the rain event has passed, and flow passes very quickly through the smaller tributaries of the area into the larger streams. Both with snowmelt flooding and rainfall flooding, the combined effect of these smaller tributaries can create extremely fast-moving floodwaters that greatly exceed the capacity of the larger streams. These fast-moving floodwaters allow little time for residents in the floodplain to evacuate themselves or protect their property, and the force of such rapidly flowing waters increase the potential of damage and loss of life. The duration of these flood events vary depending on the specific characteristics of that particular snowmelt season, or if the cause is rain, the characteristics of that specific rain event. Depending on the magnitude of the snowpack and the thermal input from the sun, snowmelt floods can last from a few days to one or two weeks. In the case of a rain event, floodwaters generally recede rapidly once the rain event has ended, but can last from a few hours to a few days.

A potential source of potential floodwater is trans-basin diversions of water from elsewhere into Park County. Prior history from Pitkin and Lake Counties may be instructive. In 1995, Pitkin County faced heavy snowpack, potential rainfalls and cresting streams. In an effort to mitigate possible flooding, Pitkin County officials requested from the Colorado Division of Water Resources that water be released through trans-basin diversions under the Continental Divide and into Lake County. Unfortunately, they neglected to coordinate with their counterparts in Lake County where record flood flows were being experienced. The result of the proposed diversions from Pitkin County would have been an even more elevated risk for flooding in Lake County and the Arkansas River Basin.

Such a scenario could play out in Park County as well. Park County has two trans-basin diversions that flow into the county, the Otero Pipeline and the Roberts Tunnel. The Otero Pipeline conveys water from the Arkansas Basin into Spinney Mountain Reservoir

on the South Platte River. The Roberts Tunnel serves as a conduit for water flowing from Dillon Reservoir into the Denver Metro Area. In the case of rapid snowmelt or extreme rain events within the Arkansas River Basin or within the Blue River Basin in Summit County, a scenario similar to that of Pitkin and Lake Counties in 1995 could arise. The Mitigation Advisory Committee is encouraged to evaluate current procedures regarding such a scenario, and perhaps consider a recommended mitigation action relating to communication between Summit, Lake or Chaffee Counties, Park County and Denver Water or the City of Aurora, as appropriate, to help mitigate any potential problems flooding exacerbation resulting from trans-basin diversions.

Warning System

Because flash floods occur rapidly and allow very little warning time, the only potential warning to an upcoming flood event comes through the ability to forecast a heavy rain event prior to its occurrence. The National Weather Service (NWS) issues flood watches and warnings when heavy rains or severe storms threaten the area. These warnings are carried to local residents through local media outlets such as television and radio stations. In addition, the NWS, in conjunction with the National Oceanic and Atmospheric Administration (NOAA), operates the NOAA Weather Radio System; which is a nationwide network of radio transmitters that broadcasts severe weather data to relatively inexpensive special receivers that can be purchased by the public. When a severe weather alert is issued, the transmitter will switch to alert mode, notifying residents of the potential risk. Although not extensive, the measures provide residents and citizens located in a flood prone area, some warning time to prepare for a potential flood.

Current Identification of Flood Hazards

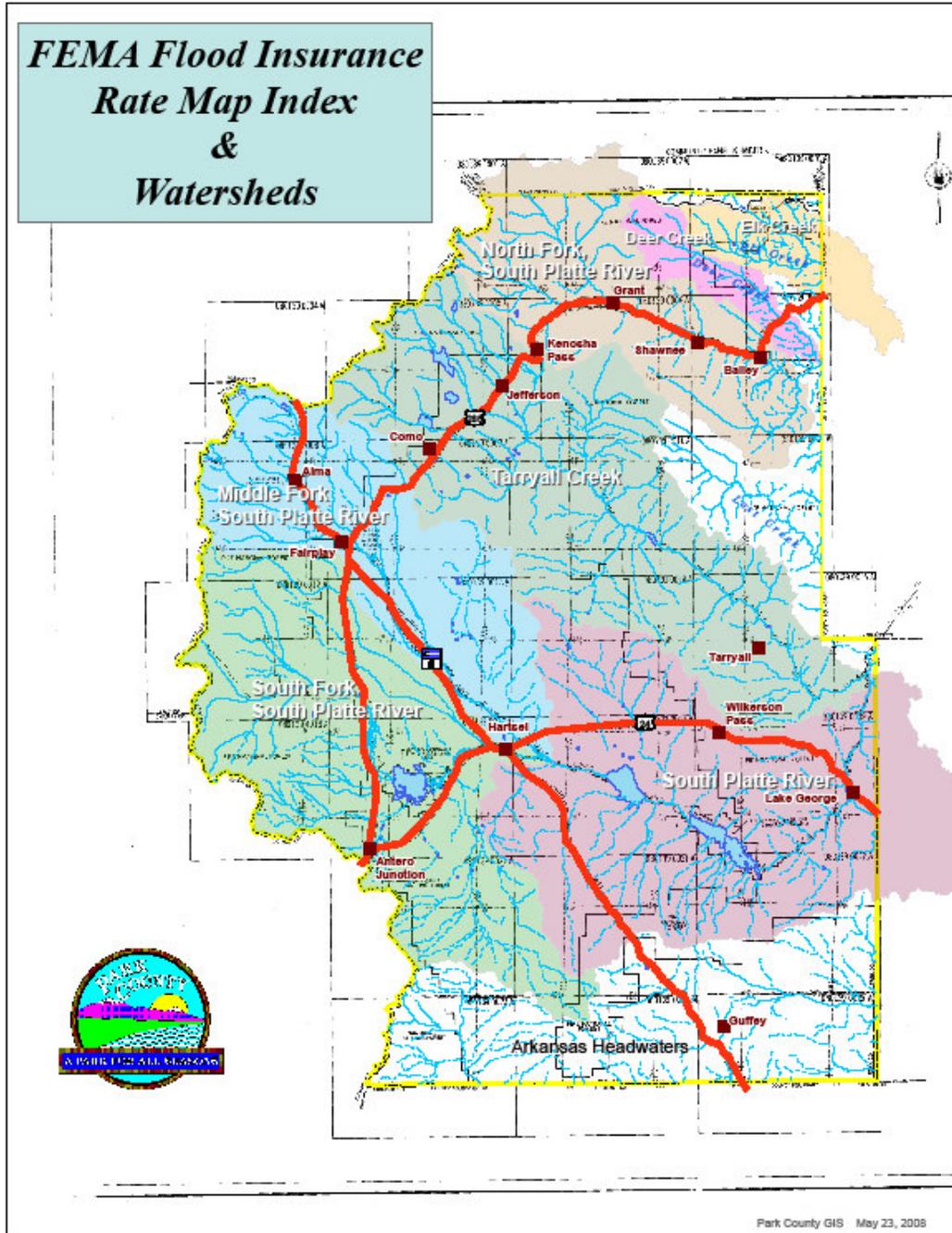
FEMA's predecessor agency, the Federal Insurance Administration (FIA) of the Department of Housing and Urban Development, prepared Flood Hazard Boundary Maps (FHBMs) for Park County in 1977. Those maps are approximate floodplain maps with no documented engineering analysis available. They were converted into FIRMs in 1987 without any engineering analysis. In addition, the FIA prepared an FHBM for the Town of Fairplay that was later converted by FEMA into a Flood Insurance Rate Map in 1986, again without any engineering analysis. The CWCB prepared a report in 1999 that included the only hydrologic analysis of stream reaches within the county. Through a USGS regional regression analysis, it established peak 100-year flow levels for Geneva Creek just upstream of its confluence with the North Fork of the South Platte River in Grant and for Tarryall Creek downstream of its confluence with Jefferson Creek. Whether or not the approximate maps described above are digitized, they do not provide any engineering information.

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The 1987 FIRMS for unincorporated Park County and the 1986 FIRM for the Town of Fairplay have not been updated since their original completion. Therefore they are subject to limited engineering and technical analysis and evaluation. However, they still officially serve as the source and basis for important hazard identification and risk assessment tools for use in evaluating floods risks and for overall floodplain management. The FIRMS are available at the Park County Mapping Department in Fairplay. The overview index map for the 1987 Park County FIRMS is shown in Figure 4-12.

Figure 4-12



4.4.5 Drought

“Drought is a condition of moisture deficit sufficient to have an adverse effect on vegetation, animals, and man over a sizeable area” (USGS, 2000). There are three significant types of drought that can affect Park County which include meteorological, agricultural, or hydrologic drought. Meteorological drought is simply a departure from a normal precipitation amount, and is reliant on no other factors. Agricultural drought describes a soil moisture deficiency to the extent it effects the needs of plant life, primarily crops. Hydrologic drought is defined in terms of shortfall of water levels of lakes and reservoirs, and stream flow in rivers, streams, and soils (Multi Hazard Risk Assessment, 2000). Drought is a natural part of most climatic areas, but the severity of droughts differs based on duration, geographic extent, and intensity.

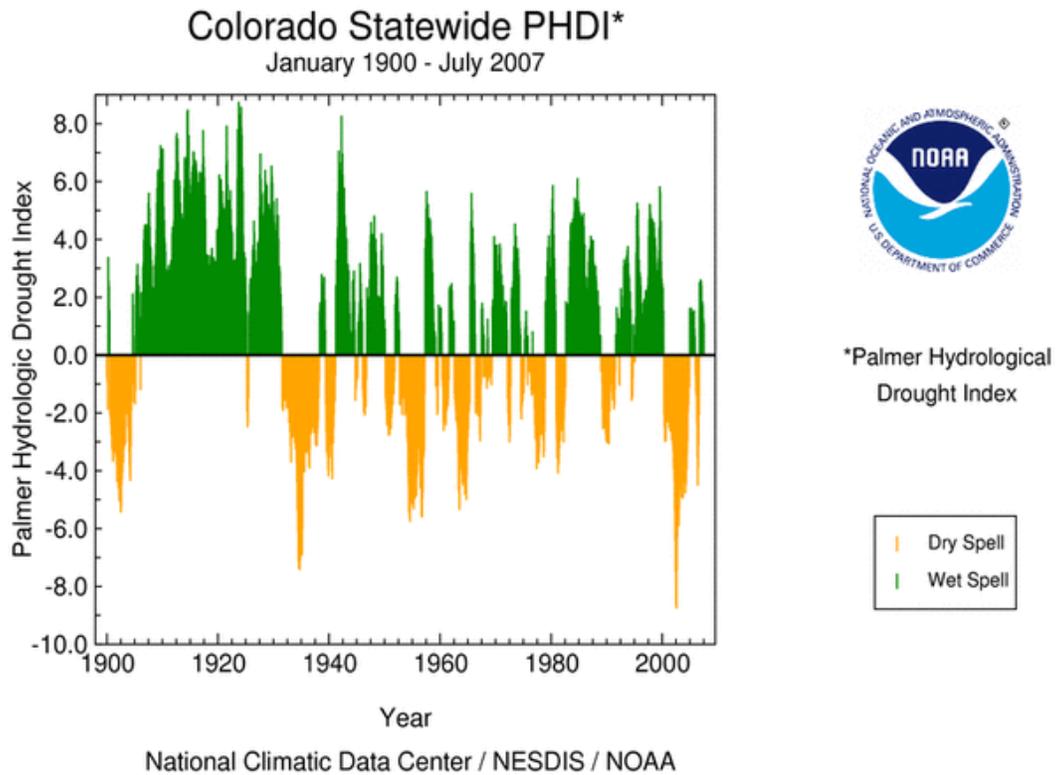
4.4.5.1 Hazard History

There have been a number of significant droughts recorded in Colorado since 1900. The most recent drought extended over a period of four years, from 1998 to 2002. This period saw rainfall levels well below normal and caused many communities throughout the region to institute water restrictions.

Park County has identified drought as a ‘Moderate Hazard’ in the initial assessment of hazards. There have been a number of significant droughts recorded in Colorado since 1900. The most recent drought extended over a period of four years, from 1998 to 2002. This period saw rainfall levels well below normal and caused many communities throughout the region to institute water restrictions.

Although meteorologists have attempted to predict long-term changes and trends in weather patterns, the onset of a significant drought cannot be predicted. Extended periods of dry weather have occurred many times from over the past 100 years. The following figure indicates the statewide Palmer Hydrologic Drought Index from 1900-2007. It clearly shows the drought that occurred from 1998 to 2004. 2002 in particular was one of the driest years on record, which helps to explain the severity of that wildfire season in Park County and throughout the state.

Figure 4-13



4.4.5.2 Hazard Profile

Just as there are multiple types of drought, there are multiple methods to indicate when a drought is occurring, as well as the severity of the drought. The multiple indices are based on a variety of data including precipitation amounts, stream flows, soil moisture, snow pack, as well as other water storage data. Commonly, the drought indices used depends on the type of drought being measured. It is important to note that not all types of drought must be occurring simultaneously. In some cases an area can be affected by one form of drought, while levels measuring another form of drought are normal.

The most commonly used drought indicator is the Palmer Drought Index. This index was developed in the 1960s by the National Oceanic and Atmospheric Administration, and uses temperature and rainfall data to determine dryness. Negative numbers

indicate drought, while positive numbers indicate surplus rainfall. Minus two is considered a moderate drought, minus three is severe drought, and minus four is extreme drought. Likewise, positive two is considered a moderate rainfall, positive three a severe rainfall, and positive four, an extreme rainfall. In addition to the Palmer Index, the Standard Precipitation Index (SPI) and the Crop Moisture Index (CMI) are also used to measure drought. The SPI relates the deficit in precipitation compared to normal levels to varying degrees of time. Because the duration of lower than average precipitation levels has varying effects on stream flows, water storage levels, and soil moisture content, the SPI attempts to measure drought based on the long-term deficit in precipitation. The CMI measures short-term moisture conditions across predominate crop producing regions. It is based on the temperature and precipitation levels for a given week as well as the CMI value for the previous week (<http://www.drought.unl.edu/whatis/indices.htm>).

The Colorado State Climatology Office uses the Palmer Drought Severity Index (PDSI) to measure long-term moisture status. A reading of -3.0 is considered to be a “severe drought”.

A technique that has been used to document historic patterns of drought is the study of tree rings. This technique can provide valuable information on the timing, the degree and the length of previous periods of drought. No tree ring data was readily available at the time that this plan was being prepared, but such data may become available in the future to help Park County better describe its drought history.

4.4.5.3 Current Identification of Drought Hazards

While Park County has experienced historical droughts, like the recent one from 1998 to 2004, there are currently no maps showing which specific portions of the county were affected by historic droughts or by precipitation, stream flow, or temperature conditions which might be precursors to droughts. Likewise, there are currently no maps showing which portions of Park County might be impacted at any point in time by ongoing drought conditions or which portions could potentially be impacted at a future point in time by imminent drought conditions.

4.4.6 Severe Thunderstorms/Hail Storms/Wind Events

One of the most common hazards, severe thunderstorms, can occur throughout the year, although historical records indicate that in Park County the majority occur between April and October. Effects from severe thunderstorms can be high winds, heavy rain (possibly causing flooding), potentially life-threatening lightning, and hail.

Damaging wind events in Park County typically occur in the form of straight-line wind events which often accompany severe thunderstorms. Depending on the type of wind event, the damage sustained can range from extremely localized to widespread and from moderate to devastating. The potential impacts of a severe wind event depend on the specific characteristics but can include broken tree branches and uprooted trees; snapped power, cable, and telephone lines; damaged radio, television, and communication towers; damaged and torn off roofs; blown out walls and garage doors; overturned vehicles; totally destroyed homes and businesses; and serious injury and loss of life. Downed trees and power lines can fall across roadways and block key access routes, as well as cause extended power outages.

Lightning is very unpredictable, which increases the risk to individuals and property. In the United States, 75 to 100 people are killed each year by lightning, although most lightning victims do survive. Persons struck by lightning often report a variety of long-term, debilitating symptoms, including memory loss, attention deficits, sleep disorders, numbness, dizziness, stiffness in joints, irritability, fatigue, weakness, muscle spasms, depression, and an inability to sit for long periods. It is a myth that lightning never strikes the same place twice. In fact, lightning will strike several times in the same place in the course of one discharge.

Large hail, and the glass it may break, can injure people and animals. Hail can be smaller than a pea, or as large as a softball, and can be very destructive to automobiles, glass surfaces (e.g., skylights and windows), roofs, plants, and crops. The size of hailstones is a direct function of the severity and size of the storm. Hailstorms occur more frequently in the late spring and throughout the summer. The land area affected by individual hailstorms is not much smaller than that of a parent thunderstorm, an average of 15 miles in diameter around the center of a storm.

4.4.6.1 Hazard History

Existing literature is limited regarding severe thunderstorm occurrences in Park County. There is, however, some more specific information about occurrences of lightning and of hail. In addition, information just became available regarding a tornado at Eleven Mile Reservoir on August 23, 2008.

Section 4

Hazard Identification and Risk Assessment

In Colorado, lightning is the number one life threatening weather hazard. Between 1959 and 1994, lightning killed 394 people. Colorado ranks number 11 for lightning deaths in the United States.

Table 4-12 Lightning Casualties and Damage			
Date	Injuries	Fatalities	Property Damage (\$)
6/15/2004	1	0	0
8/24/2003	1	1	0
8/5/2002	1	0	0
6/29/1969	0	0	2173.91
Total	3	1	2173.91

It should be noted that a natural lightning belt runs through a portion of Park County on the east side, from Cheesman Reservoir through Lake George and up into the Lost Park Wilderness Area. Within the Cheesman Lightning Belt there is a high risk of lightning strikes and fires resulting from those strikes within Park County.

The hail season in Colorado is March through October, with June having the highest frequency of storms producing hail. The majority of hailstorms occur along the Front Range to the eastern plains. In July of 1990, Denver suffered an estimated \$625 million in damages from a single storm. Records indicate that Park County has endured damaging hail storms on a regular basis since records began being kept. Six severe thunderstorm and hailstorm event(s) were recorded by SHELDUS in Park County, Colorado between 01/01/1950 and 10/31/2006.

Table 4-13 Severe Weather Events		
Date	Event	Property/Crop Damage (\$)
8/23/08	Severe Storm/Thunder Storm, Tornado	N/A
3/4/1983	Severe Storm/Thunder Storm, Winter Weather	26315.79
8/5/1983	Hail, Severe Storm/Thunder Storm	7142.86
7/28/1982	Flooding, Severe Storm/Thunder Storm	7142.86
9/20/1963	Severe Storm/Thunder Storm	793.65
6/7/1979	Flooding, Severe Storm/Thunder Storm, Winter Weather	793.65
5/16/1962	Severe Storm/Thunder Storm, Wind	45.45/454.55

Source: SHELDUS

Because of the high elevations and rugged terrain in Park County, tornadoes are rare. Past history notwithstanding, as this plan was being edited in draft form, on Saturday, August 23, 2008, a tornado struck a campground at Eleven Mile State Park. The storm and the damage it caused were described in an online article in [The Denver Post](#).

"Rare Mountain Tornado Hurts 4"

“A tornado set down in Eleven Mile State Park on Saturday, August 24, 2008. (Special to The Denver Post | Lea Grady) A tornado touched down in the mountains west of Denver on Saturday afternoon, knocking over campers and slightly injuring four people at Witcher Cove Campground.

Tornados rarely touch down in the mountains.

"I've never seen anything like it," said Sharon Morris, the Park County coroner, who was fielding media calls on behalf of the county. "And I've been here 25 years."

The twister appeared to have touched down once at about 2:15 p.m. on the

north side of Eleven Mile Reservoir in Eleven Mile State Park.

The park has 24 camper spaces, but not all of them were in use, Morris said.

Witnesses got a look at the rare mountain tornado, she said.

Colorado is ninth in the country in tornado activity, with more than 40 twisters touching down each year, according to the state emergency-management office.

‘Almost all of Colorado's tornado activity occurs in the plains east of the Rocky Mountains. Tornadoes are comparatively rare in mountainous areas because the rugged terrain tends to disrupt the storm conditions needed for tornado formation,’ according to an analysis of the state's tornadoes by the Denver Museum of Nature and Science.

Sheriff Fred Wegener estimated about five vehicles were damaged, including a motor home and pickup with a camper that overturned. He says another camp trailer was "completely obliterated."

Other vehicles had damage such as broken windows.

He said injuries were limited to cuts and scrapes, and everyone was accounted for at the campground."

The Denver Post

Article Last Updated: 08/24/2008 01:15:08 PM MDT”

4.4.6.2 Hazard Profile

The National Weather Service defines a thunderstorm as a local storm (accompanied by lightning and thunder) produced by a cumulonimbus cloud, usually with gusty winds, heavy rain, and sometimes hail. Non-severe thunderstorms rarely have lifetimes over two hours. The National Weather Service (NWS) considers a thunderstorm severe if it produces hail at least three-quarters of an inch in diameter, has winds of 58 miles per hour or higher, or produces a tornado. Severe thunderstorms are distinguished by stronger winds and heavier rain than the normal thunderstorm. These severe storms have the potential to produce damaging hail, spawn tornadoes, and initiate flash flooding. Thunderstorms may occur singly, in clusters, or in lines. Some of the most

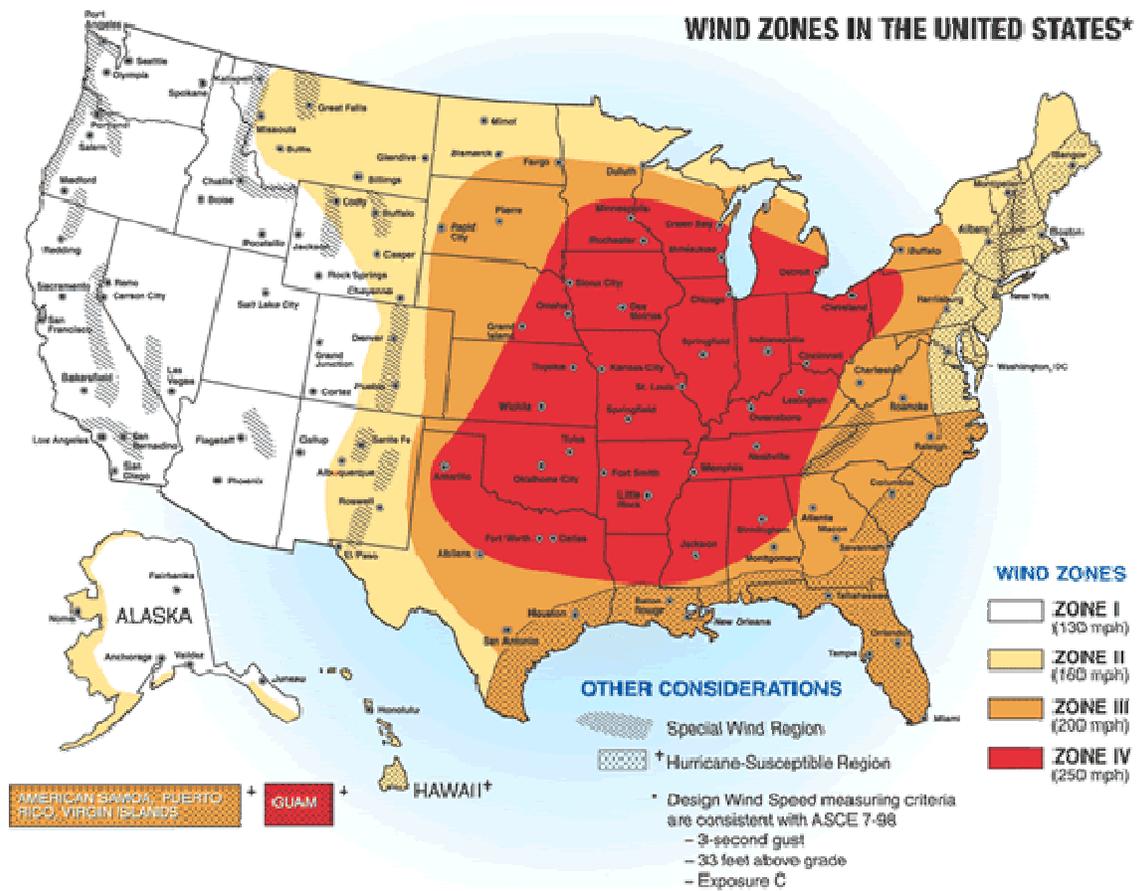
severe weather occurs when a single thunderstorm affects one location for an extended time.

Wind can be one of the most destructive forces of nature. Strong winds can erode mountains and shorelines, and topple trees and buildings. The extent and degree of damages from a high wind event are primarily related to the intensity of the event, measured in terms of wind speed. Sustained high winds can be the most damaging, although a concentrated gust also can cause significant damage. As wind speeds increase, the extent of damage varies depending on a number of site-specific characteristics that will be discussed later in this chapter.

Severe thunderstorms have affected every portion of Park County. There are no proven indicators to predict where a thunderstorm may occur and they can often be expansive enough to affect the entire area. Therefore, it is not possible to identify specific sections of Park County where thunderstorms are more likely to occur. However, very specific and localized geography can contribute to potential damages caused by these events, such as flooding, lightning-induced forest fires and winds in excess of 100 miles per hour. A more detailed discussion of these specific hazards is included in the appropriate sections. The entire County is considered to have an equal risk of being impacted by a thunderstorm event.

Central Colorado is classified as an area with a higher than average base wind speed nationally. According to the American Society of Civil Engineers *Minimum Design Loads for Buildings and other Structures* (ASCE 7-98), the design wind speed for Park County is 90 mph. This threshold is based on the 50-year recurrence interval wind event, and is intended to represent the potential base wind event, not winds associated with a tornado. Figure 4-14 shows wind zones across the United States, including Colorado.

Figure 4-14



4.4.6.3 Current Identification of Severe Thunderstorm/Hail Storm/Wind Event Hazards

While Park County has experienced historical thunderstorms, hail storms, and wind events, there are currently no maps showing which specific portions of the county were affected by historic storm events. Likewise, there are currently no maps showing which portions of Park County could potentially be impacted at a future point in time by thunderstorms, hail storms, or wind events.

4.4.7 Landslides

A landslide is an occurrence of ground movement in which soil, rock or debris move outward and downward along a slope. Types of landslides can include rock falls, deep-seated failures of slopes, shallow debris slides, and mudslides. The difference in these types of slides depends on the type of movement, as well as the type of material. Landslides can occur suddenly and dramatically or can occur slowly over a period of time. The exact location and timing of a landslide cannot be predicted. Landslides are common throughout the Colorado's central mountains because of the extremely steep slopes present in the area.

4.4.7.1 Hazard History

Historically, landslides have occurred throughout the mountainous areas of Park County. In some cases, slide locations are still visibly apparent; unfortunately, detailed historic records of the location and extent of landslides have not been kept. Because a majority of landslide occurrences have occurred adjacent to existing roadways, or around a roadway under construction, the best resource for obtaining landslide data are the local offices of the Colorado Department of Transportation (CDOT). However, the CDOT literature did not contain a list of landslide events. Therefore, Colorado Geological Survey (CGS) information was utilized to depict landslide susceptibility areas in Park County. Figure 4-15 illustrates landslide incidence and susceptibility areas in Park County.

4.4.7.1.1 Park County

Historic occurrences of landslides in the unincorporated areas of Park County were not available in the existing literature. Anecdotal evidence points to a high risk in areas such as the Placer Valley subdivision in the northwest part of the county. Other reports have indicated that forest-thinning operations (to mitigate wildfires) can sometimes destabilize soils and increase soil permeability, thus resulting in an increased potential for landslides and debris flows.

4.4.7.1.2 Town of Alma

No historic occurrences of landslides have been reported in the Town of Alma.

4.4.7.1.3 Town of Fairplay

No historic occurrences of landslides have been reported in the Town of Fairplay.

4.4.7.2 Hazard Profile

Where and when landslides occur is based on a number of natural factors, and can be exacerbated by conditions created by man. The most prominent natural factors affecting susceptibility to landslides are topography, geology, and precipitation. No single factor alone will cause a landslide to occur, but a combination of factors will. Topography plays an obvious role in the occurrence of landslides. The steeper a slope is, the greater the forces of gravity that are acting on the rocks or soils on that slope, thereby increasing the potential for failure. Geology is an important factor as well, as the strength of the rock, soil, or debris to resist the forces of gravity greatly affects the likelihood of a landslide. Therefore, the type and sequence of rock and soil types and layers greatly affect slope stability. The potential for landslides on slopes with the combination of steep terrain and loose or weak soil can be exacerbated by high levels of precipitation. Precipitation is a key catalyst for the occurrence of a landslide. Water can seep into the voids between soil and rock particles, decreasing the strength of the slope, and increasing the potential for landslides. As a result landslides are most common during or following heavy periods of rain.

Other factors that increase the potential of a landslide include erosion, undercutting, and slope loading. When the base of a slope is eroded or undercut, the strength of the entire slope can be compromised. In mountainous regions of Park County, this commonly occurs along existing roadways, or during the construction of new roadways. Slope loading can also increase the potential for landslides. The construction of structures or roadways on a steep slope can increase the strain on the material, thus increasing the potential of a slide. The amount of ground cover and vegetation on a slope also can play a role in a slope's susceptibility to landslides, as dense cover can secure an otherwise unstable slope.

Landslides can be triggered by other natural hazards. The effect of extreme precipitation including flooding has been discussed above. Also, landslides can occur on steep topography which has been denuded by wildfire. In addition, ground shaking associated with an earthquake can trigger landslides on un-stable slopes. Thin surface soils and steep topography throughout Park County create conditions favorable to erosion and landslides. Widespread construction of roads, clearing of lands, and preparation of development sites on very steep slopes exacerbate the problem.

4.4.7.2.1 Predictability

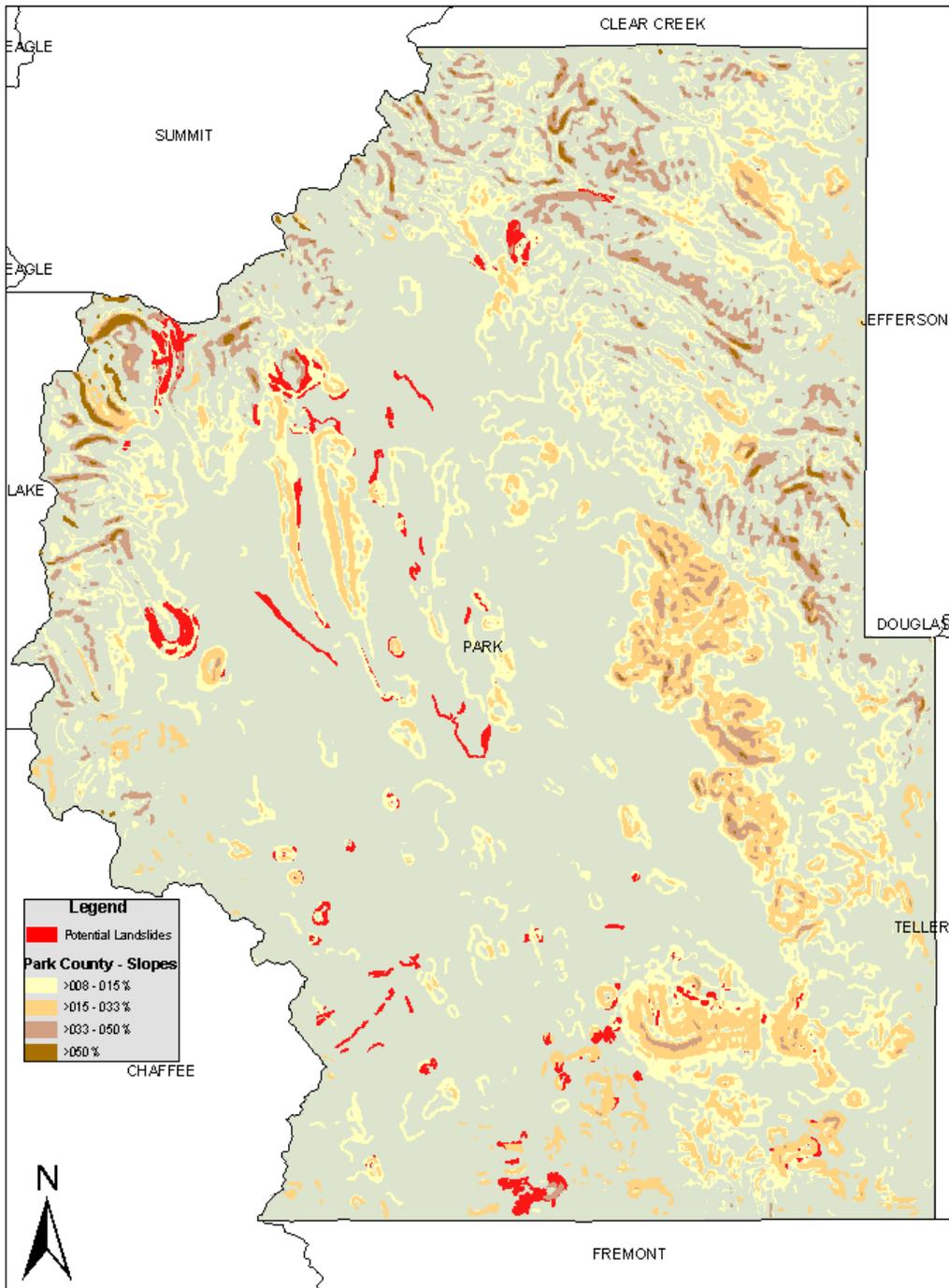
The exact time or location that a landslide will occur cannot be predicted. As previously discussed, landslides can be caused by a combination of many different factors. In some instances, the potential for a landslide to occur at a particular location can be identified

based not only on topographical and geologic factors, but also on other physical indicators. The United States Geological Survey (USGS) has developed a landslide overview map for the United States that combines susceptibility to landslides as well as the history of past landslide incidences in the area. The map ranks the susceptibility of an area and the past incidence on a level of high, moderate, and low. A level of high incidence was given to areas where more than 15% of the land had been involved in land sliding, and a level of high susceptibility was given to areas where more than 15% of the land area was determined to be susceptible to landslides based on geologic and topographic factors.

4.4.7.3 Current Identification of Landslide Hazards

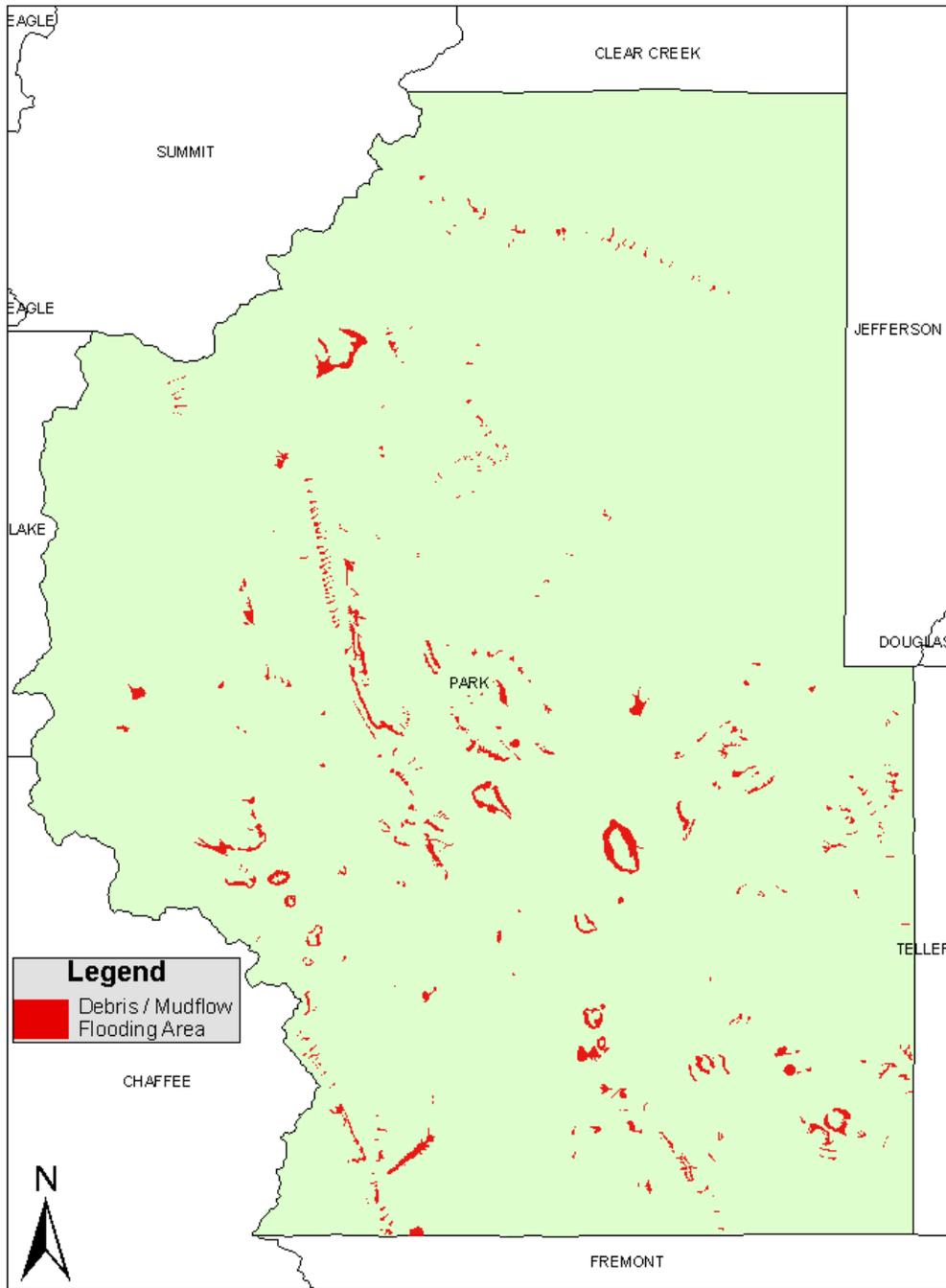
Park County has geologic mapping displaying which particular portions of the county have been identified as **Landslide Deposits**, as shown in **Figure 4-15** below. In addition, there are maps displaying which portions of Park County have been identified as **Debris Flow/Mudflow Flooding Areas**, as shown in **Figure 4-16** below. The county's GIS department will use the initial geologic mapping as a starting point and enhance it in the near future to examine further the possibility of correlating the risk of future landslides to particular locations in the county.

Figure 4-15



Landslide Deposits in Park County

Figure 4-16



Debris and Mudflow Flooding Areas

Section 4

Hazard Identification and Risk Assessment

Further information regarding landslide hazards in Colorado is available in the Colorado Landslide Hazard Mitigation Plan, published in 1988 as Colorado Geologic Survey Bulletin 48. While none of the 49 specific locations identified in the plan as posing the most serious landslide threats in Colorado are in Park County, the plan includes useful background information which may be helpful to officials in Park County and Alma. That background information includes guidance on the evaluation and communication of landslide hazards, descriptions of specific mitigation concepts, and recommendations for implementation of mitigation by the State of Colorado, local governments, and private entities. Downloadable versions of the 1988 plan and a 2002 update to that plan are available at the website of the Colorado Division of Emergency Management.

4.4.8 Dam Failure

Even in the era before severe terrorism concerns, dams in the United States faced the potential of failure. Dams can fail in numerous ways. Overtopping is one of the most common causes of dam failure. Improper building construction, including using easily eroded construction materials, also frequently leads to the slow structural failure of dams. Landslides can separate dams from their foundation or they can send a wave of water surging downstream to a dam below the landslide. Earthquakes also pose a threat to dams.

4.4.8.1 Hazard History

There is no documented history of any dam failure events in Park County.

4.4.8.2 Hazard Profile

Overtopping of a dam occurs when the dam's spillway is inadequate for dealing with excess water. During flood events, too much water to be properly handled by the spillway may rush to the dam site, and flow over the top of the dam.

Improper building construction can lead to the structural failure of a dam. This failure can be compounded by underlying geological factors such as porous bedrock that loses structural integrity when saturated. Landslides pose two threats to dams, both upstream from the dam and at the dam site itself. At the dam site, a landslide could completely remove the dam from its foundation. A landslide upstream has the potential to send a wave of water toward the dam, quite possibly causing an overtopping event. Earthquakes can also be a major threat to dams, though it is very rare that a dam will be completely destroyed by an earthquake. In the event of total failure, the most common cause is the liquefaction of fill along the dam wall.

Following the terrorist attacks of September 11, 2001, concerns for dam safety from terrorist attack came to the forefront. Dams are considered by the Department of Homeland Security (DHS) to be one of the five key national assets, and are considered critical infrastructure. Their significance places them at high risk for terrorist attack. The federal government has developed the National Strategy for the Physical Protection of Critical Infrastructures and Key Assets, which determines how vulnerable dams are and how they can be protected. A major factor in protecting the dams of the United States is that the federal government only has access and control over 5% of the dams whose failure could result in loss of life or significant property damage.

FEMA and DHS have been continuing efforts to increase security at dam sites and set up emergency management plans to deal with the aftermath of a potential terrorist attack on a critical dam.

No matter what the cause of dam failure, the aftermath of such an event can range from moderate to severe. It is likely that the failure of major dams will cause widespread loss of life downstream to humans and animals, as well as extreme environmental stress along the flood path. Water supplies upstream could be left completely dry, while water supplies downstream are overrun or contaminated with debris from the ensuing flood.

4.4.8.3 Current Identification of Dam Failure Hazards

Park County has a total of 23 dams that are regulated by the Colorado Division of Water Resources. Dam failure inundation maps have been prepared for all dams that are regulated by the Colorado Division of Water Resources. A 24th dam, Altura (Duck Lake) Dam, which is one mile north of Park County in Clear Creek County, drains directly into Park County and would affect Park County if it failed. For that reason it has been included. Any low-lying areas below these dams that have been identified in the dam failure inundation maps are at potential risk for a dam failure flood. The dam failure inundation maps are on file at the Dam Safety Branch of the Division of Water Resources. For security reasons access to these maps is strictly controlled.

4.4.9 Earthquakes

The earth's surface is composed of a series of tectonic plates, which are constantly moving and shifting against one another. The movement of these plates causes stress to develop along plate boundaries, and along fault lines. When the stress along one of these boundaries or fault lines exceeds the strength of the adjacent rock and earth, a slip or fracture occurs, releasing the built up energy as waves. Energy waves travel through the earth's crust up to the ground surface, causing the shaking that is associated with an earthquake.

Earthquakes in the United States occur most frequently along the West Coast, due to the close proximity to the North American plate boundary. Earthquakes can also occur along the East Coast of the United States, but the mechanisms causing these earthquakes are not as well understood, as these earthquakes occur within the plate rather than at plate boundaries (USGS, 2003).

The State of Colorado is subject to earthquakes occurring in one primary area – southwestern Colorado. This zone, however, does not have the potential to affect Park County.

When earthquakes occur, the shaking motion is measured on an instrument called a seismograph. The wave peaks on a seismograph indicate the strength of the shaking motion of the earthquake. The magnitude of an earthquake depends on how much energy is released and is used to measure the size of an earthquake's source (USGS, 2003). The magnitude is expressed in terms of the Richter scale, which is a logarithmic mathematical formula based on the amplitude of the waves measured by the seismograph. The Richter scale uses whole numbers and decimals to measure earthquake magnitudes.

In addition to magnitude, an earthquake can also be measured in terms of intensity. The intensity of an earthquake is the effect of the earthquake on the earth's surface. In the United States, the intensity is commonly measured with the Modified Mercalli Intensity Scale (MMI). This scale assigns an intensity level to an earthquake depending on the effects of an earthquake felt at a particular location, such as chimneys damaged, people awakened, and levels of building damage. Because this scale is based on the actual effects of an event, the intensity of a particular earthquake will vary by location, generally decreasing in intensity the farther the location is from the epicenter (the source of the earthquake).

The following table includes the levels for both the MMI scale and the Richter scale, as well as the associated levels of damages.

Table 4-14 Richter and MMI Scales

Scale	Intensity	Description of Effects	Maximum Acceleration (mm/sec)	Corresponding Richter Scale
I	Instrumental	Detected only on seismographs	<10	
II	Feeble	Some people feel it	<25	<4.2
III	Slight	Felt by people resting; like a truck rumbling by	<50	
IV	Moderate	Felt by people walking	<100	
V	Slightly Strong	Sleepers awake; church bells ring	<250	<4.8
VI	Strong	Trees sway; suspended objects swing, objects fall off shelves	<500	<5.4
VII	Very Strong	Mild alarm; walls crack; plaster falls	<1000	<6.1
VIII	Destructive	Moving cars uncontrollable; masonry fractures, poorly constructed buildings damaged	<2500	
IX	Ruinous	Some houses collapse; ground cracks; pipes break open	<5000	<6.9
X	Disastrous	Ground cracks profusely; many buildings destroyed; liquefaction and landslides widespread	<7500	<7.3
XI	Very Disastrous	Most buildings and bridges collapse; roads, railways, pipes and cables destroyed; general triggering of other hazards	<9800	<8.1
XII	Catastrophic	Total destruction; trees fall; ground rises and falls in waves	>9800	>8.1

4.4.9.1 Hazard History

Past and Possible Future Earthquakes

More than 500 earthquake tremors of magnitude 2.5 or higher have been recorded in Colorado since 1867. More earthquakes of magnitude 2.5 to 3 probably occurred during that time, but were not recorded because of the sparse distribution of population and limited instrumental coverage in much of the state. For comparison, more than 20,500 similar-sized events have been recorded in California during the same time period. The largest known earthquake in Colorado occurred on November 7, 1882 and had an estimated magnitude of 6.5. The location of this earthquake was in the northern Front Range west of Fort Collins.

Section 4

Hazard Identification and Risk Assessment

Although many of Colorado's earthquakes occurred in mountainous regions of the state, some have been located in the western valley and plateau region or east of the mountains. The most economically damaging earthquake in Colorado's history occurred on August 9, 1967 in the northeast Denver metropolitan area. This magnitude 5.3 earthquake, which was centered near Commerce City, caused more than a million dollars damage in Denver and the northern suburbs. This earthquake is believed to have been induced by the deep injection of liquid waste into a borehole at Rocky Mountain Arsenal. It was followed by an earthquake of magnitude 5.2 three months later in November 1967. Although these events cannot be classified as major earthquakes, they should not be discounted as insignificant. They occurred within Colorado's Front Range Urban Corridor, an area where nearly 75% of Colorado residents and many critical facilities are located. Since March 1971, well after the initial flurry of seismic activity, 15 earthquakes of approximate magnitude 2½ or larger have occurred in the vicinity of the northern Denver suburbs. At least two published articles propose that a magnitude 6.0 earthquake is possible on the Derby fault. Such an earthquake would cause more than \$10 billion dollars damage.

Relative to other western states, Colorado's earthquake hazard is higher than Kansas or Oklahoma, but lower than Utah, and certainly much lower than Nevada and California. Even though the seismic hazard in Colorado is low to moderate, it is likely that future damaging earthquakes will occur. It is prudent to expect future earthquakes as large as magnitude 6.5, the largest event of record. Calculations based on the historical earthquake record and geological evidence of recent fault activity suggest that an earthquake of magnitude 6 or greater may be expected somewhere in Colorado every several centuries.

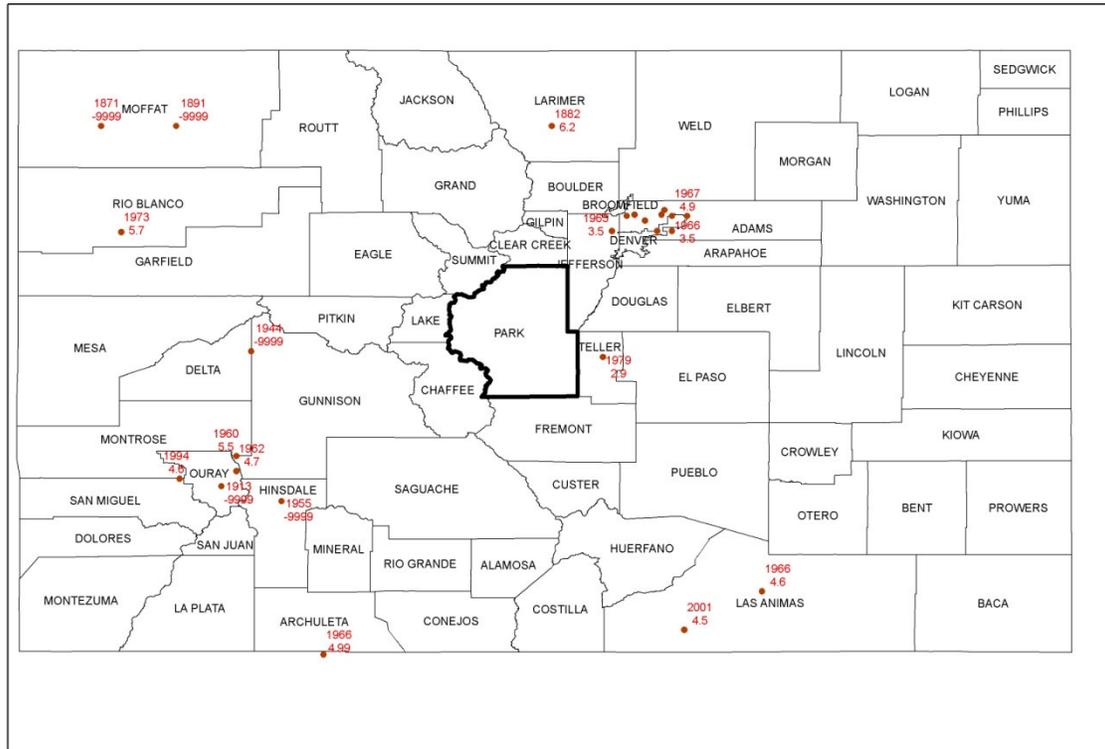
Based on the historical earthquake record and geologic studies in Colorado, an event of magnitude 6½ to 7¼ could occur somewhere in the state. Scientists are unable to accurately predict when the next major earthquake will occur in Colorado; they are only able to predict that one indeed will occur. The major factor preventing the precise identification of the time or location of the next damaging earthquake is the limited knowledge of potentially active faults. Given Colorado's continuing active economic growth and the accompanying expansion of population and infrastructure, it is prudent to continue the study and analysis of earthquake hazards. Existing knowledge should be used to incorporate appropriate levels of seismic safety in building codes and practices. The continued and expanded use of seismic safety provisions in critical and vulnerable structures and in emergency planning statewide is also recommended. Concurrently, we should expand earthquake monitoring, geological and geophysical research, and mitigation planning.

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Hazard Identification and Risk Assessment

Park County has not seen an earthquake of note for well over a century. As figure 4-17 shows, however, based on the history of earthquakes in nearby counties, especially Jefferson and Teller counties, the county is at some risk to experience an earthquake.

Figure 4-17



Colorado Earthquakes 1568 - 2004

Downloaded from nationalatlas.gov

4.4.9.2 Hazard Profile

Depending on the location, magnitude, and intensity of an earthquake, the damages and associated impacts to the community can vary greatly. As described in Table 4.14, the impacts can be as mild as light shaking barely noticeable to citizens, to as large as totally destroyed buildings and infrastructure.

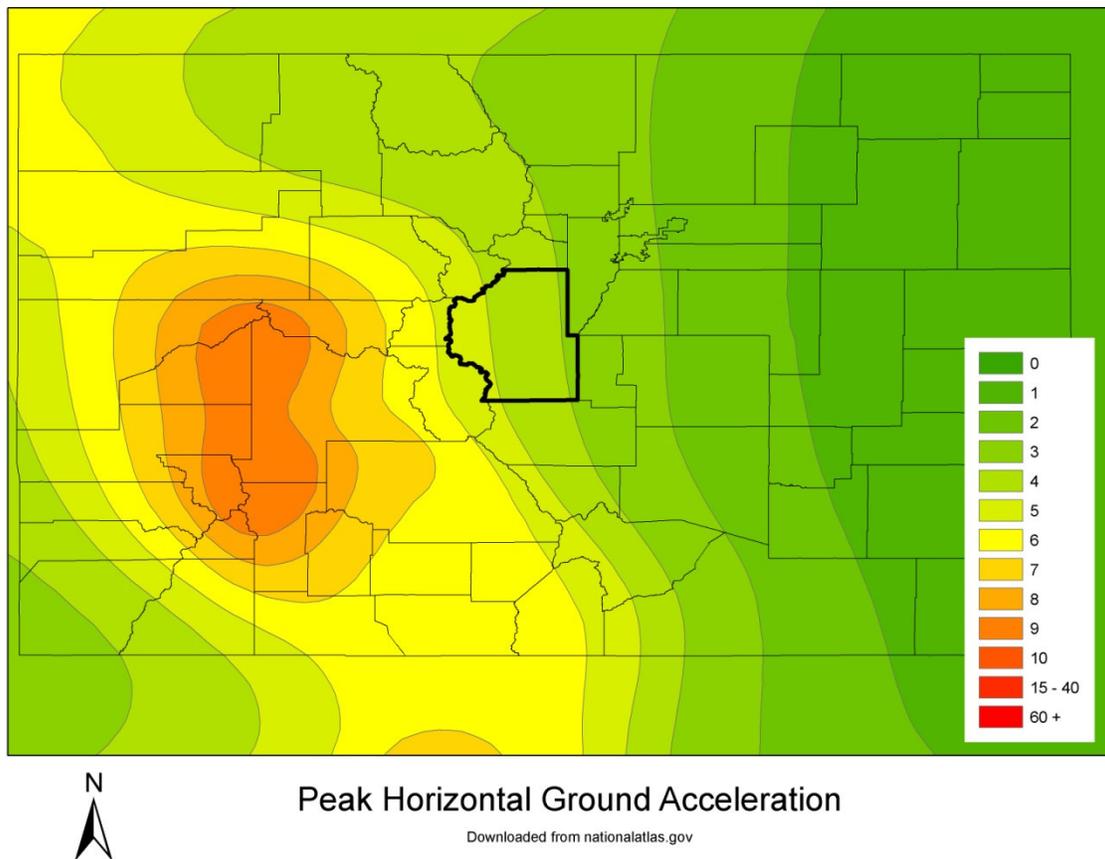
In an attempt to quantify the risk of damages due to an earthquake throughout the United States, the USGS, through the Earthquake Hazard Program, has developed maps displaying likely levels of ground motion due to future earthquakes. When developing these maps, USGS considered the potential magnitude and locations of future earthquakes based on historical data and geological information on the recurrence

intervals of fault ruptures. Using this data, the extent of potential ground shaking with a 10 percent, 5 percent, and 2 percent chance of being exceeded in a 50-year period has been calculated, and contour lines have been interpolated and delineated on hazard maps.

The most commonly used method to quantify potential ground motion is in terms of peak ground acceleration (pga). During an earthquake, particles on the earth move in response to the energy waves released at the epicenter. How quickly these particles accelerate is directly proportionate to the anticipated level of damages due to an earthquake, with the higher levels of acceleration causing the most significant damage. Peak ground acceleration is expressed as a percentage of a known acceleration, the acceleration of gravity (9.8m/s^2), and is commonly referred to as “%g”.

Figure 4-18 displays the peak acceleration for the State of Colorado with a 2 percent chance of being exceeded in a 50-year period. As can be seen in the figure, virtually all of Park County is located between the 16% of g contour and the 20% of g contour, with some portions having a value slightly greater than 20% of g.

Figure 4-18

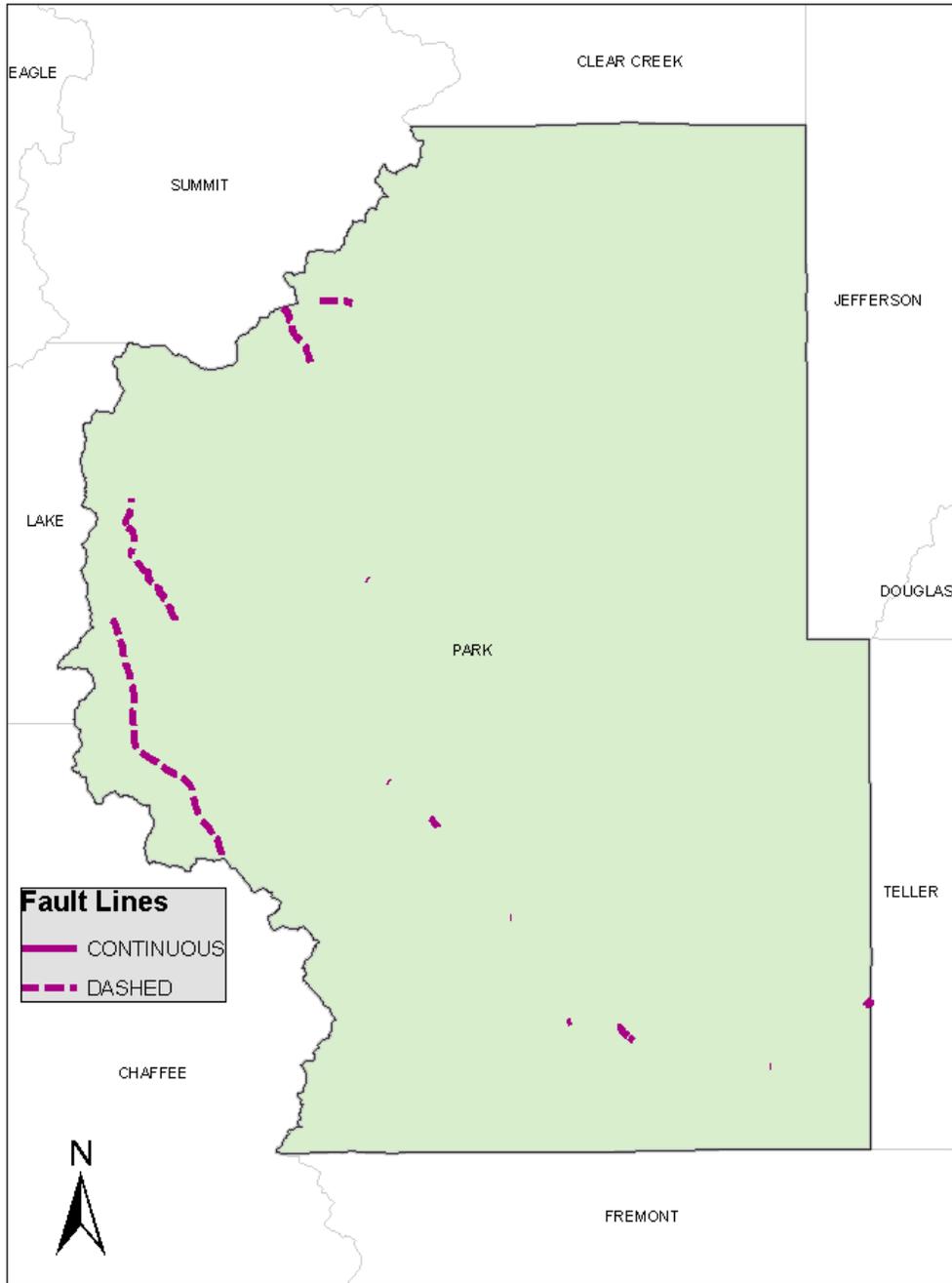


Using the scale provided in Table 4-14, this level of ground shaking is slightly greater than that associated with a level VII (MMI) intensity earthquake or between 6.1 and 6.9 on the Richter scale. Typical damages associated with such an earthquake would include cars moving uncontrollably, fractures to masonry walls and masonry buildings, and damage to poorly constructed buildings. It should be noted that this is not the highest intensity earthquake that could affect the County. Earthquakes of greater and lesser intensities can occur, and have lower and higher probability levels, respectively.

4.4.9.3 *Current Identification of Earthquake Hazards*

Park County has geologic mapping displaying which particular portions of the county have been identified as potentially active fault zones. That mapping is shown in Figure 4-19 below.

Figure 4-19



Potentially Active Fault Zones in Park County

4.5 RISK ASSESSMENT

4.5.1 Wildfire

4.5.1.1 Hazard Areas

Much of Park County is mountainous and wooded, leaving a large part of the county at risk to wildfire. Areas of steep terrain with forested mountain vegetation (ponderosa pine and Douglas fir) are at the greatest risk. Further exacerbating the problem is the lack of easy access to many of the county's heavily forested areas. Park County also has numerous potential wildland-urban-interface areas prone to wildfire. According to the WRA "red zone" mapping, the most densely populated area in the county, the Platte Canyon area in the northeast, is at considerable risk for such events. Other areas are at risk as well. Wildfire risk is significant in the area along U.S. 285 south of Kenosha Pass, the towns of Alma and Fairplay, and the Antero Junction area. To a great extent, the CWPP confirmed the general findings of the WRA. There were a total of 275 subdivisions identified in Park County in the CWPP, spread across the county with varying degrees of exposure to wildfire. The only areas that are not at risk are those areas where there is no vegetation or the vegetation is not capable of supporting a fire no matter what the conditions. The overall findings of the CWPP assessment were that many areas in the county's eastern side face significant wildfire risk. As was the case with the WRA, the analysis for the CWPP found the Platte Canyon district to have the greatest risk of wildfire of any area in Park County. The CWPP analyses did indicate a wildfire risk in the Guffey area that had not been identified in the WRA's statewide "Red Zone" map.

At present there is mapping showing those portions of Park County facing the greatest likelihood of being impacted in the future by wildfires. The possibility of a correlation between location within any one of the eight major watersheds in the county and the risk of future wildfires has been initially examined through the county's GIS capabilities, as part of this project. Distinctions have been made regarding specific locations within Park County which have a history of wildfires and regarding specific locations which might be more prone to future wildfires.

4.5.1.2 Vulnerability Analysis

As determined in the CSFS statewide *Wildfire Risk Assessment* (WRA), much of Park County is at some risk of wildfire. During the county CWPP process, completed in 2007, a hazard assessment, analyzing fuels, ignition, and values, was conducted. The CWPP process identified the specific areas of Park County with the greatest vulnerabilities to

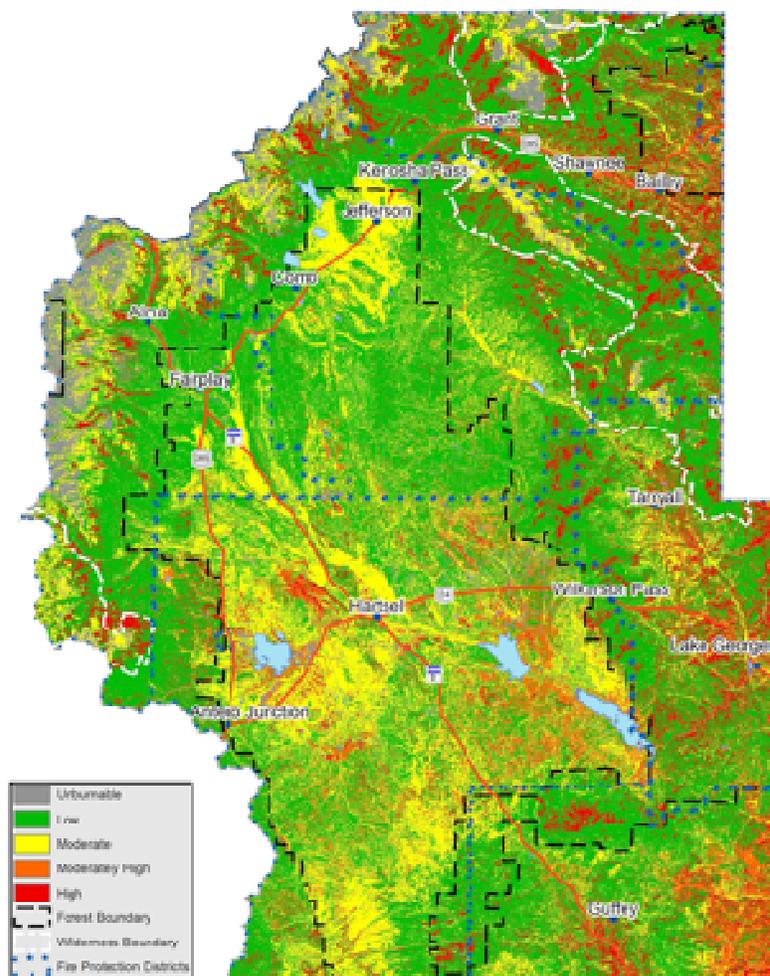
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wildland fire, sometimes providing similar findings to those of the WRA and sometimes pointing out new hazard areas besides the “red zones”.

The following map, which was generated for the CWPP, illustrates the fuel hazards profile for the entire county. While there are areas of risk throughout the county, this map shows that the areas of particularly high risk are in the Platte Canyon area, as well as Tarryall, Lake George and Guffey.

Figure 4-20



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A subdivision hazard assessment was also completed as part of the CWPP process, examining the relative vulnerabilities of the many subdivisions located in Park County. The map below points out “very high” risks to subdivisions near Fairplay and Guffey. There is “moderate” to “high” risk to areas in the Platte Canyon district, south of Como along U.S. Highway 285, and near Antero Junction.

Figure 4-21

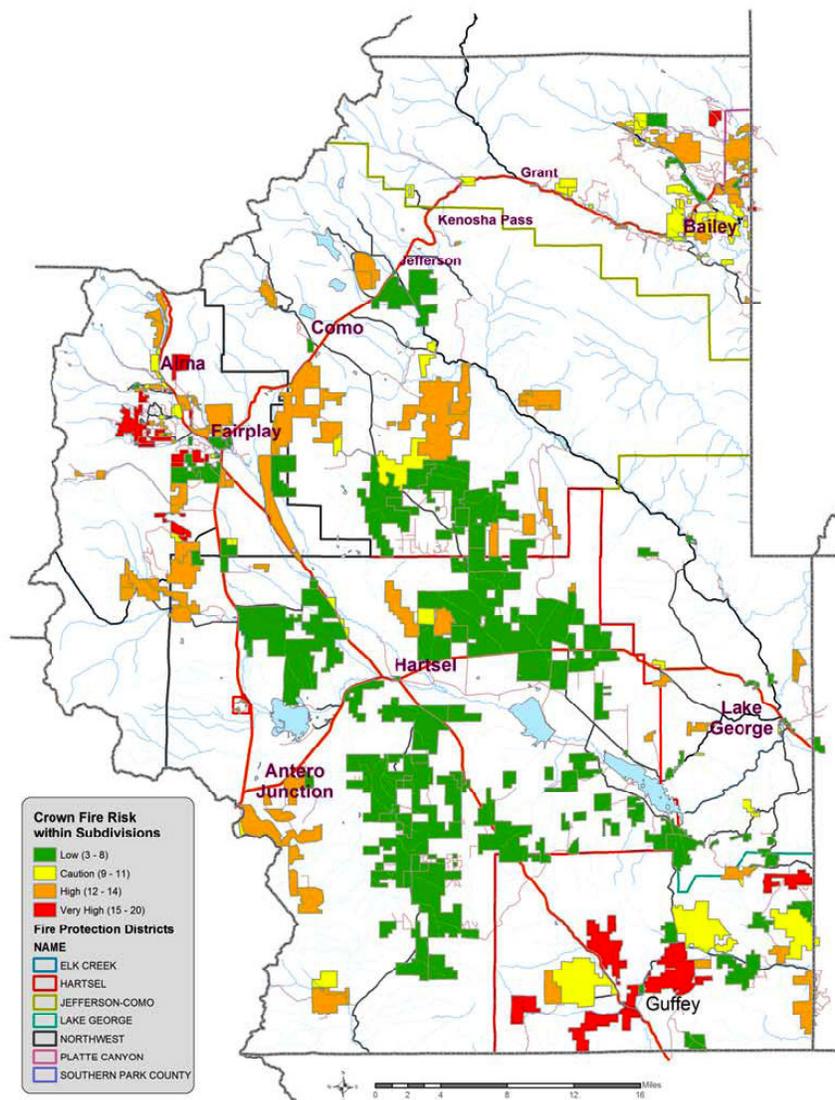
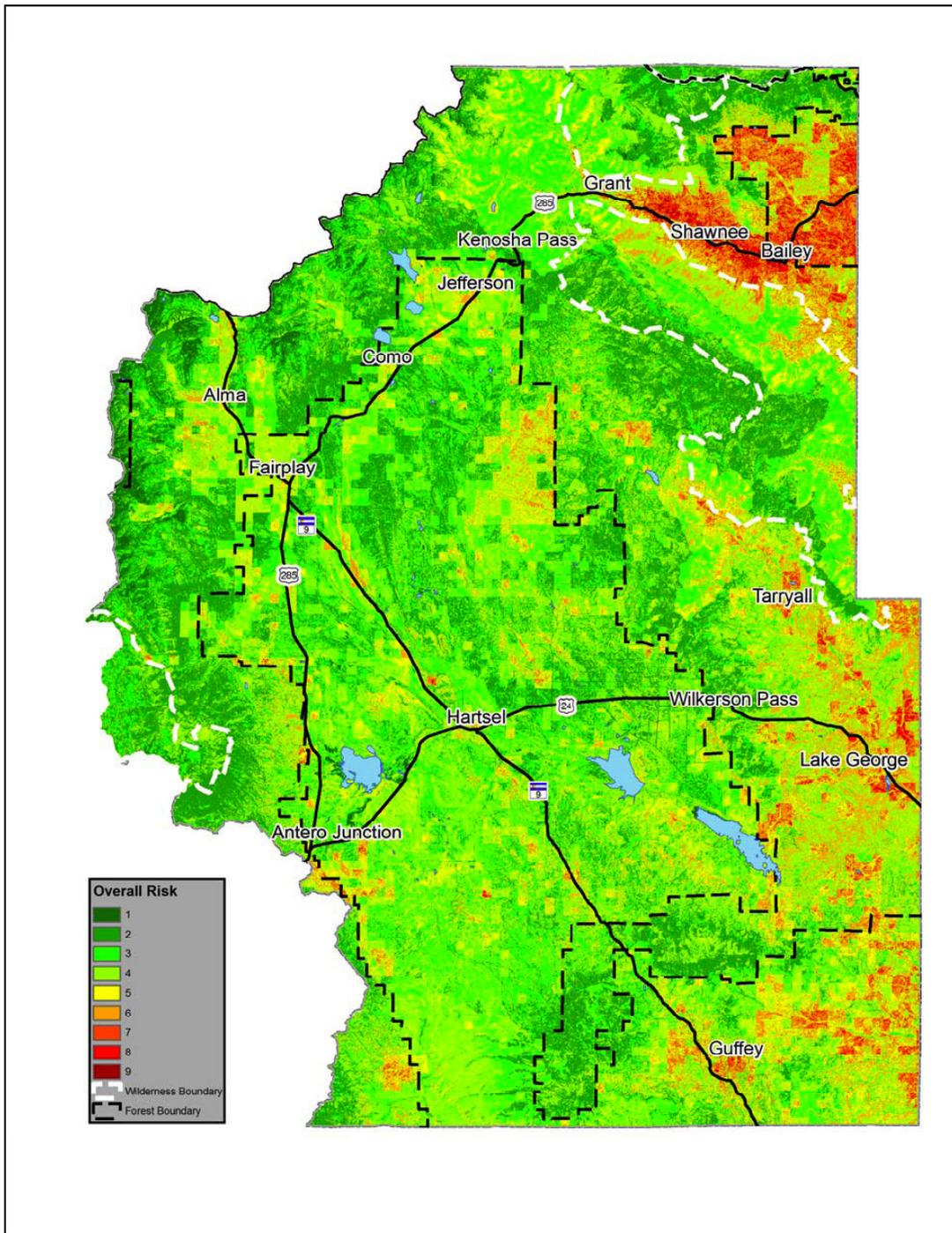


Figure 4-22 displays the overall results of the CWPP assessment. When taking into account all factors, the Platte Canyon district was determined to have the highest level of risk to wildfire. Many areas in the eastern side of the county face considerable risk, as well as the area along U.S. 285 south of Kenosha Pass, the towns of Alma and Fairplay, and the Antero Junction area.

Figure 4-22



Most of the highest vulnerabilities correspond to the state WRA “red zone” assessment, but there are some differences. Most particularly the more detailed analyses of the CWPP emphasize the risk posed to the Guffey area that was not indicated in the statewide “Red Zone” map.

Areas of Park County at high risk for wildfire, as determined in the CWPP, include rural areas, more heavily populated areas, and wildlife-urban interface areas. The county also has many areas with few permanent residents that are attractive to tourists for recreation, including hiking, camping and boating in the county’s reservoirs. The result is a threat to human life and property as well as the potential for negative economic impacts on the county from a loss of tourism.

4.5.1.3 Secondary Effects

There are numerous secondary effects of wildfires that could impact Park County. These include impacts on tourism, and thus the local economy, through activities such as camping, hiking, hunting, and fishing. The impacts can include physical losses, such as heavily burned landscapes, or degraded property values and loss of tourism due to a perception that an event inflicted more widespread damage than it actually caused. Additional secondary impacts due to wildfire include a degradation of air and water quality, as well as a threat to wildlife habitat including endangered species.

The risk of flooding increases significantly following any fire event. Fires cause problems with soil impermeability and increased potential for debris flows. Flash floods have been often documented in the wake of wildfires, in general in the western United States and specifically in Colorado. Most notably, in nearby Jefferson County, the Buffalo Creek Flood killed two people and destroyed 4 homes and the town of Buffalo Creek’s fire station less than two months after a wildfire burned 11,900 acres in the same area in May of 1995. Post-wildfire flooding has also occurred in the portion of Park County within the Hayman fire burn area, including the Sportsman’s Paradise subdivision near Lake George.

There are significant costs of long-term rehabilitation of the fire area. Often, the greatest costs or impacts to communities and people occur after the fire is out. Costs range from long-term forest rehabilitation to the rebuilding of infrastructure lost in the event.

4.5.1.4 Enhanced Mapping and Analysis of Hazard Data

As discussed earlier, maps currently exist which show which portions of Park County face the greatest likelihood of being impacted in the future by wildfires. In addition a

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preliminary correlation has been considered between the location of a site or region within any one of the eight major watersheds in the county and the risk of that site or region regarding future wildfires. In the near future, Park County will examine briefly the possibility of such a correlation. The boundaries of the eight major watersheds will be superimposed on existing mapping of recent historic wildfires, using GIS analysis, to improve on a cursory “hand” analysis. The table below summarizes the six watersheds in Park County that have been affected by wildfires over the past decade. At least in recent history, some watersheds in Park County have been more prone to wildfires than others. Two watersheds (Middle Fork South Platte River and South Fork South Platte River) have not experienced wildfires in recent years. Some of the six watersheds where there have been recent wildfires have experienced larger and/or more severe fires than others.

Table 4-15 Watershed Affected by Wildfires

Year of Fire	Name of Fire	Watersheds Affected
2000	High Meadow Fire	Deer Creek
2002	Snaking Fire	North Fork South Platte River
2002	Black Mountain Fire	Elk Creek
2002	Hayman Fire	Tarryall Creek, South Platte River
2003	Campbell Fire	Arkansas Headwaters Basin

The boundaries of the eight major watersheds will also be superimposed on existing mapping of wildfire risk. The preparation of that mapping will be followed by a cursory examination of the possible correlation between the location of a site or region within a particular major watersheds and the risk of future wildfires, again in order to improve on a cursory “hand” analysis, which is summarized in the table below.

Table 4-16 Projected Future Locations of Wildfires

Watershed	Wildfire Risk	Locations Affected
Elk Creek	High	<i>Highland Park, Harris Park, Bailey Area</i>
Deer Creek	High	<i>Highland Park, Bailey Area</i>
North Fork South Platte River	High	<i>Webster, Grant, Santa Maria, Singleton, Shawnee, Glenisle, Bailey</i>
Tarryall Creek	Moderate to High	<i>Tarryall</i>
Middle Fork South Platte River	Moderate	<i>Alma, Fairplay</i>
South Fork South Platte River	Moderate	<i>Hartsel</i>
South Platte River	Moderate to High	<i>Lake George, Sportsman’s Paradise</i>
Arkansas Headwaters Basin	Moderate	<i>Guffey</i>

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Beyond those initial efforts of mapping the entire county, Park County has prepared maps of five of the individual watersheds showing for each watershed the perimeters of recent historic wildfires, the current population density and the standard background features from USGS 7.5' quadrangle maps. Those individual watershed maps, shown in Figures 4-A through 4-E, demonstrate that, due to a combination of current forest conditions and population density, by far the greatest wildfire risk in Park County exists in three watersheds: Elk Creek, Deer Creek and the North Fork South Platte River.

Figure 4-A

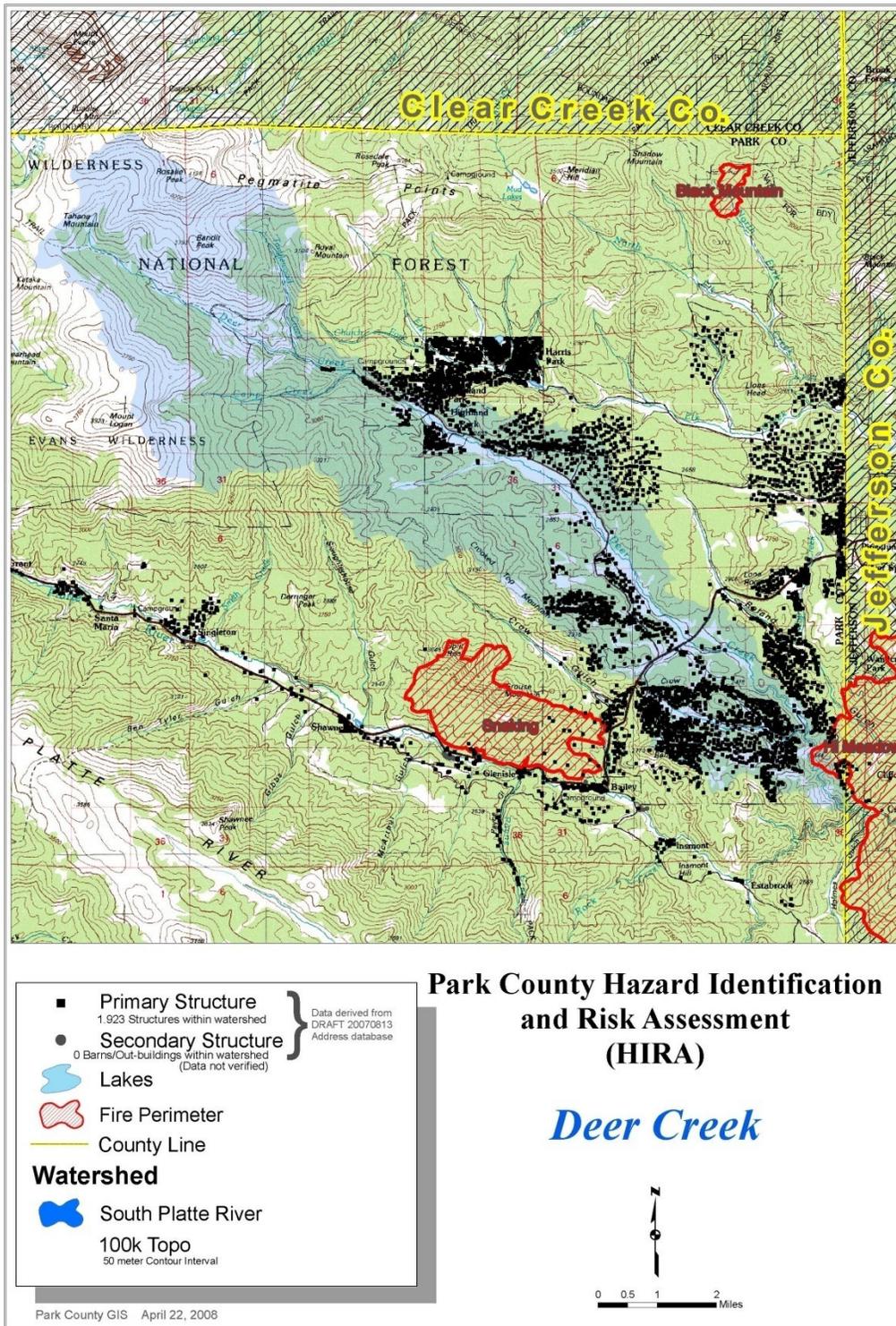


Figure 4-B

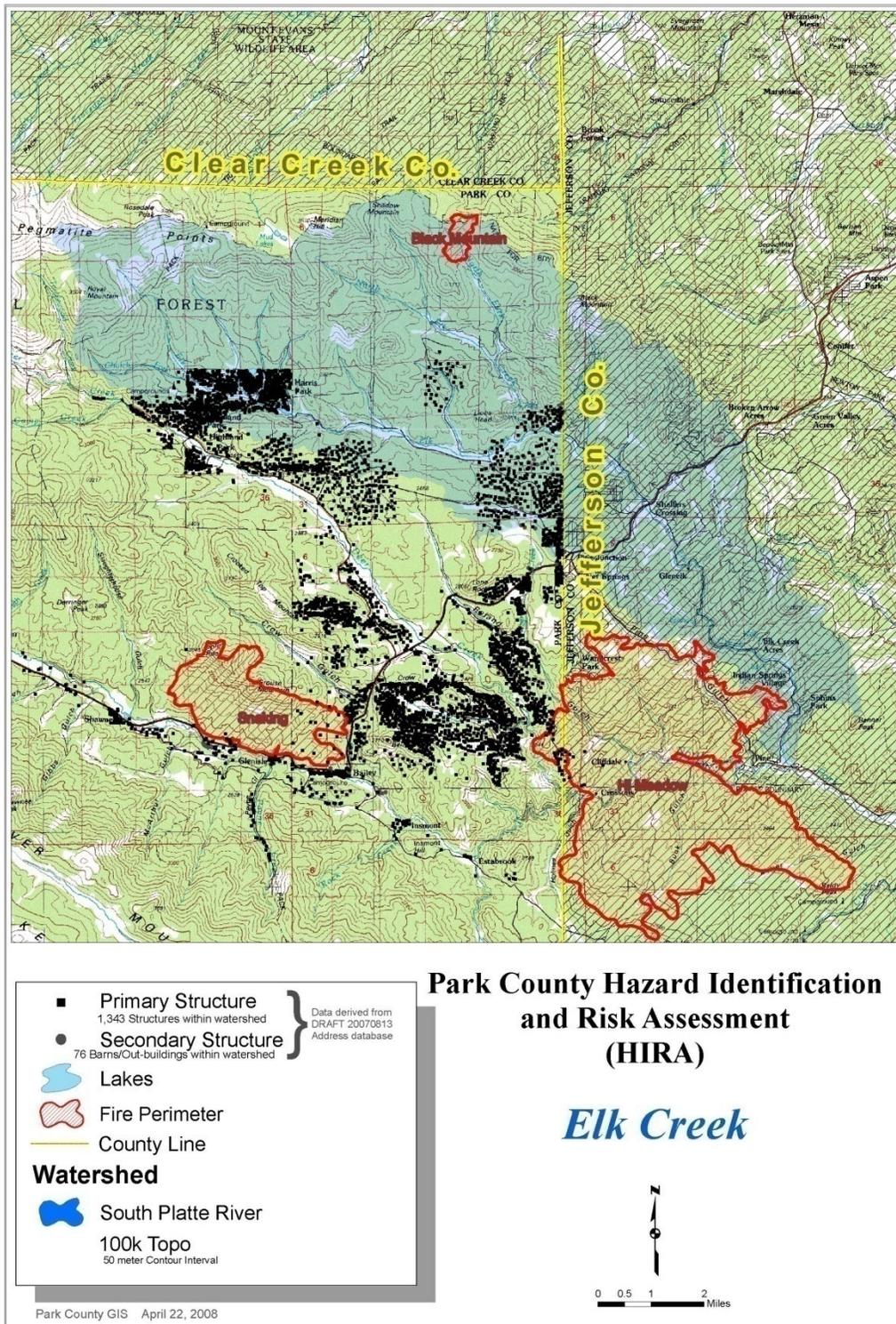


Figure 4-C

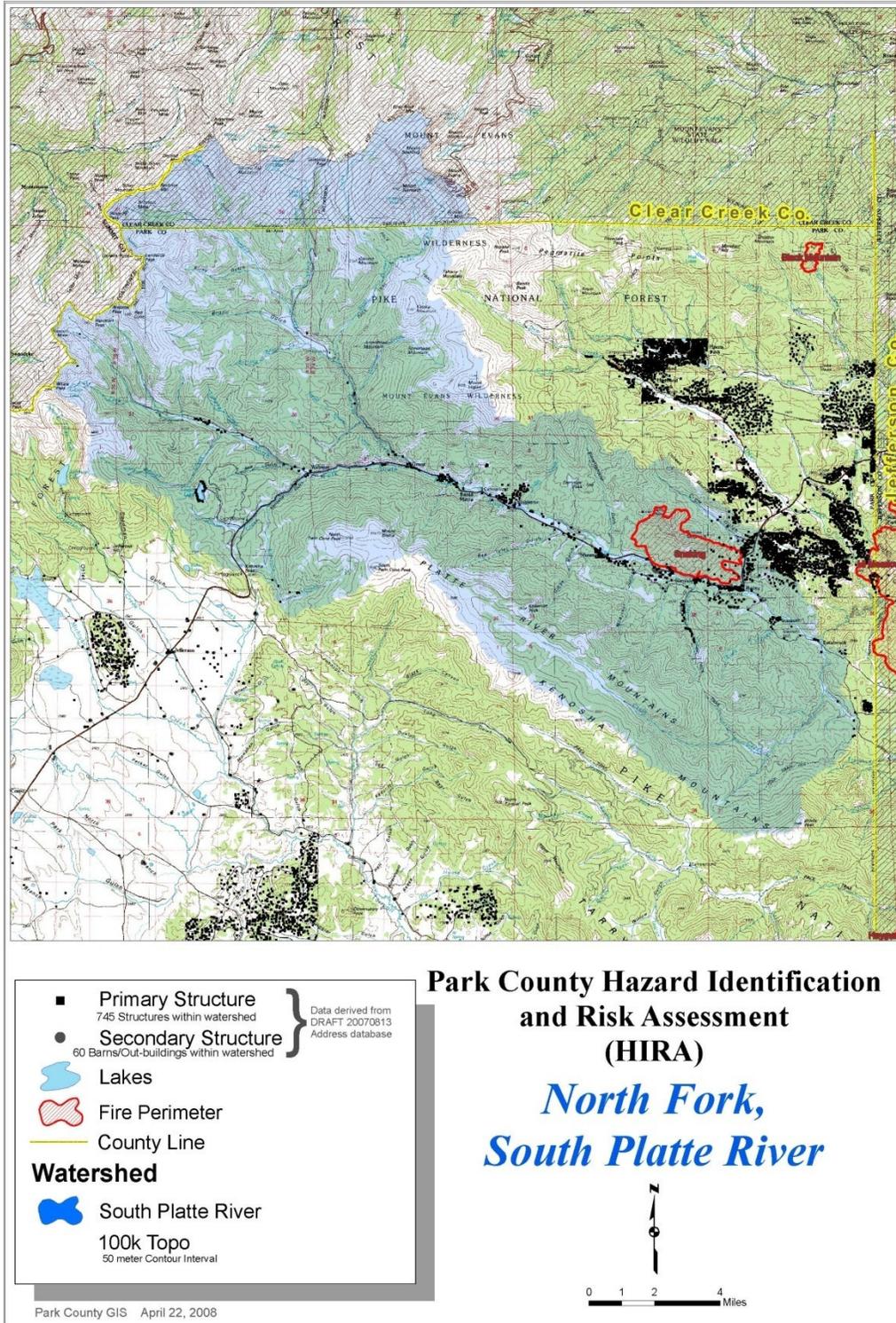


Figure 4-D

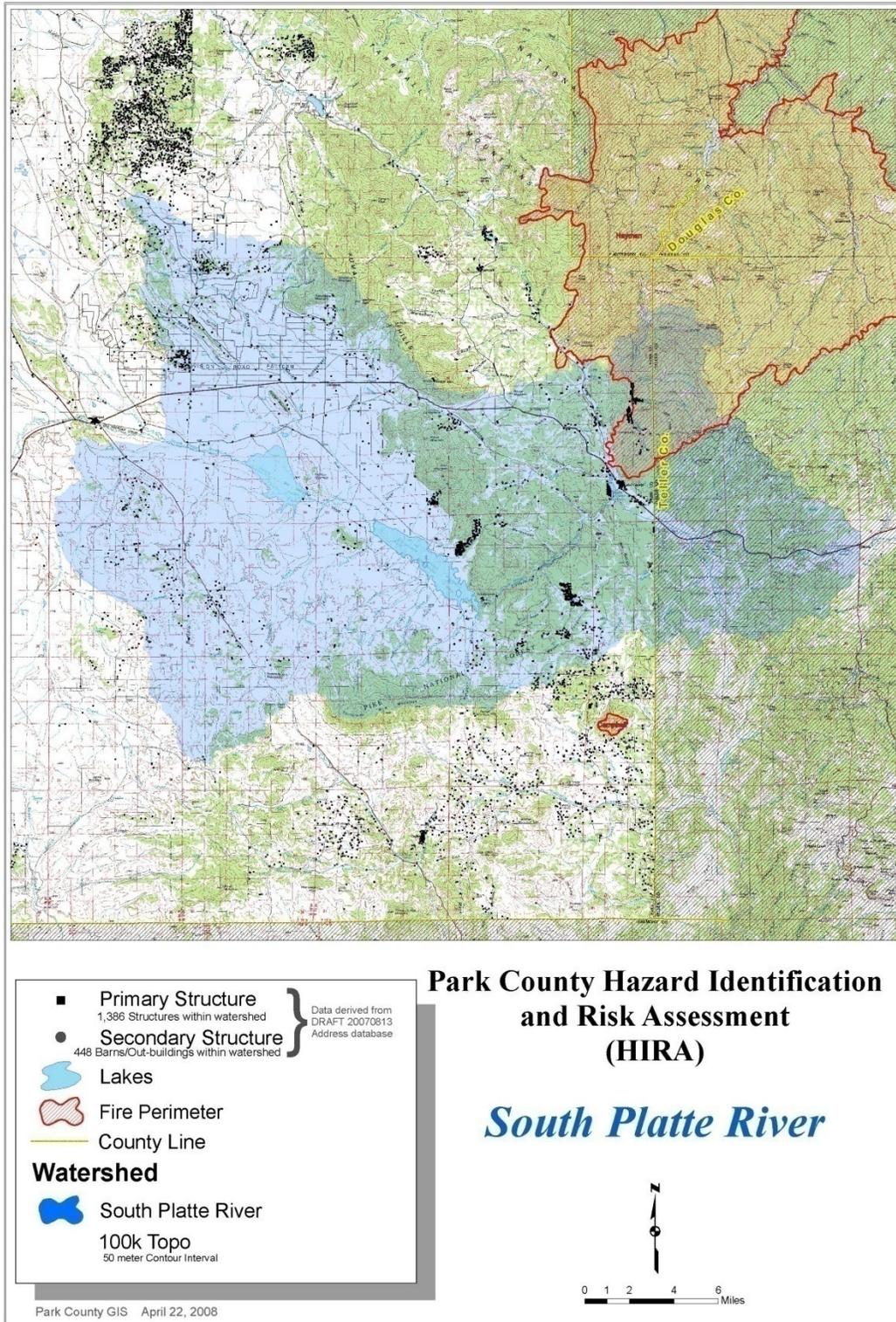
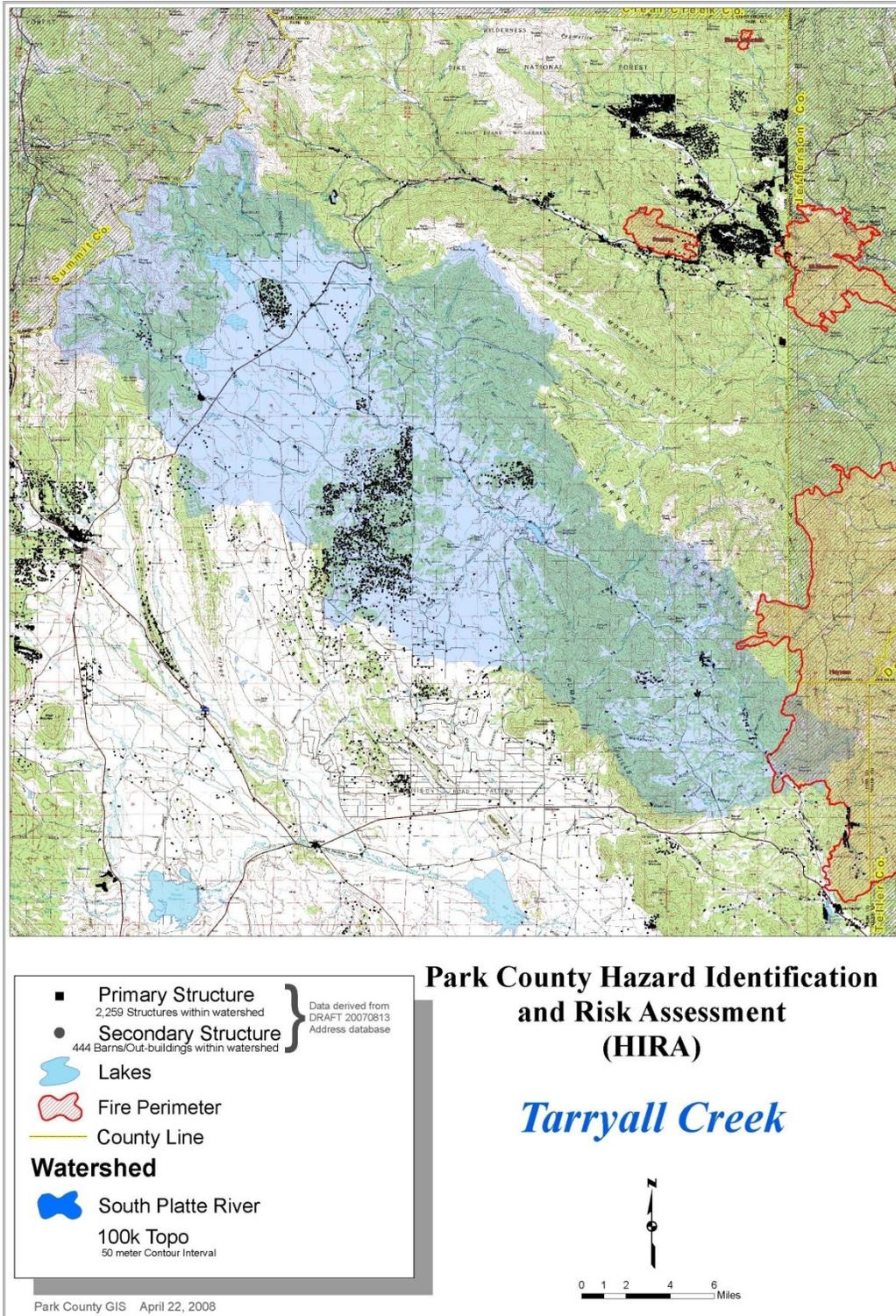


Figure 4-E



4.5.2 Severe Winter Storms

4.5.2.1 Hazard Areas

To date, some preliminary distinctions have been made regarding which of the eight major watersheds within Park County, or which particular portions of any of those watersheds, may have a history of more frequent or more significant severe winter weather impacts or which watersheds or particular portions of those watersheds might be more prone to future severe winter weather impacts. During and after the severe winter of 2007-2008, the Park County GIS department mapped those road segments and other locations where drifting of snow was significant enough to require a major allocation of resources just to provide basic access for people and, in some cases, livestock. This initial mapping, previously shown in *Figure 4-12*, provides a logical starting point for exploring the possibility of making distinctions about the impacts of severe winter weather in Park County. A number of factors contribute to a particular area's vulnerability to damages, and some of these factors could be the subjects of further historical research, making use of geographic data from the past two winters as a start.

Certain characteristics of an area or of a structure increase its resistance to damages due to severe winter weather events. Many of these characteristics are extremely specific to the particular location or the particular structure in question. Continuing to document specific historic events would further the process of determining whether certain locations in Park County are inherently more prone to the impacts of severe winter weather than other locations.

4.5.2.2 Vulnerability Analysis

Winter storms can disrupt lives for periods of a few hours or up to several days, depending upon the severity of the storm. Transportation systems are usually among the first and hardest hit sectors of a community. Snow and ice can block primary and secondary roads, and treacherous conditions make driving difficult; some motorists may be stranded during a storm, and emergency vehicles may not be able to access all areas. The steep slopes found throughout the County exacerbate the situation, making some of the secondary roads impassable during even a minor winter weather event. Ground blizzards present significant risk to drivers, ranchers and their livestock and others trying to negotiate the dangerous conditions.

Utility infrastructure can also be adversely affected by winter storms. Heavy snow and ice can cause power lines to snap, leaving citizens without power and, in some cases, heat for hours or even days. Likewise, telephone lines can also snap, disabling

communication within portions of a community. Frozen water pipes can rupture in people's homes, and water and sewer mains can also freeze and leak or rupture if not properly maintained. These ruptures can lead to flooding and property damage.

People's health can also be adversely affected by severe winter weather. People who lose heat in their homes and do not seek alternate shelter, people who get stuck in snowdrifts while driving, or people working and playing outdoors can suffer from hypothermia and frostbite. Since winter weather hazards generally affect the entire County and vary in intensity and form, it is not possible to quantify primary effects or specific damages.

Ranchers in particular have suffered severe economic consequences during severe winter weather events. Following the severe winter storms of 2006-2007 and 2007-2008, ranchers reported significant livestock losses, in part due to the extreme cold that came with the snow. Furthermore, some ranchers reported that costs of hay nearly tripled in the wake of these storms.

4.5.2.3 Secondary Effects

Secondary effects of winter storms are broad. Treacherous driving conditions can result in automobile accidents in which passengers may be injured and property damages may occur. Impassible roads can delay deliveries of heating fuel. Impassable roads can also result in schools being closed because buses are not able to access their routes and bring children to school. The costs of salting and sanding roads and of snow removal can be staggering to communities both large and small. The costs to repair roads after spring thaws can also be significant. Furthermore, first responders such as the fire department are frequently called upon to deliver essential items such as medications to populations that cannot navigate roads during inclement weather.

After a significant snowfall, or after a winter during which there were several significant snowfalls, the resulting thaw that occurs when the temperature rises above freezing can cause flooding in some areas. As noted elsewhere in this document, May through September are the months with the highest occurrences of flooding. Because of the mountainous terrain in this area, flood events tend to occur rapidly and with little warning.

The local economy can also suffer if businesses close due to inclement winter weather. The impact could be significant in a larger event. In addition, disabled transportation systems may mean that shipments of goods and services are delayed, which may result in decreased inventory for retailers and increased inventory for industrial and commercial suppliers.

4.5.2.4 Enhanced Mapping and Analysis of Hazard Data

At present, Park County is in the beginning stages of developing detailed severe winter weather event mapping and analyses. The county has gathered initial data related to past severe winter weather events, starting with the winter of 2007-2008. The harsh winter of 2007–2008 demonstrated that ground blizzards and heavy drifting are important components of severe winter weather in Park County. The GIS department has mapped specific locations impacted by the severe winter weather in 2007–2008 and will in the near future, superimpose on that mapping the boundaries of the eight major watersheds. While the winter of 2006–2007 was not as severe as the winter of 2007-2008, there may be additional historic information from that winter that could be added to the GIS mapping that has already been prepared. Three factors that can cause severe winter weather problems at a specific location are heavy snowfall, high winds, and heavy drifting (height and/or width of drifts). In both of the most recent winters, specific roads, subdivisions and communities were more significantly affected.

While documenting such historical occurrences and their specific locations may be somewhat anecdotal, the enhancement of the initial mapping of locations experiencing serious ground blizzards and heavy drifting events during those two winters will ensure the development and maintenance of an ongoing geographic record of severe winter weather events and their impacts in Park County. Organizing and presenting the data according to major watershed will help in preliminary analysis of whether historic severe winter weather events or future severe winter weather risks show any clear pattern of variability depending on geographic location within Park County, even though the major streams themselves do not directly cause severe winter weather incidents.

4.5.3 HAZMAT

4.5.3.1 Hazard Areas

Areas that could be affected by a HAZMAT Transport accident are the US Highway 285 Corridor, the US 24 Corridor and the State Highway 9 Corridor. The North Fork of the South Platte River is also at risk for contamination from a HAZMAT spill between Bailey and Grant. All communities along these corridors could be affected by such an incident.

At present there is no mapping to display or analyze historic HAZMAT information for Park County according to the eight major watersheds in the county. No distinctions have been made regarding specific locations within Park County which have a history of more frequent or more severe HAZMAT impacts or which specific locations might be more prone to future HAZMAT impacts. Given the fact that the county is aware of only two HAZMAT incidents in recent history, the available data do not support extensive analysis. It should be noted however, that both of those incidents occurred on Crow Hill in the Bailey area. Because of their combination of steep mountain grades, windy curves and potential for severe winter weather and adverse road conditions, Crow Hill and other passes in Park County, including Hoosier Pass, Red Hill Pass, Kenosha Pass and Wilkerson Pass, are likely locations to anticipate future incidents.

4.5.3.2 Vulnerability Assessment

Park County contains three major highways, the north-south US Highway 285, which is considered the county's "Primary Arterial", US Highway 24, and State Highway 9. US Highway 285 and State Highway 9 are often used as an alternate route to Interstate 70 for hazardous materials transports. US Highway 24 is the primary route from Colorado Springs into the Central Mountains of Colorado. Incidents occurring in urban locations, such as Fairplay or downtown Bailey could have significant human consequences as well. Park County emergency services professionals have indicated that many hazardous materials pass through the county. Any number of hazardous materials, if released into the air by fire, wind or both could threaten people's health or lives, and would likely force evacuations.

Park County reported in its 2006 Emergency Operations Plan that it did not have its own Hazardous Materials Response Team. The county depends on aid from teams based in Jefferson, El Paso or Summit Counties. Data relating to the number of vehicles transporting hazardous materials or the types of materials that they transport is limited. The Mitigation Advisory Committee may want to consider expanding data. A HAZMAT incident in 2004 near Bailey pointed out some challenges that can be faced in

responding to such incidents. The description below was provided by the Park County Sherriff:

“On May 20, 2004, there was a tanker fire in the Bailey area, near Crow Hill. During that incident we were under some pretty dry climate conditions, causing an increase in wildfire danger. The tanker was carrying gasoline. Platte Canyon Fire Protection District was on scene along with other agencies trying to extinguish the fire. Once Colorado State Patrol HAZMAT arrived on scene, they asked us to let the fire burn, instead of extinguishing the blaze. Due to the high wildfire danger, and the occurrence of several spot fires, it was decided by Fire Chief Davis, and supported by me, that do to the current conditions the fire had to be put out. This was an instance where the development of one hazard greatly increased the risk of another.”

4.5.3.3 Secondary Effects

Secondary effects of HAZMAT incidents are contamination of streams, lakes and ponds (including reservoirs), and groundwater aquifers, soil contamination, and wildfires and building fires ignited by explosions of flammable materials, and hail damage to buildings, vehicles and crops. The specific impacts of wildfires are discussed further in other sections of this Plan. Other secondary effects of HAZMAT incidents can include disruption of transportation and other critical services such as water, electrical, and telephone services. Additional secondary effects include impacts on tourism, and thus the local economy, through activities such as camping, hiking, hunting, and fishing. Because water, soil, and vegetation can be affected by HAZMAT incidents, a secondary effect can be toxins carried out of the area by wildlife and fish that come into contact with the contaminated water, soil, and/or vegetation.

4.5.3.4 Enhanced Mapping and Analysis of Hazard Data

No maps currently exist to show historic HAZMAT events in Park County or to show which portions of the county could be impacted in the future by HAZMAT events. While at present, Park County does not anticipate any HAZMAT event mapping or analyses, the county could gather data related to past HAZMAT events besides the two incidents that are already known. If there are any additional data, they might be organized and presented according to major watershed to determine whether historic HAZMAT events or future HAZMAT risks show any clear pattern of variability depending on geographic location within Park County, even though the major streams themselves do not directly cause HAZMAT incidents.

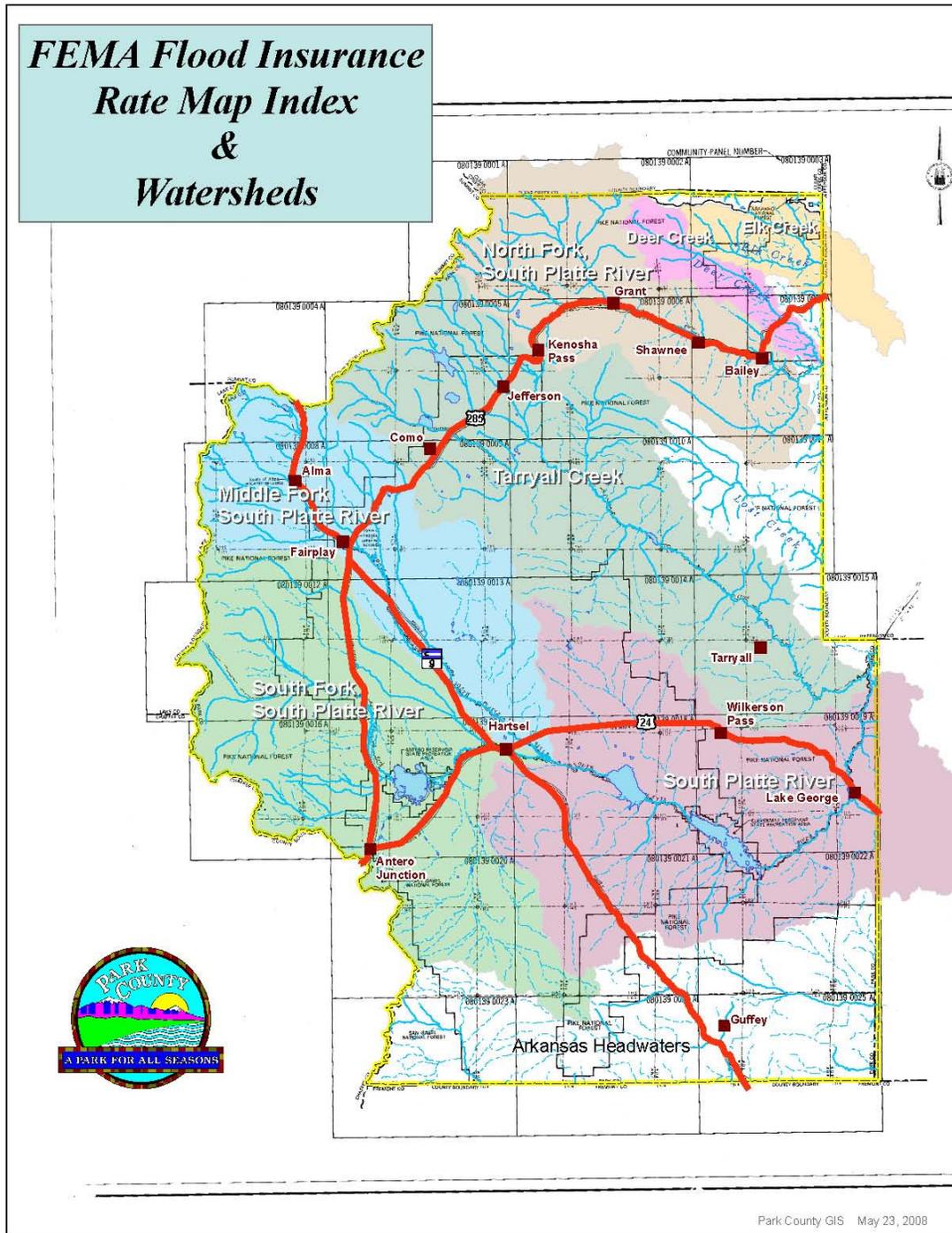
4.5.4 Flooding

4.5.4.1 Hazard Areas

The portions of the county most susceptible to flooding are those directly adjacent to the area's major drainage ways and selected smaller tributaries throughout the area. Due to the mountainous terrain in much of the county and the associated steep slopes, a great deal of development in the county is located in the valleys along these streams. Development generally consists of residential uses, with commercial districts primarily limited to the two incorporated towns, Fairplay and Alma.

Through the National Flood Insurance Program (NFIP), FEMA has developed Flood Insurance Rate Maps (FIRMs) that identify flood zones through detailed hydrologic and hydraulic studies for many communities throughout Colorado. To date, no such detailed studies have been prepared for Park County, Alma or Fairplay. When such detailed studies are prepared, the flood zones represent the areas susceptible to the 1% annual chance flood, or a 100-year flood. When these floodplain studies are detailed, FEMA will calculate Base Flood Elevations (BFEs), which are used to define the 100-year floodplain. The BFE is a commonly used standard level for determining flood risk, and managing potential floodplain development. When the floodplain studies are approximate, BFEs may be estimated through approximate engineering techniques or through techniques that are not based on any engineering. The FEMA maps for Park County and for the Town of Fairplay were developed through mapping techniques that are not based on engineering analysis. The index map for the Park County FIRMs, showing the layout of the individual map panels from 1987, has been digitized and the Park County watershed boundaries have been superimposed on that index map, shown in Figure 4-23.

Figure 4-23



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The specific flood hazard areas in each of the major watersheds in Park County are described below.

4.5.4.1.1 Elk Creek Basin

The section of Elk Creek and its tributaries that is most susceptible to flooding is between the Mt. Evans Wilderness and Harris Park. There is residential development along the main stem of Elk Creek and several of its tributaries. The Elk Creek Basin has not been studied in detail as part of a FEMA Flood Insurance Study, and BFE's have not been determined for the 100-year flood. The lack of engineering analysis currently available for the Elk Creek Basin makes it difficult to estimate the number of properties in the 100-year floodplain.

As noted in the hazard history section, no 100-year flood events have been officially recorded in the Elk Creek Basin. This does not preclude the occurrence of a 100-year event in the future. Given the significant population in the Elk Creek Basin, the high rate of population growth, the existing infrastructure at risk to flooding and the fact that the watershed has experienced a wildfire in the past five years, Park County may want to consider a Map Modernization project in this basin. Table 4-17 below summarizes the flood risk profile for this basin.

This watershed is subject to snowmelt flooding, rainfall flooding, post-wildfire flooding and debris flows.

Risk Factor	Significance (<i>high, medium, low</i>)
Current population	high
Current rate of population growth	high
Infrastructure at risk	high
Wildfire in past 5 years	high
Wildfire in past 10 years	low
Current pine beetle infestation	high
Pine beetle infestation anticipated in next five years	high

4.5.4.1.2 Deer Creek Basin

The section of Deer Creek and its tributaries that is most susceptible to flooding extends from Highland Park, beyond US Highway 285, all the way to the confluence of Deer Creek with the North Fork of the South Platte River near the Park County-Jefferson County line. There is residential development along the main stem of Deer Creek and

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several of its tributaries. The Deer Creek Basin has not been studied in detail as part of a FEMA Flood Insurance Study, and BFE's have not been determined for the 100-year flood. The lack of engineering analysis currently available for the Deer Creek Basin makes it difficult to estimate the number of properties in the 100-year floodplain.

As noted in the hazard history section, no 100-year flood events have been officially recorded in the Deer Creek Basin. This does not preclude the occurrence of a 100-year event in the future. Given the significant population in the Deer Creek Basin, the high rate of population growth, the existing infrastructure at risk to flooding and the fact that the watershed has experienced a wildfire in the past ten years, Park County may want to consider a Map Modernization project in this basin. Table 4-18 below summarizes the flood risk profile for this basin.

This watershed is subject to snowmelt flooding, rainfall flooding, post-wildfire flooding and debris flows.

Table 4-18 Deer Creek Basin	
Risk Factor	Significance (<i>high, medium, low</i>)
Current population	high
Current rate of population growth	high
Infrastructure at risk	high
Wildfire in past 5 years	low
Wildfire in past 10 years	high
Current pine beetle infestation	high
Pine beetle infestation anticipated in next five years	high

4.5.4.1.3 North Fork South Platte Basin

The section of the North Fork of the South Platte and its tributaries that is most susceptible to flooding is in the corridor between Grant and Bailey along US Highway 285. There is residential and commercial development along the main stem of the North Fork and several of its tributaries. The North Fork Basin has not been studied in detail as part of a FEMA Flood Insurance Study, and BFE's have not been determined for the 100-year flood. The lack of engineering analysis currently available for the North Fork Basin makes it difficult to estimate the number of properties in the 100-year floodplain.

As noted in the hazard history section, no 100-year flood events have been officially recorded in the North Fork Basin. This does not preclude the occurrence of a 100-year event in the future. Given the significant population in the North Fork Basin, the high rate of population growth, the existing infrastructure at risk to flooding and the fact that the watershed has experienced a wildfire in the past five years, Park County may want

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to consider a Map Modernization project in this basin. Table 4-19 below summarizes the flood risk profile for this basin.

This watershed is subject to snowmelt flooding, rainfall flooding, post-wildfire flooding and debris flows.

Table 4-19 North Fork South Platte Basin

Risk Factor	Significance (<i>high, medium, low</i>)
Current population	high
Current rate of population growth	high
Infrastructure at risk	high
Wildfire in past 5 years	high
Wildfire in past 10 years	low
Current pine beetle infestation	high
Pine beetle infestation anticipated in next five years	high

4.5.4.1.4 Tarryall Creek Basin

The section of Tarryall Creek and its tributaries that is most susceptible to flooding is in the corridor between the developments just north of US Highway 285 in the vicinity of Jefferson and Como all the way to Tarryall Reservoir. There is development along the main stem of the Tarryall Creek and several of its tributaries. The Tarryall Creek Basin has not been studied in detail as part of a FEMA Flood Insurance Study, and BFE's have not been determined for the 100-year flood. The lack of engineering analysis currently available for the Tarryall Creek Basin makes it difficult to estimate the number of properties in the 100-year floodplain.

As noted in the hazard history section, no 100-year flood events have been officially recorded in the Tarryall Creek Basin. This does not preclude the occurrence of a 100-year event in the future. Given the moderate population in the Tarryall Creek Basin, the low rate of population growth, the existing infrastructure at risk to flooding, it does not appear that Park County will need to consider a significant Map Modernization project in this basin, even though the watershed experienced a wildfire within the past five years. Table 4-20 below summarizes the flood risk profile for this basin.

This watershed is subject to snowmelt flooding on larger streams, rainfall flooding on smaller streams, post-wildfire flooding and debris flows.

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Table 4-20 Tarryall Creek Basin

Risk Factor	Significance (<i>high, medium, low</i>)
Current population	low
Current rate of population growth	low
Infrastructure at risk	medium
Wildfire in past 5 years	high
Wildfire in past 10 years	low
Current pine beetle infestation	high
Pine beetle infestation anticipated in next five years	high

4.5.4.1.5 Middle Fork South Platte Basin

The two municipalities in Park County, the Town of Alma and the Town of Fairplay, are both entirely contained within the Middle Fork of the South Platte Basin. The Hazard Areas description for this basin has been split into three sections, one for unincorporated Park County, and one each for the two towns.

Middle Fork South Platte River (unincorporated Park County)

The section of the Middle Fork of the South Platte and its tributaries within unincorporated Park County that is most susceptible to flooding is in the corridor between Hoosier Pass and the Town of Fairplay along State Highway 9 and several county roads. There is residential and commercial development along the main stem of the Middle Fork and several of its tributaries. The Middle Fork Basin has not been studied in detail as part of a FEMA Flood Insurance Study, and BFE's have not been determined for the 100-year flood. The lack of engineering analysis currently available for the Middle Fork Basin makes it difficult to estimate the number of properties in the 100-year floodplain.

As noted in the hazard history section, no 100-year flood events have been officially recorded in the Middle Fork Basin. This does not preclude the occurrence of a 100-year event in the future. Given the moderate population in the unincorporated portion of the Middle Fork Basin, the low rate of population growth, and the existing infrastructure at risk to flooding, it does not appear that Park County will need to consider a significant Map Modernization project in the unincorporated section of the basin. Table 4-21 below summarizes the flood risk profile for this section of the basin.

This watershed is subject to snowmelt flooding on large streams and rainfall flooding on smaller streams.

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Table 4-21 Middle Fork South Platte Basin

Risk Factor	Significance (<i>high, medium, low</i>)
Current population	Low
Current rate of population growth	Low
Infrastructure at risk	Medium
Wildfire in past 5 years	Low
Wildfire in past 10 years	Low
Current pine beetle infestation	High
Pine beetle infestation anticipated in next five years	High

Middle Fork South Platte River (Alma)

The Middle Fork of the South Platte and Buckskin Creek within the Town of Alma are susceptible to flooding. There is residential and commercial development along the main stem of the Middle Fork and Buckskin Creek. The Middle Fork Basin has not been studied in detail as part of a FEMA Flood Insurance Study, and BFE's have not been determined for the 100-year flood. The lack of engineering analysis currently available for the Middle Fork Basin makes it difficult to estimate the number of properties in the 100-year floodplain.

As noted in the hazard history section, no 100-year flood events have been officially recorded in the Middle Fork Basin. This does not preclude the occurrence of a 100-year event in the future. Given the moderate population in the Town of Alma, the moderate rate of population growth, and the existing infrastructure at risk to flooding, it appears that the Town of Alma may want to consider a Map Modernization project in the incorporated section of the basin and collaboration with the county to simultaneously map unincorporated areas adjacent to the town, as appropriate. Table 4-22 below summarizes the flood risk profile for this section of the basin.

This watershed is subject to snowmelt flooding on large streams and rainfall flooding on smaller streams.

Table 4-22 Middle Fork South Platte River (Alma)

Risk Factor	Significance (<i>high, medium, low</i>)
Current population	medium
Current rate of population growth	medium
Infrastructure at risk	medium
Wildfire in past 5 years	low
Wildfire in past 10 years	low
Current pine beetle infestation	high
Pine beetle infestation anticipated in next five years	high

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Middle Fork South Platte River (Fairplay)

The Middle Fork of the South Platte and various dry gulches within the Town of Fairplay are susceptible to flooding. There is residential and commercial development along the main stem of the Middle Fork and various dry gulches. The Middle Fork Basin has not been studied in detail as part of a FEMA Flood Insurance Study, and BFE's have not been determined for the 100-year flood. The lack of engineering analysis currently available for the Middle Fork Basin makes it difficult to estimate the number of properties in the 100-year floodplain.

As noted in the hazard history section, no 100-year flood events have been officially recorded in the Middle Fork Basin. This does not preclude the occurrence of a 100-year event in the future. Given the significant population in the Town of Fairplay, the moderate rate of population growth, and the existing infrastructure at risk to flooding, it appears that the Town of Fairplay may want to consider a Map Modernization project in the incorporated section of the basin and collaboration with the county to simultaneously map unincorporated areas adjacent to the town, as appropriate. Table 4-23 below summarizes the flood risk profile for this section of the basin.

This watershed is subject to snowmelt flooding on large streams and rainfall flooding on smaller streams.

Table 4-23 Middle Fork South Platte River (Fairplay)	
Risk Factor	Significance (<i>high, medium, low</i>)
Current population	high
Current rate of population growth	medium
Infrastructure at risk	medium
Wildfire in past 5 years	low
Wildfire in past 10 years	low
Current pine beetle infestation	high
Pine beetle infestation anticipated in next five years	high

4.5.4.1.6 South Fork South Platte Basin

The sections of the South Fork of the South Platte River and its tributaries which are most susceptible to flooding are in the corridor between the US Forest Service's boundary with private property and State Highway 9 and the corridor between Antero Reservoir and Hartsel. There is a moderate amount of development along the main stem of the South Fork and some of its tributaries. The South Fork Basin has not been

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studied in detail as part of a FEMA Flood Insurance Study, and BFE's have not been determined for the 100-year flood. The lack of engineering analysis currently available for the South Fork Basin makes it difficult to estimate the number of properties in the 100-year floodplain.

As noted in the hazard history section, no 100-year flood events have been officially recorded in the South Fork Basin. This does not preclude the occurrence of a 100-year event in the future. Given the low population in the South Fork Basin, the low rate of population growth, and the existing infrastructure at risk to flooding, it does not appear that Park County will need to consider a significant Map Modernization project in this basin. Table 4-24 below summarizes the flood risk profile for this basin.

This watershed is subject to snowmelt flooding on large streams and rainfall flooding on smaller streams.

Table 4-24 South Fork South Platte Basin	
Risk Factor	Significance (<i>high, medium, low</i>)
Current population	low
Current rate of population growth	low
Infrastructure at risk	medium
Wildfire in past 5 years	low
Wildfire in past 10 years	low
Current pine beetle infestation	low
Pine beetle infestation anticipated in next five years	low

4.5.4.1.7 South Platte River Basin

The sections of the South Platte River and its tributaries that are most susceptible to flooding are the Hartsel area and the Lake George area. There is a moderate amount of development along the main stem of the South Platte and some of its tributaries. The South Platte Basin has not been studied in detail as part of a FEMA Flood Insurance Study, and BFE's have not been determined for the 100-year flood. The lack of engineering analysis currently available for the South Platte Basin makes it difficult to estimate the number of properties in the 100-year floodplain.

As noted in the hazard history section, no 100-year flood events have been officially recorded in the South Platte Basin. This does not preclude the occurrence of a 100-year event in the future. Given the moderate population in the South Platte Basin, the moderate rate of population growth, the existing infrastructure at risk to flooding and the fact that the watershed has experienced a wildfire in the past five years, Park

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County may want to consider a Map Modernization project in this basin. Table 4-25 below summarizes the flood risk profile for this basin.

This watershed is subject to snowmelt flooding on large streams, rainfall flooding on smaller streams, post-wildfire flooding and debris flows.

Table 4-25 South Platte River Basin	
Risk Factor	Significance (<i>high, medium, low</i>)
Current population	medium
Current rate of population growth	medium
Infrastructure at risk	medium
Wildfire in past 5 years	high
Wildfire in past 10 years	low
Current pine beetle infestation	low
Pine beetle infestation anticipated in next five years	high

4.5.4.1.8 Arkansas River Headwaters Basin

The section of the Arkansas River Headwaters Basin and tributaries that is most susceptible to flooding is the Guffey area. There is a small amount of development along the main stems of two of the major tributaries, Badger Creek and Currant Creek and tributaries to those streams and to Four Mile Creek. The Arkansas Headwaters Basin has not been studied in detail as part of a FEMA Flood Insurance Study, and BFE's have not been determined for the 100-year flood. The lack of engineering analysis currently available for the Arkansas Headwaters Basin makes it difficult to estimate the number of properties in the 100-year floodplain.

As noted in the hazard history section, no 100-year flood events have been officially recorded in the Arkansas Headwaters Basin. This does not preclude the occurrence of a 100-year event in the future. Given the low population in the Arkansas Headwaters Basin, the low rate of population growth, the existing infrastructure at risk to flooding and the fact that the watershed has experienced a wildfire in the past five years, it does not appear that Park County will need to consider a significant Map Modernization project in this basin. Table 4-26 below summarizes the flood risk profile for this basin.

This watershed is subject to rainfall flooding, post-wildfire flooding and debris flows.

Table 4-26 Arkansas River Headwaters Basin	
Risk Factor	Significance (<i>high, medium, low</i>)
Current population	Low
Current rate of population growth	Low
Infrastructure at risk	Medium
Wildfire in past 5 years	High
Wildfire in past 10 years	Low
Current pine beetle infestation	Low
Pine beetle infestation anticipated in next five years	Low

4.5.4.2 Vulnerability Analysis

In the previous sections of this analysis, specific areas susceptible to flooding in the County were identified. The next step in a Hazard Identification and Risk Assessment is to identify what is vulnerable to the affects of potential flooding. Flooding impacts a community to the degree it affects the lives of its citizens and the community functions overall. Therefore, the most vulnerable areas of a community will be those most affected by floodwaters in terms of potential loss of life, damages to homes and businesses, loss of tourism, and disruption of community services and utilities. For example, an area with a highly developed floodplain is significantly more vulnerable to the impacts of flooding than a rural or undeveloped floodplain where potential floodwaters would have little impact on the community.

A number of factors contribute to the relative vulnerabilities of certain areas in the floodplain. Development, or the presence of people and property in the hazardous areas, is a critical factor in determining vulnerability to flooding. Additional factors that contribute to flood vulnerability range from specific characteristics of the floodplain to characteristics of the structures located within the floodplain. The following is a brief discussion of some of these factors and how they may relate to the area.

- **Flood depth:** The greater the depth of flooding, the higher the potential for significant damages. Flood depths have been estimated for the 100-year flood (1 % chance flood in any given year).
- **Flood duration:** The longer duration of time that floodwaters are in contact with building components such as structural members, interior finishes, and mechanical equipment, the greater the potential for damage. As stated previously, because of the steep topography of the area, floodwaters tend to recede quickly following an event, but may remain longer in localized areas.

- **Elevation:** The lowest possible point where floodwaters may enter a structure is the most significant factor contributing to its vulnerability to damage due to flooding. Entry point elevations of structures throughout the County area vary greatly relative to the BFE. Data on the specific elevations of these structures have not been compiled for use in this analysis.
- **Construction Type:** Certain types of construction are more resistant to the effects of floodwaters than others. Masonry buildings, constructed of brick or concrete blocks, are typically the most resistant to flood damages simply because masonry materials can be in contact with limited depths of flooding without sustaining significant damage. Because the construction materials used are easily damaged when inundated with water, wood frame structures are more susceptible to flood damage. The type of construction throughout the County varies from area to area.

4.5.4.2.1 Repetitive Loss Properties

FEMA defines a Repetitive Loss property as any insurable building for which two or more claims of more than \$1,000 were paid by the National Flood Insurance Program (NFIP) within any rolling ten-year period, since 1978. A Repetitive Loss property may or may not be currently insured by the NFIP. According to FEMA, there are presently over 122,000 Repetitive Loss properties nationwide.

At this time, there are no (0) Repetitive Loss properties in Park County, the Town of Alma or the Town of Fairplay. This fact was verified through a review of FEMA's **Community Information System** (CIS) website. The Town of Alma does not currently participate in the NFIP. According to the CIS, there are no (0) flood insurance policies in force in unincorporated Park County and there are no (0) flood insurance policies in the Town of Fairplay. Since none of those insured properties or any other uninsured properties within those two jurisdictions are Repetitive Loss properties, the issue of Repetitive Loss is not presently a concern in either of those communities. Likewise the issue of Repetitive Loss properties is not a concern in the Town of Alma, where there are currently no flood insurance policies in force.

4.5.4.3 Secondary Effects

If a significant flood event occurs, there is a potential for a variety of secondary impacts. Some of the most common secondary effects of flooding are impacts to infrastructure and utilities such as roadways, water service, and wastewater treatment, and impacts to local commerce, including tourism. Many of the roadways in the County are vulnerable to damage due to floodwaters. The effect of flood damages to roadways can limit access to areas, cutting off some residents from emergency services as well as other essential

services, as well as hampering outsiders visiting the County or traveling through on their way to other destinations.

Since a major heating source in the area is propane gas, there may be many properties in floodplains with above-ground fuel storage tanks. It is likely that the majority of tanks in the floodplain are not secured or strapped down. If these tanks were to be damaged or dislodged during a flood event, the resulting gas leaks could present serious explosion risks. Tanks can also become floating projectiles in quickly moving floodwaters, causing serious damage to property and danger to individuals in their path.

Another secondary effect of flooding is erosion which can, in turn, contribute to sedimentation. Some stream reaches in Park County fail to meet state water quality standards because of sediment loading. CDPHE and Park County can identify specific stream reaches that have sediment loading problems. Then the county can begin to investigate possible causes of the sediment loading in the affected stream reaches. Those causes may include historic mining activity in or near the streams and/or their tributaries, past wildfires in the watershed upstream, naturally erosive soils, destabilizing agricultural practices, upstream urbanization and the application of traction sand on adjacent highways. The county could subsequently approach state and federal agencies about possible technical and financial assistance in identifying the causes of sediment loading and the potential value of various mitigation measures.

4.5.4.4 Enhanced Mapping and Analysis of Hazard Data

Park County's existing approximate floodplain maps do not provide any engineering information. The maps are not based on any hydrologic or hydraulic analyses. During the fall of 2007, the Colorado Water Conservation Board (CWCB) indicated its interest in working with Park County to develop floodplain mapping for selected stream reaches in the County, utilizing engineering analyses that would be performed as part of the project. Ultimately, during the spring of 2008, Park County and the CWCB negotiated a project scope that consisted of digitizing the existing approximate floodplain maps without developing any new detailed floodplain mapping or enhanced approximate floodplain mapping. At the time of completion of this mitigation plan, that Map Modernization (Phase I) project was still in progress.

Once the digital Map Modernization project has been completed, the Park County GIS department can superimpose the boundaries of the individual watersheds on the digital floodplain maps and subsequently create separate watershed floodplain maps for each watershed in the county. Eventually detailed floodplain mapping or enhanced approximate floodplain mapping could be added to the initial approximate digital

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floodplain mapping. Annual mapping projects, with funding being shared on an ongoing basis by Park County and CWCB and/or appropriate federal agencies, could be conducted in order of priority.

Pursuing a future mapping program with the CWCB, involving annual mapping projects, would provide Park County and Alma and Fairplay with the greatest likelihood of acquiring detailed floodplain mapping or enhanced approximate mapping. Such a collaborative program between the local governments and CWCB would involve the development and/or acquisition of hydrologic information, topographic data, base mapping, and hydraulic analyses for selected priority locations throughout Park County. The following table is a list of areas that Park County might choose to consider for a future Map Modernization (Phase II – Risk MAP) project with the CWCB. The study priority areas were determined by a cursory analysis of flooding history, wildfire history, population and infrastructure density and other factors.

Table 4-27 Potential Floodplain Mapping Study Areas		
Potential Study Area	Watershed(s)	Study Priority
Selected segments of Elk Creek and tributaries	Elk Creek	<i>High</i>
Selected segments of Deer Creek and tributaries	Deer Creek	<i>High</i>
Selected segments of North Fork in Grant – Bailey corridor and tributaries	North Fork South Platte River	<i>High</i>
Alma	Middle Fork South Platte River	<i>Medium</i>
Fairplay	Middle Fork South Platte Rive	<i>Medium</i>
Hartsel area	South Platte River, Middle Fork South Platte River, South Fork South Platte River	<i>Medium</i>
Selected tributaries in Lake George area	South Platte River	<i>Medium</i>
Selected segments of Tarryall Creek and tributaries	Tarryall Creek	<i>Low</i>
Guffey area	Arkansas Headwaters	<i>Low</i>

4.5.5 Drought

4.5.5.1 Hazard Areas

At present there is no mapping to display or analyze historic or current drought information or projected drought information for Park County according to the eight major watersheds in the county. No distinctions have been made regarding specific locations within Park County which have a history of more frequent or more severe drought impacts or which specific locations might be more prone to future drought conditions.

4.5.5.2 Vulnerability Analysis

If a significant drought event were to occur, it could bring extensive economic, social, and environmental impacts to the County. Commonly one of the most significant economic effects to a community is the impact on agriculture. through higher costs of irrigation (energy usage of pumps), lack of water availability for surface water rights holders, lower groundwater tables, the potential for drilling new and/or deepening current wells, potentially accelerated sales of livestock herds and increased costs of livestock feed (especially if the region as a whole is suffering from drought). Significant increases in the prices of essential items such as hay can have a prohibitive effect on ranching operations. Other economic effects could be felt by businesses that rely on adequate water levels for their day-to-day business such as carwashes and laundromats. Drought can also create conditions that promote the occurrence of other natural hazards such as wildfires and wind erosion. The likelihood of flash flooding is increased if a period of severe drought is followed by a period of extreme precipitation. Another significant side-effect from drought is the increase in the threat of wildfires in forested/grassland areas of the county. Drought conditions can lead to increased susceptibility of wildfires to grow at a more rapid pace than during periods of normal moisture. Low-flow conditions also decrease the quantity and pressure of water available to firefighters to fight fires.

Environmental drought impacts include both human and animal habitats, and hydrologic units. During periods of drought, the amount of available water decreases in lakes, streams, aquifers, soil, wetlands, springs, and other surface and subsurface water sources. This decrease in water availability can affect water quality such as salinity, bacteria, turbidity, and temperature increase and pH changes. Changes in any of these levels can have a significant effect on the aquatic habitat of a numerous plants and animals found throughout the County. Low water flow can result in decreased sewage flows and subsequent increases in contaminants in the water supply. Decrease in the availability of water also decreases drinking water supply and the food supply as food

sources become scarcer. This disruption can work its way up the food chain within a habitat. Loss of biodiversity and increases in mortality can lead to increases in disease and endangered species.

4.5.5.3 Secondary Effects

If a significant drought event occurs, there is a potential for a variety of secondary impacts. The most common secondary effects of drought are impacts to local commerce, including tourism and providers of goods and services to Park County's agricultural community. Droughts lead to diminished stream flows, lower reservoir levels, and in the extreme, dried-up reservoirs, which can all have an adverse effect on water-related recreation. Activities such as fishing can be significantly restricted because of drought. Also there are many places in the forest that cannot be accessed because the increase in wildfire danger. In addition, wildfires that result from drought conditions can impact tourism and they can impact infrastructure like roads and utilities.

4.5.5.4 Enhanced Mapping and Analysis of Hazard Data

The current Colorado Drought Mitigation and Response Plan (dated 2001) provides some guidance as to how Park County could gather data related to past, current, and future drought conditions. The data might be organized and presented according to major watershed to determine whether historic drought impacts or impending drought risks show variability depending on geographic location within Park County, perhaps indicating preliminarily whether some of the major watersheds are more prone to drought than others at a particular point in time. The state's plan utilized a number of drought identification databases including the Colorado Modified Palmer Drought Index (PDI), the Surface Water Supply Index (SWSI) and/or the Standardized Precipitation Index (SPI).

Drought mitigation planning work conducted elsewhere in Colorado in a manner that is consistent with the state drought plan indicates some collection and organization of data that could be undertaken by Park County. The stream flow values for April through September, April to June precipitation data (as a % of normal) from official NOAA Cooperative stations, and July to September precipitation data (as a % of normal) were the basic data that were used to analyze and illustrate the levels of drought and drought frequency in these other Colorado communities. For each of these three variables, color-coded tables were developed that depicted values that were: a) between 99 and 86 % of normal, b) between 85 and 76% of normal, and c) 75% or less than normal. Typically one of these three variables was 'drier' than normal on a given year (rarely did all three register as above normal), not necessarily indicating drought conditions (perhaps simply demonstrating that Colorado's climate is semi-arid. There were,

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however, several years when two or three of these variables were classified as 'severe' or less than 75% of normal, generally correlating quite well with drought conditions.

Another important factor that was reviewed in examining drought-like conditions in these communities was periods of anomalously warm weather, most notably the number of days where the daily high temperature meets or exceeds 85 F in the lower elevation of the mountain counties. The more days when afternoon high temperatures were reaching the 85 F mark, the greater the demand was for irrigation of crops and the more stressed rangeland grasses were. In addition, the greater the number of 'warm' days, the greater the wildfire threat became because of the acceleration of drying of forest land and adjacent underbrush. Again color-coded tables were developed to display ranking of: a) much above normal, b) above normal, c) slightly above normal, d) normal, e) slightly below normal, f) below normal, and g) well below normal. The data showed that some distinct, prolonged periods of warm days appeared. These periods did correlate with most, but not all, of the dry periods of summertime droughts. To the extent possible, Park County can organize these data by the eight major watersheds to determine potential regional drought patterns within the county.

There are other drought-related data sources available to Park County to help with pre-drought preparation. Two of these data sources are related to ocean temperatures that have been correlated to drought in particular portions of North America. Initial research in Colorado shows that the 3-month average values of the Multivariate El Niño/Southern Oscillation (ENSO) Index (MEI) provides useful information about potential drought. The basic relationship indicates that La Nina ocean temperatures (i.e. 3-month average values of the MEI that are ≤ -0.25) do have a tendency to result in very dry or at best average conditions. Likewise, research shows an initial correlation with the value of the North Atlantic Oscillation (NAO). If the April to June (3-month average) $NAO \leq 0.00$, there may be impending low precipitation conditions. The comparison of the January to May (5-month average) of the NAO to the number of days with maximum temperatures ≥ 85 F indicated some ability to detect the threat of hot days. When the NAO for this period was > 0.00 then, historically many of the observed years had at least an average or above average number of days ≥ 85 F. Conversely in years when the NAO for this period was < 0.00 then there were few years where the number of days 85 F and above were average or above average.

The third data source available to Park County is the seasonal water supply forecasts from National Resources Conservation Service (NRCS). Forecasts of less than 80% for the April to September period indicate potential problems. These forecasts are typically issued within the first 3-7 days of the month. The fourth data source is the

Snow Water Equivalent (SWE) information from the NRCS. When SWE values are less than 90% of normal, then snowmelt runoff may be low.

The research described above lays out a path that Park County can follow for collecting and analyzing drought-related data in a GIS environment, employing a watershed-based framework. It demonstrates some of the proactive steps that local governments in a semi-arid state like Colorado can take to lessen the adverse effects of potential droughts prior to the onset of drought conditions. This kind of approach can be of particular value in addressing a hazard that can have as slow and unnoticeable an onset as drought can have.

4.5.6 Severe Thunderstorms / Hail Storms / Wind Events

4.5.6.1 Hazard Areas

Although no specific areas of Park County have been designated as having a higher risk of being affected by a severe thunderstorm, hailstorm or wind event, there are a number of factors that contribute to a particular area's vulnerability to damages. A lightning event has potential to inflict most damage to urban areas and dry forest that is susceptible to wildfire. Certain characteristics of an area or of a structure increase its resistance to damages due to high wind events then others. Many of these factors are extremely specific to the particular location or the particular structure in question.

At present there is no mapping to display or analyze historic or current severe thunderstorm, hailstorm or wind event information or projected severe thunderstorm, hailstorm or wind event information for Park County according to the eight major watersheds in the county. No distinctions have been made regarding specific locations within Park County which have a history of more frequent or more severe thunderstorm, hailstorm or wind event impacts or which specific locations might be more prone to future severe thunderstorm, hailstorm or wind events.

4.5.6.2 Vulnerability Analysis

The effects of each factor of an area or a structure on vulnerability can be discussed in general. The following is a list of these factors and a description of how they relate to vulnerability, particularly in Park County.

4.5.6.2.1 Population Density

Population density is an important factor when analyzing vulnerability to high wind events. The highest potential for damages, injuries, and loss of life is where the highest

concentration of development exists. The population density in Park County varies, however, and areas of significantly higher density are present. Therefore, these have a higher potential vulnerability to damage and loss of life in a high wind event.

4.5.6.2.2 Design Wind Pressures

Buildings must be designed to withstand both external and internal wind pressures on the structural framing and exterior elements. The level to which these structures are designed, as expected, directly correlates with its ability to resist damages due to high winds. The community's building code dictates to what design wind speed a structure must be designed to; as noted previously, the design wind speed for Park County is 90 mph. The County does have an adopted building code. For some building types, those structures constructed subsequent to the adoption of the building code are the most likely to be the most resistant to damages from wind. However, no comprehensive data on the date built for these structures exists for Park County.

4.5.6.2.3 Building Type

The type of building construction will have a significant impact on potential damages from high wind events. A summary of basic building types – listed in order of decreasing vulnerability (from most to least vulnerable) – is provided below.

- **Manufactured:** This building type includes manufactured buildings that are produced in large numbers of identical or smaller units. These structures typically include light metal structures or mobile homes.
- **Non-Engineered Wood:** Wood buildings that have not been specifically engineered during design. These structures may include single and multi-family residences, some one or two story apartment units, and small commercial buildings.
- **Non-Engineered Masonry:** Masonry buildings that have not been specifically engineered during design. These structures may include single and multi-family residences, some one or two story apartment units, and some small commercial buildings.
- **Lightly Engineered:** Structures of this type may combine masonry, light steel framing, open-web steel joists, wood framing, and wood rafters. Because of the mixture of construction types within individual buildings, some portions of these buildings have been engineered while other portions of the same buildings have not. Examples of these structures include motels, commercial, and light industrial buildings.
- **Fully Engineered:** These buildings typically have been designed for a specific location, and have been fully engineered during design. Examples include high-rise office buildings, hotels, hospitals, and most public buildings.

Park County includes a variety of building types. Residential construction is primarily wood framed, varying from single story to multiple stories, although some masonry residential properties are present as well. As mentioned in the list above, manufactured and non-engineered wood framed structures are the most susceptible to potential damage. With these types of construction being the most prevalent for residential properties in Park County, many residential structures in the area could be classified to have a high level of vulnerability to wind events.

Other types of structures that are vulnerable to damages during high wind events and that are found throughout Park County are metal framed buildings, usually associated with light industrial building uses as well as agricultural buildings. Because these structures are unoccupied for a majority of the day, the potential losses for these structures may be lower than those of residential buildings. However, the high numbers of employees present in some industrial buildings during working hours can increase the potential for loss of life during a tornado or high wind event. Agricultural buildings, such as barns and silos, are not typically designed to be resistant to the forces of high winds. Although the potential for human losses in these structures may be lower, the potential for high amounts of damages are significant.

Other building related factors include height, shape, and the integrity of the building envelope. Taller buildings and those with complex shapes and complicated roofs are subject to higher wind pressures than those with simple configurations. The building envelope is composed of exterior building components and cladding elements including doors and windows, exterior siding, roof coverings, and roof sheathing. Any failure or breach of the building envelope can lead to increased pressures on the interior of the structure, further damage to contents and framing, and possible collapse.

4.5.6.2.4 Estimating Losses

Potential damages due to a wind event can be estimated based on specific characteristics of a structure and a potential wind speed. The FEMA Benefit Cost module, used for estimating the benefits of potential wind mitigation projects, contains a wind damage function based on building type, and potential wind speed. This wind damage function expresses the potential damage to a building as a percentage of the buildings replacement value, and potential damages to a building's contents as a percentage of the value of its contents. For use in this module, FEMA separates structures according to the building types described in the Vulnerability Analysis. Using these building types, and the potential wind speeds for Park County, potential damages can be expressed in terms of a percentage of the building and content values. ASCE 7-98 categorizes the South Central Colorado area as a 90-mph wind zone, based on a 50-year recurrence interval. Based on ASCE 7, the potential wind speed for an

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event with a 100-year recurrence interval was estimated to be 107% of the 50-year wind speed, or 96.3 mph. Table 4-28 includes estimates of potential damage of the specific building types in Park County for the 50- and 100-year interval wind event. It should be noted that the 100-year wind speed assumed corresponds with an F1 category tornado on the Fujita scale. Damages from the impact of a tornado stronger than an F1 could greatly exceed these estimates.

Table 4-28 Potential Severe Weather Events

Building Type	50-Year Event (90 mph)		100-Year Event (96.3 mph)	
	Building Damage	Contents Damage	Building Damage	Contents Damage
Light Engineered	5%	2.5%	15%	15%
Non-engineered wood	7.5%	5%	20%	20%
Non-engineered masonry	5%	2.5%	15%	15%
Fully Engineered	2.5%	2.5%	5%	15%
Manufactured Homes	25%	40%	50%	100%

4.5.6.3 Secondary Effects

Because severe thunderstorms can include high winds, heavy rain, lightning, and hail, there is a potential for a variety of secondary effects. Some common secondary effects of severe thunderstorms are downed trees and power lines, wind damage to buildings and vehicles, flooding impacts to infrastructure and utilities, wildfires and building fires ignited by lightning, and hail damage to buildings, vehicles and crops. The specific impacts of flooding and wildfires are discussed further in other sections of this Plan. Other secondary effects of severe thunderstorms can include disruption of critical services such as water, electrical, and telephone services. Damage to police stations, fire stations, and other emergency service facilities can weaken a community's ability to respond in the crucial hours and days following an event. Additional secondary effects include impacts on tourism, and thus the local economy, through activities such as camping, hiking, hunting, and fishing. Secondary effects of high winds include falling trees that are standing dead. When the pine beetle infestation problem worsens in Park County, the effects of these winds will be exacerbated.

4.5.6.4 *Enhanced Mapping and Analysis of Hazard Data*

No maps currently exist to show historic storm events in Park County or to show which portions of the county could be impacted in the future by thunderstorms, hail storms, or wind events. No correlation has been drawn between the location of a site or region within any one of the eight major watersheds in the county and the past history or expected risk of that site or region regarding thunderstorms, hail storms, or wind events. At present, Park County does not anticipate any thunderstorm/hail storm/wind event mapping or analyses.

4.5.7 Landslides

4.5.7.1 *Hazard Areas*

Because of the physical characteristics of the area, virtually all of the mountainous areas of Park County are located in a moderate risk area to the effects of landslides. As stated previously, due to the many factors that contribute to when and where a landslide will occur, it is extremely difficult to indicate precise locations that are at a greater risk of being affected by a landslide than other areas. However, one of the best indicators of where a landslide may occur are locations of past landslide activity. These areas have demonstrated susceptibility to landslide occurrence, making additional landslides at these locations likely.

Based on geologic analyses, GIS mapping of *Landslide Deposits* and of *Debris Flow/Mudflow Flooding Areas* has been prepared for Park County. The mapping of *Landslide Deposits* was previously shown in Figure 4-15 and the mapping of *Debris Flow/Mudflow Flooding Areas* was previously shown in Figure 4-16. This mapping does not depict all areas within the County where historic landslides have occurred, or all areas where they may be a problem in the future, but it does provide initial geologic information. Historically, detailed records have not been maintained by the governments of Park County or the two towns; therefore the data required to identify all known high landslide risk areas located within the County is not available.

The mapping does show in a preliminary manner those portions of Park County facing the greatest likelihood of being impacted in the future by landslides. The possibility of a correlation between location within any one of the eight major watersheds in the county and the risk of future landslides will be initially examined through the county's GIS capabilities, as part of this project. In the near future, the boundaries of the eight major watersheds will be overlaid on the GIS mapping of and of *Landslide Deposit Debris* and of *Flow/Mudflow Flooding Areas*. Distinctions will be made regarding specific locations within Park County which might be more prone to future landslides.

4.5.7.2 Vulnerability Assessment

Because the conditions that cause a landslide are extremely site specific, the impacts of an individual landslide can vary greatly. Landslides can damage or potentially destroy anything in the path of the slide including homes, businesses, roads, and utilities. The precise impacts of a landslide will depend on the specific characteristics of the slide, as well as the level of development in the slide area.

Due to the extreme steep slopes in the mountainous areas of Park County, virtually all of the development in the area is at moderate risk to the effects of landslides. The vulnerability of specific structures and assets can only be determined by a detailed investigation of the site characteristics, primarily the proximity to at-risk slopes. A majority of the unincorporated areas throughout the County have extremely steep slopes. The potential for landslide damage to structures in these areas could be moderate. Areas affected by wildfires also have seen increased activity and risk of landslides. In particular, areas around Bailey and Lake George have seen increased landslide risk due to soil instability and from sediment and debris left by wildfires. These landslides have the potential to affect both infrastructure and private property in those particular areas.

Based on past occurrences, the most vulnerable assets located within Park County are its roadways. Many of the roads in the area traverse steep slopes increasing the vulnerability to damage. The damage to a roadway affected by a landslide can vary from partial blockage to total destruction.

4.5.7.3 Secondary Effects

Some common secondary effects of landslides are limitations of access due to impassable roads and disruption of critical services such as water, electrical, and telephone services from landslide damage, such as downed power lines or telephone lines or severed water lines. In the case of damage to roads, the community may feel more significant economic and safety impacts due to the loss of function of the roadways, in addition to the damage to roads themselves. Many of the roadways throughout the County provide the only direct access from one community to another, or potentially the only access to certain remote areas. This reduction in access can increase the response time of emergency vehicles, creating a potentially serious threat to public safety in these areas. Damage to police stations, fire stations, and other emergency service facilities can weaken a community's ability to respond in the crucial hours and days following an event. Additional secondary effects include impacts on tourism, and thus the local economy, through activities such as camping, hiking,

hunting, and fishing. Landslide debris can also partially or fully block rivers, in which case the potential for significant flooding exists.

4.5.7.4 Enhanced Mapping and Analysis of Hazard Data

As discussed earlier, maps currently exist which show *Landslide Deposits* and *Debris Flow/Mudflow Flooding Areas* in Park County indicating which portions of the county could be impacted in the future by landslides. A detailed correlation has not been drawn, however, between the location of a site or region within any one of the eight major watersheds in the county and the risk of that site or region regarding landslides. Because landslides are often associated with streams or other water features, and because the topography and geology of Park County bears some relation to the major watersheds, Park County has chosen to examine briefly the possibility of such a correlation in the near future. The boundaries of the eight major watersheds will be superimposed on the existing mapping of *Landslide Deposits* *Debris* and *Flow/Mudflow Flooding Areas*. The preparation of that mapping as part of this project will be followed by a cursory examination by county staff of the possible correlation between the location of a site or region within a particular major watersheds and the risk of landslides. Beyond those initial efforts, Park County does not anticipate any landslide mapping or analyses.

4.5.8 Dam Failure

4.5.8.1 Hazard Areas

The 23 dams in Park County that are regulated by the Colorado Division of Water Resources are in various locations within 6 of the 8 major watersheds identified within the county. In addition, a 24th dam, Altura (Duck Lake) Dam, located one mile north of Park County on Guanella Pass Road, in Clear Creek County, has been included since it drains directly into Park County and would affect Park County more than Clear Creek County. Of those 24 dams, 6 will be the discussed in more detail as part of the Vulnerability Analysis, due to their size and location. The following is a table of all regulated dams in the county.

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Table 4-29 Regulated Dams in Park County

Dam	Watershed	Major Reservoir
Antero Dam	South Fork South Platte River	Yes
Altura (Duck Lake) Dam**	North Fork South Platte River	
Baker Dam	Tarryall Creek	
Bayou Salado Dam	Tarryall Creek	
Buffalo Creek Dam	South Fork South Platte River	
Camp Alexander Dam	South Fork South Platte River	
Cline Dam	Tarryall Creek	
Eleven Mile Canyon Dam	South Platte River	Yes
Estates Number 1 Dam	Elk Creek	
Jefferson Lake Dam	Tarryall Creek	Yes
Joe Wilson Recreation Dam	South Platte River	
Krain Dam	Tarryall Creek	
Lake George Dam	South Platte River	
Lininger Lake Dam	North Fork South Platte River	
Lower Michigan Dam	Tarryall Creek	
Montgomery Dam	Middle Fork South Platte River	Yes
OYE Dam	South Fork South Platte River	
Spinney Mountain Dam	South Platte River	Yes
Tarryall Dam	Tarryall Creek	Yes
Tarryall Ranch Reservoir Number 1 Dam	Tarryall Creek	
Upper Michigan Dam	Tarryall Creek	
Wagon Tongue Dam	South Platte River	
Wagon Tongue Number 2 Dam	South Platte River	
Whiteford Lake Dam	North Fork South Platte River	

*Source: <http://www.hometownlocator.com/DisplayCountyFeatures.cfm?FeatureType=dam&SCFIPS=08093>

**Duck Lake is in Clear Creek County, 1 mile north of the Park County line. This reservoir drains into Park County.

The portions of Park County most susceptible to dam failure flooding are those areas downstream of the 24 regulated dams that are directly adjacent to the county's major drainage ways and selected smaller tributaries. The dam failure flooding hazards in each of the major watersheds are described below.

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4.5.8.1.1 Elk Creek Basin

The section of Elk Creek and its tributaries that is most susceptible to flooding is between the Mt. Evans Wilderness and Harris Park. There is residential development along the main stem of Elk Creek and several of its tributaries.

Table 4-30 Elk Creek Basin

Dam	Watershed	Major Reservoir
Estates Number 1 Dam	Elk Creek	No

4.5.8.1.2 Deer Creek Basin

The section of Deer Creek and its tributaries that is most susceptible to flooding extends from Highland Park, beyond US Highway 285, all the way to the confluence of Deer Creek with the North Fork of the South Platte River near the Park County-Jefferson County line. There is residential development along the main stem of Deer Creek and several of its tributaries. None of the twenty four regulated dams is located within the Deer Creek Basin and none has the potential to impact the basin directly.

4.5.8.1.3 North Fork South Platte Basin

The section of the North Fork of the South Platte and its tributaries that is most susceptible to flooding is in the corridor between Grant and Bailey along US Highway 285. There is residential and commercial development along the main stem of the North Fork and several of its tributaries.

Table 4-31 North Fork South Platte Basin

Dam	Watershed	Major Reservoir
Altura (Duck Lake) Dam**	North Fork South Platte River	No
Lininger Lake Dam	North Fork South Platte River	No
Whiteford Lake Dam	North Fork South Platte River	No

***Duck Lake is in Clear Creek County, 1 mile north of the Park County line. This reservoir drains into Park County.*

4.5.8.1.4 Tarryall Creek Basin

The section of Tarryall Creek and its tributaries that is most susceptible to flooding is in the corridor between the developments just north of US Highway 285 in the vicinity of Jefferson and Como all the way to Tarryall Reservoir. There is development along the main stem of the Tarryall Creek and several of its tributaries.

Table 4-32 Tarryall Creek Basin		
Dam	Watershed	Major Reservoir
Baker Dam	Tarryall Creek	No
Bayou Salado Dam	Tarryall Creek	No
Cline Dam	Tarryall Creek	No
Jefferson Lake Dam	Tarryall Creek	Yes
Krain Dam	Tarryall Creek	No
Lower Michigan Dam	Tarryall Creek	No
Tarryall Dam	Tarryall Creek	Yes
Tarryall Ranch Reservoir Number 1 Dam	Tarryall Creek	No
Upper Michigan Dam	Tarryall Creek	No

4.5.8.1.5 Middle Fork South Platte Basin

The two municipalities in Park County, the Town of Alma and the Town of Fairplay, are both entirely contained within the Middle Fork of the South Platte Basin. The Hazard Areas description for this basin has been split into three sections, one for unincorporated Park County, and one each for the two towns.

Middle Fork South Platte River (unincorporated Park County)

The section of the Middle Fork of the South Platte and its tributaries within unincorporated Park County that is most susceptible to flooding is in the corridor between Hoosier Pass and the Town of Fairplay along State Highway 9 and several county roads. There is residential and commercial development along the main stem of the Middle Fork and several of its tributaries.

Table 4-33 Middle Fork South Platte Basin		
Dam	Watershed	Major Reservoir
Montgomery Dam	Middle Fork South Platte River	Yes

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Middle Fork South Platte River (Alma)

The Middle Fork of the South Platte and Buckskin Creek within the Town of Alma are susceptible to flooding. There is residential and commercial development along the main stem of the Middle Fork and Buckskin Creek.

Table 4-34 Middle Fork South Platte River (Alma)

Dam	Watershed	Major Reservoir
Montgomery Dam	Middle Fork South Platte River	Yes

Middle Fork South Platte River (Fairplay)

The Middle Fork of the South Platte and various dry gulches within the Town of Fairplay are susceptible to flooding. There is residential and commercial development along the main stem of the Middle Fork and various dry gulches.

Table 4-35 Middle Fork South Platte River (Fairplay)

Dam	Watershed	Major Reservoir
Montgomery Dam	Middle Fork South Platte River	Yes

4.5.8.1.6 South Fork South Platte Basin

The sections of the South Fork of the South Platte River and its tributaries which are most susceptible to flooding are in the corridor between the US Forest Service's boundary with private property and State Highway 9 and the corridor between Antero Reservoir and Hartsel. There is a moderate amount of development along the main stem of the South Fork and some of its tributaries.

This watershed is subject to snowmelt flooding on large streams and rainfall flooding on smaller streams.

Table 4-36 South Fork South Platte Basin

Dam	Watershed	Major Reservoir
Antero Dam	South Fork South Platte River	Yes
Buffalo Creek Dam	South Fork South Platte River	No
Camp Alexander Dam	South Fork South Platte River	No
OYE Dam	South Fork South Platte River	No

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4.5.8.1.7 South Platte River Basin

The sections of the South Platte River and its tributaries that are most susceptible to flooding are the Hartsel area and the Lake George area. There is a moderate amount of development along the main stem of the South Platte and some of its tributaries.

Table 4-37 South Platte River Basin

Dam	Watershed	Major Reservoir
Eleven Mile Canyon Dam	South Platte River	Yes
Joe Wilson Recreation Dam	South Platte River	No
Lake George Dam	South Platte River	No
Spinney Mountain Dam	South Platte River	Yes
Wagon Tongue Dam	South Platte River	No
Wagon Tongue Number 2 Dam	South Platte River	No

4.5.8.1.8 Arkansas River Headwaters Basin

The section of the Arkansas River Headwaters Basin and tributaries that is most susceptible to flooding is the Guffey area. There is a small amount of development along the main stems of two of the major tributaries, Badger Creek and Currant Creek and tributaries to those streams and to Four Mile Creek. None of the twenty four regulated dams is located within the Arkansas River Headwaters Basin and none has the potential to impact the basin directly.

4.5.8.2 Vulnerability Analysis

There are six major reservoirs in Park County that are owned or operated by outside entities that warrant more significant planning consideration and a vulnerability analysis providing more detail. The size and location of these reservoirs means that they present the greatest risk to communities or infrastructure in the case of a dam failure. The following table denotes the location, and ownership status of each of the six reservoirs.



Table 4-38 Vulnerability Analysis

Reservoir	Watershed Where Reservoir Is Located	Owner/Operator
Antero Reservoir	South Fork South Platte River	Denver Water
Eleven Mile Reservoir	South Platte River	Denver Water
Jefferson Lake	Tarryall Creek	City of Aurora
Montgomery Reservoir	Middle Fork South Platte River	Colorado Springs Utilities
Spinney Mountain Reservoir	South Platte River	City of Aurora
Tarryall Reservoir	Tarryall Creek	Division of Wildlife

All of the dams in the county meet regulatory standards; none of them pose an immediate threat of failing. However, if one were to fail, the potential effects from dam failures could be varied depending on the scope and location of such a failure. For example, a failure of the Montgomery Dam could have catastrophic effects on the towns of Alma and Fairplay, as well as to infrastructure such as State Highway 9 and US 285, and possibly to dams downstream on the South Platte. It could also have severe environmental impacts along the Middle Fork of the South Platte and the South Platte. A failure of Antero Dam could have a domino effect, triggering the failure of Spinney Mountain Dam and Eleven Mile Dam downstream. Similarly a failure of Spinney Mountain Dam could trigger the failure of Eleven Mile Dam downstream. The effects of such a domino scenario would include flooding of Lake George, US 24, numerous private subdivisions and eventually infrastructure in downstream counties, including Cheesman Reservoir. Any dam failure could pose severe to catastrophic effects on downstream areas, as well as severe to catastrophic economic effects on the county.

4.5.8.2.1 Elk Creek Basin

None of the six major reservoirs is located within the Elk Creek Basin and none has the potential to impact the basin directly.

4.5.8.2.2 Deer Creek Basin

None of the six major reservoirs is located within the Deer Creek Basin and none has the potential to impact the basin directly.

4.5.8.2.3 North Fork South Platte Basin

None of the six major reservoirs is located within the North Fork South Platte Basin and none has the potential to impact the basin directly.



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4.5.8.2.4 Tarryall Creek Basin

Two of the six major reservoirs are located within the Tarryall Creek Basin. Dam failure flooding would cause adverse impacts in portions of the basin directly downstream of these reservoirs. The section of Tarryall Creek and its tributaries that is most susceptible to flooding is in the corridor between the developments just north of US Highway 285 in the vicinity of Jefferson and Como all the way to Tarryall Reservoir. There is development along the main stem of the Tarryall Creek and several of its tributaries. In addition, dam failure flooding in the Tarryall Creek Basin could cause flooding downstream of the confluence of Tarryall Creek with the South Platte River, within the South Platte River Basin.

Table 4-39 Tarryall Creek Basin

Reservoir	Watershed Where Reservoir Is Located	Other Watersheds Potentially Impacted	Owner/Operator	Downstream Communities and Infrastructure
Jefferson Lake	Tarryall Creek	South Platte River	City of Aurora	Jefferson, Tarryall Reservoir, US 285
Tarryall Reservoir	Tarryall Creek	South Platte River	Division of Wildlife	Tarryall, Private Subdivisions near Lake George

4.5.8.2.5 Middle Fork South Platte Basin

The two municipalities in Park County, the Town of Alma and the Town of Fairplay, are both entirely contained within the Middle Fork of the South Platte Basin. The Hazard Areas description for this basin has been split into three sections, one for unincorporated Park County, and one each for the two towns.

Middle Fork South Platte River (unincorporated Park County)

One of the six major reservoirs is located within the Middle Fork South Platte River Basin. Dam failure flooding would cause adverse impacts in portions of the basin directly downstream of this reservoir that is within unincorporated Park County. The section of the Middle Fork of the South Platte and its tributaries within unincorporated Park

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County that is most susceptible to flooding is in the corridor between Hoosier Pass and the Town of Fairplay along State Highway 9 and several county roads. There is residential and commercial development along the main stem of the Middle Fork and several of its tributaries. In addition, dam failure flooding in the Middle Fork South Platte River Basin could cause flooding downstream of the confluence of the Middle Fork of the South Platte River with the South Fork of the South Platte River, within the South Platte River Basin.

Table 4-40 Middle Fork South Platte Basin

Reservoir	Watershed Where Reservoir Is Located	Other Watersheds Potentially Impacted	Owner/Operator	Downstream Communities and Infrastructure
Montgomery Reservoir	Middle Fork South Platte River	South Platte River	Colorado Springs Utilities	Town of Alma, Town of Fairplay, Hartsel, Lake George, Spinney Mountain Reservoir, Eleven Mile Reservoir, SH 9, US 285, US 24

Middle Fork South Platte River (Alma)

One of the six major reservoirs is located within the Middle Fork South Platte River Basin. Dam failure flooding would cause adverse impacts in portions of the basin directly downstream of this reservoir that is within the Town of Alma. The Middle Fork of the South Platte and Buckskin Creek within the Town of Alma are susceptible to flooding. There is residential and commercial development along the main stem of the Middle Fork and Buckskin Creek. In addition, dam failure flooding in the Middle Fork South Platte River Basin could cause flooding downstream of the confluence of the Middle Fork of the South Platte River with the South Fork of the South Platte River, within the South Platte River Basin.

Table 4-41 Middle Fork South Platte River (Alma)

Reservoir	Watershed Where Reservoir Is Located	Other Watersheds Potentially Impacted	Owner/Operator	Downstream Communities and Infrastructure
Montgomery Reservoir	Middle Fork South Platte River	South Platte River	Colorado Springs Utilities	Town of Alma, Town of Fairplay, Hartsel, Lake George, Spinney Mountain Reservoir, Eleven Mile Reservoir, SH 9, US 285, US 24

Middle Fork South Platte River (Fairplay)

One of the six major reservoirs is located within the Middle Fork South Platte River Basin. Dam failure flooding would cause adverse impacts in portions of the basin directly downstream of this reservoir that is within the Town of Fairplay. The Middle Fork of the South Platte and various dry gulches within the Town of Fairplay are susceptible to flooding. There is residential and commercial development along the main stem of the Middle Fork and various dry gulches. In addition, dam failure flooding in the Middle Fork South Platte River Basin could cause flooding downstream of the confluence of the Middle Fork of the South Platte River with the South Fork of the South Platte River, within the South Platte River Basin.

Table 4-42 Middle Fork South Platte River (Fairplay)

Reservoir	Watershed Where Reservoir Is Located	Other Watersheds Potentially Impacted	Owner/Operator	Downstream Communities and Infrastructure
Montgomery Reservoir	Middle Fork South Platte River	South Platte River	Colorado Springs Utilities	Town of Alma, Town of Fairplay, Hartsel, Lake George, Spinney Mountain Reservoir, Eleven Mile Reservoir, SH 9, US 285, US 24

4.5.8.2.6 South Fork South Platte Basin

One of the six major reservoirs is located within the South Fork South Platte River Basin. Dam failure flooding would cause adverse impacts in portions of the basin directly downstream of this reservoir. The sections of the South Fork of the South Platte River and its tributaries which are most susceptible to flooding are in the corridor between the US Forest Service’s boundary with private property and State Highway 9 and the corridor between Antero Reservoir and Hartsel. There is a moderate amount of development along the main stem of the South Fork and some of its tributaries. In addition, dam failure flooding in the South Fork South Platte River Basin could cause flooding downstream of the confluence of the South Fork of the South Platte River with the Middle Fork of the South Platte River, within the South Platte River Basin.

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Table 4-43 South Fork South Platte Basin

Reservoir	Watershed Where Reservoir Is Located	Other Watersheds Potentially Impacted	Owner/Operator	Downstream Communities and Infrastructure
Antero	South Fork South Platte River	South Platte River	Denver Water	Hartsel, Lake George, Spinney Mountain Reservoir, Eleven Mile Reservoir, US 24

4.5.8.2.7 South Platte River Basin

Two of the six major reservoirs are located within the South Platte River Basin and the other four major reservoirs have the potential to impact the basin directly. The sections of the South Platte River and its tributaries that are most susceptible to flooding are the Hartsel area and the Lake George area. There is a moderate amount of development along the main stem of the South Platte and some of its tributaries.

Table 4-44 South Platte River Basin

Reservoir/Dam	Watershed Where Reservoir Is Located	Watersheds Potentially Impacted	Owner/Operator	Downstream Communities and Infrastructure
Antero	South Fork South Platte River	South Platte River	Denver Water	Hartsel, Lake George, Spinney Mountain Reservoir, Eleven Mile Reservoir, US 24
Eleven Mile	South Platte River		Denver Water	Lake George, US 24

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Jefferson Lake	Tarryall Creek	South Platte River	City of Aurora	Jefferson, Tarryall Reservoir, US 285
Montgomery	Middle Fork South Platte River	South Platte River	Colorado Springs Utilities	Town of Alma, Town of Fairplay, Hartsel, Lake George, Spinney Mountain Reservoir, Eleven Mile Reservoir, SH 9, US 285, US 24
Spinney Mountain	South Platte River		City of Aurora	Lake George, Eleven Mile Reservoir, US 24
Tarryall	Tarryall Creek	South Platte River	Division of Wildlife	Tarryall, Private Subdivisions near Lake George

4.5.8.2.8 Arkansas River Headwaters Basin

None of the six major reservoirs is located within the Arkansas River Headwaters Basin and none has the potential to impact the basin directly.

4.5.8.3 Secondary Effects

If a significant flood event occurs, there is a potential for a variety of secondary impacts. Some of the most common secondary effects of flooding are impacts to infrastructure and utilities such as roadways, water service, and wastewater treatment, and impacts to local commerce, including tourism. Many of the roadways in the County are vulnerable to damage due to floodwaters. The effect of flood damages to roadways can limit access to areas, cutting off some residents from emergency services as well as other essential services, as well as hampering outsiders visiting the County or traveling through on their way to other destinations.

Since a major heating source in the area is propane gas, there may be many properties in floodplains with above-ground fuel storage tanks. It is likely that the majority of tanks in the floodplain are not secured or strapped down. If these tanks were to be damaged or dislodged during a flood event, the resulting gas leaks could present serious explosion risks. Tanks can also become floating projectiles in quickly moving floodwaters, causing serious damage to property and danger to individuals in their path.

4.5.8.4 Enhanced Mapping and Analysis of Hazard Data

Dam failure inundation maps have been prepared for all 24 dams in or immediately adjacent to Park County that are regulated by the Colorado Division of Water Resources, including the six reservoirs deemed in the Vulnerability Analysis to be “major reservoirs”. While all 24 reservoirs pose some risk to Park County, the size and location of the six major reservoirs means that they present the greatest risk to communities or infrastructure in the case of a dam failure. The dam failure inundation maps are on file at the Dam Safety Branch of the Division of Water Resources. For security reasons access to these maps is, and must continue to be, strictly controlled.

Keeping that need for security in mind, Park County could pursue the possibility of a GIS project with the Dam Safety Branch to provide authorized officials from Park County, Alma, and Fairplay with appropriate GIS mapping of dam failure risks. Such a project could initially focus just on the six major reservoirs. Once Park County and the CWCB complete digital floodplain mapping, there might be some value in overlaying a secure dam failure inundation zone GIS layer onto that floodplain mapping. Eventually such GIS information could be made available, in a strictly controlled manner, to those local agencies with an emergency response role in the event of dam failure flooding.

4.5.9 Earthquakes

4.5.9.1 Hazard Areas

Because of the large area affected by most earthquakes, as well as the vast diversity of the locations and intensities of historic earthquakes that have and can affect western Colorado, no specific areas of Park County can be identified as a higher risk of being affected by an earthquake. However, this same distinction also indicates that the entire County is at a similar risk to earthquake.

Some slightly elevated hazards may be experienced in those areas subjected to deep mining. The presence of mine portals and shafts in the sub terrain provide the rock strata with a void in which to settle following a seismic event. The settlement of earth into these voids can cause fissures or sinkholes on the surface, which could cause significant damage to buildings and other infrastructure on the surface, even following a minor seismic event.

Park County has obtained GIS mapping of *Potentially Active Fault Zones*, prepared by the Colorado Geologic Survey. That mapping was previously shown in *Figure 5-**. Because there is not a known correlation between watershed location in the county and the potential for earthquakes, there is currently no mapping to display or analyze seismic risk information for Park County according to the eight major watersheds in the county. No distinctions have been made regarding specific watersheds within Park County which may have a history in a geologic timeframe of more frequent or more severe earthquakes or which specific watersheds might be more prone to future earthquakes.

4.5.9.2 Vulnerability Analysis

The effects of earthquakes are wide-ranging, from little or no effect, to major structural damage. The degree of damage largely depends on the location of the epicenter relative to the community and the magnitude of the event. As stated previously, these factors cannot be controlled or predicted. Other factors such as the level of seismic design, the type of construction, and other site specific characteristics also play a role in the level of damages sustained during an earthquake.

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

been sufficiently studied to know whether they are capable of generating earthquakes or not. It is not possible to accurately estimate the timing or location of future dangerous earthquakes in Colorado.

The lack of an adequate network of seismometers in Colorado makes it difficult to detect and locate earthquakes. Moreover, the historical record is quite short (~150 years). Nevertheless, the available seismic hazard information can provide a basis for a reasoned and prudent approach to seismic safety.

The County and the two municipalities within Park County have adopted the 2006 International Building Code (IBC). The Code requires varying levels of seismic design, which depend on an importance factor determined by the structures use and nature of occupancy. The seismic provisions of the 2006 IBC are based on the 2003 ***National Earthquake Hazards Reduction Program (NEHRP) Recommended Provisions for Seismic Regulations for New Buildings***. The higher levels of seismic design are assigned to those structures where the risk of injury or loss of life is highest, or those whose function is most critical to the community should an event occur. Examples of these structures include schools, health care facilities, power-generating facilities, water and wastewater treatment facilities, police stations, and fire stations. Although these structures are required to be designed to resist higher levels of seismic activity, they also represent the highest vulnerability to earthquake losses within the County.

4.5.9.2.1 Primary Effects of Earthquakes

The Primary Effects of an earthquake can range from toppled chimneys and broken windows, to cracked walls and roadways, to complete collapse of structures and bridges. Depending on the magnitude and location of the earthquake the overall effects on the community can range from minimal to catastrophic. In larger events loss of life and injuries can be extensive and the cost of damages can be massive. As stated previously, although historically moderate earthquakes have affected the County, the potential for a higher magnitude earthquake does exist, due mainly to the proximity of the two key seismic zones.

4.5.9.3 Secondary Effects

In some cases the Secondary Effects from an earthquake can be as damaging and disruptive to a community and its citizens. The most significant potential secondary effect of an earthquake to the County is the potential for landslides. Ground shaking during an earthquake can cause previously weakened steep slopes to fail, as well as otherwise stable slopes. The specific impacts of landslides are discussed further in other sections of this Plan.

In addition to landslides other secondary effects can include disruption of critical services such as water, electrical, and telephone services. Damage to police stations, fire stations, and other emergency service facilities can weaken a community's ability to respond in the crucial hours and days following an event.

4.5.9.4 *Enhanced Mapping and Analysis of Hazard Data*

As discussed earlier, maps currently exist which show **Potentially Active Fault Zones** in Park County indicating which portions of the county could be impacted in the future by earthquakes. No correlation has been drawn, however, between the location of a site or region within any one of the eight major watersheds in the county and the past history or expected risk of that site or region regarding earthquakes. At present, Park County does not anticipate any further earthquake mapping or analyses.

4.5.10 **Potential Interactions between Future Pine Beetle Infestations and Other Hazards in Park County**

Park County's forests are facing risk from insect or disease outbreaks. While these insect outbreaks were not included in the list of hazards to be addressed in Park County's Mitigation Plan, they are of serious concern because of their relationship to other hazards already being analyzed in this plan. The outbreaks vary in intensity, and in the speed with which they kill trees. Surrounding counties, mostly to the north, including Jefferson, Clear Creek, Summit and Eagle Counties, are all experiencing epidemic infestations. Lake and Chaffee Counties, to the west, are beginning to see problems as well. The nearby problems are in turn posing a threat to Park County forests as the insects migrate toward more food. The most aggressive and prevalent invasive species in the County is **Mountain Pine Beetle**, a species that primarily affects lodge pole and ponderosa pines. That species is reaching significant infestation levels near Weston Pass and Trout Creek Pass. **Ips** or **Engraver Beetles**, and **Dwarf Mistletoe** have not reached the infestation levels of **Mountain Pine Beetle**, but they certainly pose a risk to Park County's forests.

Forest infestations can play a significant role in increasing the risks from and potential impacts of other hazards. Dead trees contribute to more fuels for forest fires, though they do decrease the risk of crown fires. Dead trees are subject to blowing over during severe winter weather or severe thunderstorms, raising the potential for downing power lines, blocking roads, and falling on houses, businesses, properties and recreational trails. Dead trees also increase the risk of debris flows during heavy rain or snowmelt induced flooding and dam failure events. In addition, dead trees lead to soil instability, exacerbating the risk of and the impacts of landslides. Conversely, one other

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hazard, **Drought**, can play a role in increasing the initial risk of a **Mountain Pine Beetle** infestation.

The table below summarizes the interrelationships discussed above.

Table 4-45 Correlation of Potential Pine Beetle Infestation To Other Hazards in Park County				
Hazard	This Hazard Contributes to Pine Beetle Risk	Pine Beetle Exacerbates Overall Risk From This Hazard	Pine Beetle Exacerbates Impacts From This Hazard	No Correlation
Wildfire		X		
Severe Winter Weather			X	
HAZMAT				X
Flooding		X	X	
Drought	X		?	
Severe Thunderstorms, Hailstorms & Wind Events			X	
Landslides		X	X	
Dam Failure		X	X	
Earthquakes				X

4.6 FUTURE GEOGRAPHIC INFORMATION SYSTEMS (GIS) HYDROLOGIC FRAMEWORK

Geographic Information Systems (GIS) are commonly used in the identification and mitigation of natural disasters as well as recovery from disasters. The application of spatially referenced watersheds, precipitation monitoring locations, stream networks, stream gages, floodplains, and diversion structures could provide Park County with the tools to better mitigate damage from flooding and to predict potential for flooding.

The Park County GIS department has information readily available to provide a reliable GIS hydrologic framework to enhance their natural disaster mitigation and planning associated with flooding (snowmelt, rainfall, and post-wildfire) and drought.

This hydrologic framework would consist of the following:

Hydrologic units - The basis of any hydrologic disaster mitigation and planning is the drainage basin, or watershed. Watersheds come in a variety of size and order. Hydrologic unit codes (HUCs) are the primary framework for watersheds. These HUC's are numeric and the greater

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the number of digits in the HUC, the greater the detail (or smaller the watershed). HUCs are available for Park County and could be placed into a GIS framework.

NRCS SNOTEL DATA – SNOw pack TELemetry (SNOTEL) is a program installed, operated, and maintained by the Natural Resources Conservation Service (NRCS) to automatically collect snow pack and related climatic data in the Western United States. The data from SNOTEL sites is available via the internet and can provide Park County with the capability of monitoring snow pack (and therefore potential runoff) at the watershed level.

SNODAS - SNOw Data Assimilation System (SNODAS) is a modeling and data assimilation system developed by the NOAA National Weather Service's National Operational Hydrologic Remote Sensing Center (NOHRSC) to provide the best possible estimates of snow cover and associated variables to support hydrologic modeling and analysis. The aim of SNODAS is to provide a physically consistent framework to integrate snow data from satellite and airborne platforms, and ground stations with model estimates of snow cover. This data will be available to Park County and could provide it with a more complete picture of the snow pack across all watersheds to complement the information provided by the NRCS SNOTEL sites.

USGS Stream Network – Streams are the pathways for melted snow or falling rain to travel downstream from the headwaters of each watershed. Park County GIS can capture the USGS network of streams and arroyos in Park County and place it into the GIS framework

USGS and State Engineer Stream Gages – Stream discharge sites in Park County can provide real-time stream flow data via the internet. The gages could allow the county and other interested parties to monitor locations where stream flows are abnormally high or low.

Floodplain Mapping – Park County GIS can scan, digitize and geo-reference hard copy approximate floodplain mapping previously prepared by FEMA.

Irrigation Ditches and Diversion Structures Park County could incorporate the GIS information of irrigation diversion structures and ditches in Park County from the CWCB's South Platte Decision Support System (SPDSS).

These seven spatial data layers could provide Park County with a more complete hydrologic picture from which to implement flood mitigation and protection of personal and public property. The initial focus of this system would be on flood hazard mitigation, but this information would also be useful for drought mitigation and wildfire mitigation as well.

SECTION 5 CAPABILITY ASSESSMENT

5.1 INTRODUCTION

Hazard mitigation in Park County began before this planning process. Several plans, procedures, and activities that are already in place or underway demonstrate that prior effort. This section of the Plan assesses the current capability of Park County and the Towns of Alma and Fairplay to mitigate the effects of the hazards identified in chapter 4, the Hazard Identification and Risk Assessment. It highlights those ongoing activities that should be incorporated into the County's overall mitigation strategy. This assessment includes a comprehensive examination of the following local government capabilities:

1. *Staff and Organizational Capability,*
2. *Technical Capability,*
3. *Fiscal Capability,*
4. *Policy and Program Capability.*
5. *Legal Authority. and*
6. *Political Willpower.*

The Capability Assessment was conducted to identify potential hazard mitigation opportunities available to the towns and the county. Careful analysis should detect any gaps, shortfalls, or weaknesses within existing governmental activities that could exacerbate the county's vulnerability. The assessment will also highlight the positive measures already in place or being carried out at the town and county level, which should continue to be supported and enhanced, if possible, as part of future mitigation efforts. The Capability Assessment serves as the foundation for designing an effective hazard mitigation strategy. It not only helps establish the goals and objectives for Park County, Alma and Fairplay to pursue under this Plan, but ensures that those goals and objectives are realistically achievable under current and foreseeable local conditions.

5.2 LOCAL GOVERNMENT CAPABILITIES

1. **Staff and Organizational Capability:** This chapter includes information about the County Commissioners, Town Councils, Departments, Elected Boards, Appointed Boards, and Committees.
2. **Technical Capability**
 - a. Technical Expertise
 - b. Geographic Information Systems (GIS)
 - c. Internet Access
3. **Fiscal Capability:** Annual county and town budgets allocation analysis
4. **Policies and Program Capability**
 - a. Recent Hazard Mitigation Efforts
 - b. CRS Activities
 - c. Emergency Operations Plans
 - d. Floodplain Management Plans
 - e. Storm water Management Plans
 - f. Comprehensive Plans
 - g. Ordinances
 - h. Open Space Plans
 - i. Watershed Protection Plans
5. **Legal Authority**
 - a. Regulations
 - General Police Powers
 - Building Codes and Building Inspection
 - b. Land Use
 - 1) Planning
 - 2) Zoning
 - 3) Subdivision Regulations
 - 4) Storm water Management Regulations
 - 5) Floodplain Regulations
 - c. Acquisition
 - d. Taxation
 - e. Spending
6. **Political Willpower**

Table 5-1 Political Willpower			
Plan or Ordinance	Park County	Alma	Fairplay
Local Hazard Mitigation Plan			
CRS Activities			
Emergency Operations Plan	X		
Floodplain Management Plan			
Storm water Management Plan			
Watershed Protection Plan		X	X
Open Space Plan		X	X
Comprehensive Land Use Plan	X	X	X
Building Code	X	X	X
Land Use Ordinance/Regulation	X	X	X
Zoning Ordinance/Regulation	X	X	X
Subdivision Ordinance/Regulation	X	X	
Storm water Ordinance/Regulation			
Floodplain Ordinance/Regulation	X	X	
State of Emergency Ordinance/Regulation			
Capital Improvement Plan			

The following sections review and summarize Park County’s, Alma’s, and Fairplay’s capabilities.

5.2.1 Park County

5.2.1.1 Staff and Organizational Capability

Park County has a staff and organizational capability to implement hazard mitigation strategies. The County is administered by a three-person commission (3 County Commissioners) form of government. The Commission oversees the day-to-day operations of county government and manages the various county departments. They also direct and supervise the administration of all county offices, boards, and agencies under the general direction and control of the Commission.

Responsibilities include:

- Development of the annual budget,
- Coordination of public relations programs,
- Provision of administrative services to the county,
- Administration of equal employment opportunity and affirmative action policies and programs,
- Human resource management and payroll,
- Risk management,
- Facilities management, and
- A number of delegated programs.

The County has a number of professional staff departments to serve the residents of the county and to carry out day-to-day administrative activities. These include the following:

- Land Use Administrator
- Road and Bridge
- County Clerk and Recorder
- Human Services
- Planning and Zoning
- Sheriff's Office
- Assessor
- Nursing Services
- Treasurer
- Library

There are also Boards and Committees that provide administrative support to the County including a Planning Commission and Board of Adjustment. The Emergency Management Department is responsible for mitigation, preparedness, response, and recovery operations within Park County, with the assistance from the Planning Department and emergency services agencies including law enforcement agencies and fire districts. The Planning Department is also responsible for addressing land use planning as well as developing mitigation strategies. The Planning Department has been involved in the development of this mitigation plan to identify gaps, weaknesses or opportunities for enhancement with existing mitigation programs. For the most part, it was determined that the county departments are adequately staffed and trained to accomplish their missions, but they lack adequate funding.

5.2.1.2 *Technical Capability*

Park County has the technical capability to implement hazard mitigation strategies.

5.2.1.2.1 **Technical Expertise**

Park County has an emergency management director and a floodplain official on staff to administer its hazard mitigation programs. The county also relies on outside contractors/consultants to perform required technical work where the County does not have the expertise. There is also an Information Technology (IT) Department, which can enhance local government operations and the county's ability to develop and maintain a state-of-the art hazard mitigation program.

5.2.1.2.2 **Geographic Information Systems**

GIS systems can best be described as a set of tools (hardware, software, and trained staff) used to collect, manage, analyze and display spatially-referenced data. Many local governments are now incorporating GIS systems into their existing planning and management operations. Park County utilizes their Mapping/GIS Department in several county emergency planning activities, and has the capability to assist in furthering hazard mitigation goals.

Geologic Mapping. The mapping identifies selected areas of potential geologic problems such as mudflow/debris flow flooding, rock fall, landslide deposits, mine subsidence, and potentially active faults.

Addressing. County GIS is undertaking an effort to improve digital addressing in support of 9-1-1 and other emergency response applications.

5.2.1.2.3 **Internet Access**

Park County provides its employees with high-speed broadband Internet service. Employees have personal internet accounts which they can utilize while at work. The County does have a website which electronically connects with its constituents. This provides an enormous opportunity for local officials to keep abreast of the latest information relative to their work and makes receiving government services more affordable and convenient. Additionally, Park County has an emergency management webpage that gives citizens the opportunity to remain informed during disasters and to prepare for emergencies before they occur. Information technology also offers increased economic opportunities, higher living standards, more individual choices, and wider and more meaningful participation in government and public life. Simply put,

information technology can make distance – a major factor for county officials and residents - far less important than in the past. Internet access will help further the County’s hazard mitigation awareness programs, but should be supplemented with more traditional (and less technical) means as well.

Reverse 911. The County implemented a Reverse 911 system several years ago to provide emergency notification to residents. Special buffer ‘pre-plan’ zones have been pre-created to notify residents in the event of a flood or other emergency in the County. Pre-plan areas include: flood zones, other hazard areas.

5.2.1.3 Fiscal Capability

Park County has fiscal capability to implement hazard mitigation strategies. For Fiscal Year 2007, the county has budgeted total annual expenditures of \$26,883,253.00. The majority of these funds are obligated to general fund expenditures. The County receives most of its revenues through property taxes, grant monies, and other restricted intergovernmental contributions (Federal and State pass through dollars). The county does not currently have a sales tax. It is likely that Park County could afford to provide the cost share for the existing hazard mitigation grant programs. However, current budget deficits at both the State and local government level in Colorado, combined with the apparent increased reliance on local accountability by the Federal government, creates a significant and growing concern for the county regarding possible future directions for mitigation programs. Under the DMA 2000, FEMA has made special accommodations for "small and impoverished communities," who will be eligible for a 90% Federal share, 10% non-Federal cost share for projects funded through the Pre-Disaster Mitigation (PDM) grant program. According to the current Interim Final Rule for Section 322 of the Act, Park County will not qualify as a small and impoverished county. The definition is restricted to “communities of 3,000 or fewer individuals that is identified by the State as a rural county.”

5.2.1.4 Policy and Program Capability

This part of the capabilities assessment includes the identification and evaluation of existing plans, policies, practices, programs, or activities that either increase or decrease the county’s vulnerability to hazards. Positive activities, which decrease hazard vulnerability, will be sustained and enhanced to the fullest extent possible. Negative activities, which increase hazard vulnerability, will be targeted for reconsideration and will be thoroughly addressed within the Mitigation Strategy for Park County.

5.2.1.4.1 Recent Hazard Mitigation Efforts

The County has developed a Community Wildfire Protection Plan that has been approved by the Board of Commissioners and the State and Federal land managers that outlines mitigation projects to decrease wildfire danger throughout the County. Many of Park County's local communities have also become FireWise Communities, allowing citizens to participate in wildfire mitigation.

5.2.1.4.2 CRS (Community Rating System) Activities

Communities that regulate development in floodplains are able participate in the NFIP. In return, the NFIP makes federally backed flood insurance policies available for properties in the county. The CRS was implemented in 1990 as a program for recognizing and encouraging county floodplain management activities that exceed the minimum NFIP standards. There are ten CRS classes: class 1 requires the most credit points and gives the largest premium reduction; class 10 receives no premium reduction. Park County does not currently participate in the CRS.

5.2.1.4.3 Emergency Operations Plans

Park County has developed and adopted an Emergency Operations Plan which predetermines actions to be taken by government agencies and private organizations in response to an emergency or disaster event. The Plan describes the County's capabilities to respond to emergencies and establishes the responsibilities and procedures for responding effectively to the actual occurrence of a disaster. The plan does not specifically address hazard mitigation, but it does identify the specific operations to be undertaken by the County to protect lives and property immediately before, during and immediately following an emergency. There are no foreseeable conflicts between this Hazard Mitigation Plan and Park County's Emergency Operations Plan, primarily because they are each focused on two separate phases of emergency management (mitigation vs. preparedness and response). The Plan identifies the County Commission as having the lead role in the long-term recovery phase following a disaster – which presents a unique window of opportunity for implementing hazard mitigation strategies. However, none are specified within the Emergency Operations Plan.

5.2.1.4.4 Floodplain Management Plan

Park County's Floodplain Management authority exists within the Land Use Regulations, Article 7, Division 10, Section 7-1000 through 7-1009. The County does not currently have a separate floodplain management plan for NFIP purposes. This Hazard Mitigation Plan is intended to fulfill the CRS planning requirement, if and when, the County decides to participate in the CRS.

5.2.1.4.5 Storm water Management Plan

Park County does not currently have an adopted storm water management plan; however, the County is an agent of the State of Colorado for storm water management purposes under the Federal Clean Water Act, which addresses the discharge of pollutants to surface waters from "point sources" and "non-point sources".

5.2.1.4.6 Watershed Protection Plan

Park County does not currently have a separate watershed protection plan.

5.2.1.4.7 Open Space Plan

Park County does not currently have a separate open space plan.

5.2.1.4.8 Comprehensive Plan

The County adopted its most current Strategic Master Plan in 2001. The plan provides the future vision for the county regarding growth and development. Hazard mitigation planning is not specifically addressed in the plan.

5.2.1.5 Legal Authority

Local governments in Colorado have a wide range of tools available to them for implementing mitigation programs, policies, and actions. A hazard mitigation program can utilize any or all of the four broad types of government powers granted by the State of Colorado, which are (a) regulation (by ordinance in the case of cities and towns), (b) acquisition, (c) taxation, and (d) spending. The scope of this local authority is subject to constraints, however, as Colorado's political subdivisions must not act without proper delegation from the State. All power is vested in the State and can only be exercised by local governments to the extent it is delegated. Thus, this portion of the capabilities assessment will summarize Colorado's enabling legislation that grants the four types of government powers listed above within the context of available hazard mitigation tools and techniques.

5.2.1.5.1 Regulation

- (1) General Police Power

Colorado' local governments have been granted broad regulatory powers in their jurisdictions. Colorado State Statutes bestow the general police power on local governments, allowing them to enact and enforce ordinances/regulations that define, prohibit, regulate or abate acts, omissions, or conditions detrimental to the health, safety, and welfare of the people, and to define and abate nuisances (including public health nuisances). Since hazard mitigation can be included under the police power (as protection of public health, safety and welfare), towns, cities and counties may include requirements for hazard mitigation in local ordinances/regulations. Local governments may also use their ordinance/regulation-making power to abate "nuisances," which could include, by local definition, any activity or condition making people or property more vulnerable to any hazard. Park County has enacted and enforces regulations designed to promote the public health, safety and general welfare of its citizenry and that are, therefore, relevant to hazard mitigation.

(2) Building Codes and Building Inspection

Many structural mitigation measures involve constructing and retrofitting homes, businesses, and other structures according to standards designed to make the buildings more resilient to the impacts of natural hazards. Many of these standards are imposed through building codes. Municipalities and counties may adopt codes for their respective areas, if approved by the state, as providing "adequate minimum standards." Local regulations cannot be less restrictive than the State code. Local governments in Colorado are also empowered to carry out building inspections. The State legislation empowers cities and counties to create an inspection department, and enumerates its duties and responsibilities which include enforcing State and local laws relating to the construction of buildings, installation of plumbing, electrical, heating systems, etc.; building maintenance; and other matters. Park County has adopted the 2006 building code and has established a Building/ Inspections Office to carry out its building inspections.

(3) Land Use

Regulatory powers granted by the State to local governments provide the most basic means by which a local government can control the use of land within its jurisdiction. Through various land use regulatory powers, a local government can control the amount, timing, density, quality, and location of new development. All of these characteristics of growth can determine the level of vulnerability of the county in the event of a natural hazard. Land use regulatory powers include the power for counties and municipalities to engage in planning, and enact and enforce zoning regulations/ordinances, subdivision controls, and floodplain regulations/ordinances.

Each local community possesses great power to prevent unsuitable development in hazard-prone areas. Park County has adopted a land use regulation.

(A) Planning

According to State statutes, local governments in Colorado may create or designate a planning agency. The planning agency may perform a number of duties including: make studies of the area; determine objectives; prepare and adopt plans for achieving those objectives; develop and recommend policies, ordinances, and administrative means to implement plans; and perform other related duties. The importance of the planning powers of local governments is illustrated by the requirement that zoning regulations be made in accordance with a comprehensive plan. While the regulation/ordinance itself may provide evidence that zoning is being conducted “in accordance with a plan,” the existence of a separate planning document ensures that the government is developing regulations and ordinances that are consistent with the overall goals of the county. Park County has established a Planning Office and Zoning Office.

(B) Zoning

Zoning is the traditional and most common tool available to local governments to control the use of land. Broad enabling authority is granted for municipalities and counties in Colorado to engage in zoning. Land “uses”, which are controlled by zoning, include the type of use (e.g., residential, commercial, industrial) as well as minimum specifications for use such as lot size, building height and setbacks, density of population, etc. Local governments are authorized to divide their territorial jurisdiction into districts, and to regulate and restrict the erection, construction, reconstruction, alteration, repair or use of buildings, structures, or land within those districts. Districts may include general use districts, overlay districts, and special use districts or conditional use districts. Zoning regulations/ordinances consist of maps and written text. Park County enforces a County wide zoning regulation.

(C) Subdivision Regulations

Subdivision regulations control the division of land into parcels for the purpose of building development or sale. Flood-related subdivision controls typically require that sub-dividers install adequate drainage facilities and design water and sewer systems to minimize flood damage and contamination. They prohibit the subdivision of land subject to flooding unless flood hazards are overcome through filling or other measures, and they prohibit filling of floodway areas. Subdivision regulations require that subdivision plans be approved prior to the division or sale of land. Subdivision regulations are a more limited tool than zoning and only indirectly affect the type of use made of land or minimum specifications for structures. Subdivision is defined as all divisions of a tract or parcel of land into two or more lots and all divisions involving a new street. In Park County, the definition of subdivision does not include the division of land into parcels greater than 35 acres. Park County has adopted subdivision regulations as part of the Land Use Regulations. The current regulations are dated November 2005.

The Park County Subdivision Regulations control divisions of two or more parcels as a subdivision. The term “subdivision” does not apply to any division of land that creates parcels of land where each parcel is 35 acres or more in size or a subdivision of land that is approved as a Subdivision Exemption. All proposed subdivisions must go through an approval process. Subdivision plats are required for review and must include a graphic description of areas subject to flooding. Lands subject to flooding, irregular drainage conditions, excessive erosion and other reasons considered unsuitable for residential use shall not be permitted for residential use unless the hazards can be and are corrected. Plats are also reviewed by the local permit officer to determine whether the property has other environmental concerns, and specifies what permits are required. Final plats must be prepared by a registered or licensed professional land surveyor. The Land Use Administrator and Code Enforcement Office also review plats to identify matters of topography and drainage concern. Although not designed specifically for hazard mitigation purposes, this regulation will prevent flood losses in tandem with the Floodplain Regulations. It will also minimize the adverse effects that development can have on storm water drainage through impervious surface requirements and through sedimentation and erosion control. Through its roadway requirements, the regulation also provides for adequate ingress and egress to subdivisions by emergency vehicles for fires or severe weather events. The mitigation effectiveness of this regulation is moderate.

(D) Storm water Regulations

Storm water regulations are most often used to control runoff and erosion potential which results from small-scale development of less than five acres. A reduction in damage from small-scale development is achieved through requirements such as on-site retention/detention ponds, etc. The State of Colorado encourages local governments to adopt storm water regulations under land use authorities. The County has not adopted storm water regulations.

(E) Floodplain Regulation

Colorado State statutes provide cities and counties land use authority. In particular, issues such as floodwater control are empowered through State Statute. The County has adopted floodplain regulations. The current regulations are dated November 2005.

The Floodplain Regulations are designed to minimize public and private losses due to flood conditions in specific areas. It requires a development permit to be submitted to the County prior to any construction or substantial improvement activities. Permits will only be approved if they meet the provisions of the regulations, which include development standards that will minimize the potential for flood losses. Standards are established for construction materials, equipment, methods, practices and uses. Most importantly, the regulations establish the requirements for elevation and flood proofing (non-residential) to the base flood elevation. These regulations require the minimum regulatory standards of the NFIP for development within the floodplain intended to reduce flood losses and promote wise use of the floodplain. The County also requires that anyone proposing a development in the floodway or floodplain prepare a plan which shows 1) the floodplain and floodways and overall site affected, 2) the proposed improvements or development, 3) the elevations of the area in question, and 4) any existing or proposed structures, fill, storage of materials, drainage facilities and the location of each. The County's floodplain areas were last studied in 1991. No floodplain areas in the County are currently being re-studied as part of the State's Floodplain Mapping Program. It is possible floodplain areas will be redelineated with updated topography, and that base flood elevations will be recalculated at some point in the future, as funding becomes available. The mitigation effectiveness of these regulations is high.

Park County participates in the National Flood Insurance Program (NFIP).

PARK COUNTY NATIONAL FLOOD INSURANCE PROGRAM
PARTICIPATION DETAILS

JURISDICTION	INITIAL MAP	CURRENT MAP EFFECTIVE
Park County	11/22/77	8/5/86

As of 12/31/2007, Park County did not have any flood insurance policies in effect.

(F) State of Emergency Regulation

Park County does not have an Emergency Regulation

5.2.1.5.2 Acquisition

The power of acquisition can be a useful tool for pursuing local mitigation goals. Local governments may find the most effective method for completely “hazard proofing” a particular piece of property or area is to acquire the property (either in fee or a lesser interest, such as an easement), thus removing the property from the private market and eliminating or reducing the possibility of inappropriate development occurring. Colorado legislation empowers cities, towns, and counties to acquire property for public purpose by gift, grant, devise, bequest, exchange, purchase, lease, or eminent domain. Park County has not undertaken acquisition as a mitigation measure/tool.

5.2.1.5.3 Taxation

The power to levy taxes and special assessments is an important tool delegated to local governments by Colorado law. The power of taxation extends beyond merely the collection of revenue, and can have a profound impact on the pattern of development in the county. Communities have the power to set preferential tax rates for areas which are more suitable for development in order to discourage development in otherwise hazardous areas. Local units of government also have the authority to levy special assessments on property owners for all or part of the costs of acquiring, constructing, reconstructing, extending or otherwise building or improving flood protection works within a designated area. This can serve to increase the cost of building in such areas, thereby discouraging development. Because the usual methods of apportionment seem mechanical and arbitrary, and because the tax burden on a particular piece of property is often quite large, the major constraint in using special assessments is political. Special assessments seem to offer little in terms of control over land use in developing areas. They can, however, be used to finance the provision of necessary services within

municipal or county boundaries. In addition, they are useful in distributing to the new property owners the costs of the infrastructure required by new development. Park County does levy property taxes.

5.2.1.5.4 Spending

The fourth major power that has been delegated from the Colorado General Assembly to local governments is the power to make expenditures in the public interest. Hazard mitigation principles can be made a routine part of all spending decisions made by the local government, including the adoption annual budgets and a Capital Improvement Plan (CIP). A CIP is a schedule for the provision of municipal or county services over a specified period of time. Capital programming, by itself, can be used as a growth management technique, with a view to hazard mitigation. By tentatively committing itself to a timetable for the provision of capital to extend services, a county can control growth, to some extent, especially in areas where the provision of on-site sewage disposal and water supply are unusually expensive. In addition to formulating a timetable for the provision of services, a local county can regulate the extension of and access to services. A CIP that is coordinated with extension and access policies can provide a significant degree of control over the location and timing of growth. These tools can also influence the cost of growth. If the CIP is effective in directing growth away from environmentally sensitive or high hazard areas, for example, it can reduce environmental costs. Park County does not have a CIP.

5.2.1.6 Political Willpower

Most Park County residents are knowledgeable about the potential hazards that their county faces, and in recent years, they have become more familiar with the practices and principles of mitigation. Because of this fact, coupled with Park County's history with natural disasters, it is expected that the current and future political climates are favorable for supporting and advancing future mitigation strategies.

5.2.2 Town of Alma

5.2.2.1 Staff and Organizational Capability

The Town of Alma has a staff and organizational capability to implement hazard mitigation strategies. The town is administered by a seven-person town council form of government. The Town Administration oversees the day-to-day operations of town government and manages the various departments. The Council directs and supervises

the administration of all town offices, boards, and agencies under the general direction and control of the Council. Responsibilities of the Administrator and the Council include:

- Development of the annual budget,
- Coordination of public relations programs,
- Provision of administrative services to the county,
- Administration of equal employment opportunity and affirmative action policies and programs,
- Human resource management and payroll,
- Risk management,
- Facilities management, and
- A number of delegated programs.

The Town of Alma has a number of professional staff departments to serve the residents of the town and to carry out day-to-day administrative activities. These include the following:

- Town Planner
- Public Works Director
- Town Clerk
- Human Services (in cooperation with Park County Government)
- Planning and Zoning (in cooperation with Park County Government)
- Police Department
- Assessor (in cooperation with Park County Government)
- Treasurer
- Library

There are also Boards and Committees that provide administrative support to the town including a Planning Commission and Board of Adjustment. The Park County Emergency Management Department is responsible for mitigation, preparedness, response, and recovery operations within Park County, with the assistance from the Planning Department and emergency services agencies including law enforcement agencies and fire districts. The County Office of Emergency Management works closely with the Town of Alma to meet town and county emergency management goals. The Planning Department is also responsible for addressing land use planning as well as developing mitigation strategies. The Planning Department has been involved in the development of this mitigation plan to identify gaps, weaknesses or opportunities for enhancement with existing mitigation programs. For the most part, it was determined that the town departments are adequately staffed and trained to accomplish their missions, but they lack adequate funding.

5.2.2.2 *Technical Capability*

The Town of Alma has the technical capability to implement hazard mitigation strategies.

5.2.2.2.1 **Technical Expertise**

The Town of Alma works cooperatively with the County Office of Emergency Management, and the floodplain official on staff to administer its hazard mitigation programs. It also relies on outside contractors/consultants to perform required technical work where the town does not have the expertise.

5.2.2.2.2 **Geographic Information Systems**

GIS systems can best be described as a set of tools (hardware, software, and trained staff) used to collect, manage, analyze and display spatially-referenced data. Many local governments are now incorporating GIS systems into their existing planning and management operations. The Town of Alma utilizes the Park County Mapping/GIS Department in several town emergency planning activities, and has the capability to assist in furthering hazard mitigation goals.

5.2.2.2.3 **Internet Access**

The Town of Alma provides its employees with satellite Internet service. However, employees have personal internet accounts which they can utilize while at work. The Alma Foundation maintains a website about the town, electronically connecting with its constituents. This provides an enormous opportunity for locals to keep abreast of the latest information relative to their work and makes receiving government services more affordable and convenient. Additionally, Park County has an emergency management webpage that gives citizens the opportunity to remain informed during disasters and to prepare for emergencies before they occur. Information technology also offers increased economic opportunities, higher living standards, more individual choices, and wider and more meaningful participation in government and public life. Simply put, information technology can make distance – a major factor for town officials and residents - far less important than in the past. Internet access will help further the town’s hazard mitigation awareness programs, but should be supplemented with more traditional (and less technical) means as well.

5.2.2.3 Fiscal Capability

The Town of Alma has limited fiscal capability to implement hazard mitigation strategies. For Fiscal Year 2007, the town has budgeted total annual expenditures of \$195,418.00. The majority of these funds are obligated to general fund expenditures. The Town also has two enterprise funds for water (\$69,410.00) and sewer (46,710.00). The Town receives most of its revenues through property taxes, grant monies, and other restricted intergovernmental contributions (Federal and State pass through dollars). The Town also receives revenues through a 3% sales tax. It is likely that the Town of Alma could afford to provide the cost share for the existing hazard mitigation grant programs. However, current budget deficits at both the State and local government level in Colorado, combined with the apparent increased reliance on local accountability by the Federal government, creates a significant and growing concern for the town regarding possible future directions for mitigation programs. Under the DMA 2000, FEMA has made special accommodations for "small and impoverished communities," who will be eligible for a 90% Federal share, 10% non-Federal cost share for projects funded through the Pre-Disaster Mitigation (PDM) grant program. According to the current Interim Final Rule for Section 322 of the Act, Park County will not qualify as a small and impoverished county. The definition is restricted to "communities of 3,000 or fewer individuals that is identified by the State as a rural county."

5.2.2.4 Policy and Program Capability

This part of the capabilities assessment includes the identification and evaluation of existing plans, policies, practices, programs, or activities that either increase or decrease the county's vulnerability to hazards. Positive activities, which decrease hazard vulnerability, will be sustained and enhanced to the fullest extent possible. Negative activities, which increase hazard vulnerability, will be targeted for reconsideration and will be thoroughly addressed within the Mitigation Strategy for the Town of Alma.

5.2.2.4.1 Recent Hazard Mitigation Efforts

Park County has developed a Community Wildfire Protection Plan that has been approved by the Board of Commissioners and the State and Federal land managers that outlines mitigation projects to decrease wildfire danger throughout the County. Many of Park County's local communities have also become FireWise Communities, allowing citizens to participate in wildfire mitigation. The Town of Alma is included in the County plan.

5.2.2.4.2 CRS (Community Rating System) Activities

Communities that regulate development in floodplains are able participate in the NFIP. In return, the NFIP makes federally backed flood insurance policies available for properties in the county. The CRS was implemented in 1990 as a program for recognizing and encouraging county floodplain management activities that exceed the minimum NFIP standards. There are ten CRS classes: class 1 requires the most credit points and gives the largest premium reduction; class 10 receives no premium reduction. The Town of Alma does not currently participate in the CRS.

5.2.2.4.3 Emergency Operations Plans

Park County has developed and adopted an Emergency Operations Plan which predetermines actions to be taken by government agencies and private organizations in response to an emergency or disaster event. The Plan describes the County's capabilities to respond to emergencies and establishes the responsibilities and procedures for responding effectively to the actual occurrence of a disaster. The plan does not specifically address hazard mitigation, but it does identify the specific operations to be undertaken by the County to protect lives and property immediately before, during and immediately following an emergency. There are no foreseeable conflicts between this Hazard Mitigation Plan and Park County's Emergency Operations Plan, primarily because they are each focused on two separate phases of emergency management (mitigation vs. preparedness and response). The Plan identifies the County Commission as having the lead role in the long-term recovery phase following a disaster – which presents a unique window of opportunity for implementing hazard mitigation strategies. However, none are specified within the Emergency Operations Plan. The Town of Alma does not currently have an Emergency Operations Plan separate from the County.

5.2.2.4.4 Floodplain Management Plan

The Town of Alma's Floodplain Management authority exists within the town Land Use Regulations, Article IX, zoning ordinance 2003-3. The Town does not currently have a separate floodplain management plan for NFIP purposes, except for provisions listed in the land use regulations. This Hazard Mitigation Plan is intended to fulfill the CRS planning requirement, if and when, the town decides to participate in the CRS.

5.2.2.4.5 Storm water Management Plan

The Town of Alma has a storm water management plan for Highway 9 and for all new subdivisions (11/2006).

5.2.2.4.6 Watershed Protection Plan

The Town of Alma has a watershed protection plan, adopted in 1982.

5.2.2.4.7 Open Space Plan

The Town of Alma has an open space plan as part of their land use regulations.

5.2.2.4.8 Comprehensive Plan

The Town adopted a Comprehensive Plan in 2000. The plan provides the future vision for the town regarding growth and development. Hazard mitigation planning is not specifically addressed in the plan.

5.2.2.5 Legal Authority

Local governments in Colorado have a wide range of tools available to them for implementing mitigation programs, policies, and actions. A hazard mitigation program can utilize any or all of the four broad types of government powers granted by the State of Colorado, which are (a) regulation (by ordinance in the case of cities and towns), (b) acquisition, (c) taxation, and (d) spending. The scope of this local authority is subject to constraints, however, as Colorado's political subdivisions must not act without proper delegation from the State. All power is vested in the State and can only be exercised by local governments to the extent it is delegated. Thus, this portion of the capabilities assessment will summarize Colorado's enabling legislation that grants the four types of government powers listed above within the context of available hazard mitigation tools and techniques.

5.2.2.5.1 Regulation

(1) General Police Power

Colorado' local governments have been granted broad regulatory powers in their jurisdictions. Colorado State Statutes bestow the general police power on local governments, allowing them to enact and enforce ordinances/regulations that define, prohibit, regulate or abate acts, omissions, or conditions detrimental to the health, safety, and welfare of the people, and to define and abate nuisances (including public health nuisances). Since hazard mitigation can be included under the police power (as protection of public health, safety and welfare), towns, cities and counties may include requirements for hazard mitigation in local ordinances/regulations. Local governments may also use their ordinance/regulation-making power to abate "nuisances," which could include, by local definition, any activity or condition making people or property more vulnerable to any hazard. The Town of Alma has enacted and enforces ordinances designed to promote the public health, safety and general welfare of its citizenry and that are, therefore, relevant to hazard mitigation.

(2) Building Codes and Building Inspection

Many structural mitigation measures involve constructing and retrofitting homes, businesses, and other structures according to standards designed to make the buildings more resilient to the impacts of natural hazards. Many of these standards are imposed through building codes. Municipalities and counties may adopt codes for their respective areas, if approved by the state, as providing "adequate minimum standards." Local regulations cannot be less restrictive than the State code. Local governments in Colorado are also empowered to carry out building inspections. The State legislation empowers cities and counties to create an inspection department, and enumerates its duties and responsibilities which include enforcing State and local laws relating to the construction of buildings, installation of plumbing, electrical, heating systems, etc.; building maintenance; and other matters. The Town of Alma works in cooperation with Park County for all building permits.

(3) Land Use

Regulatory powers granted by the State to local governments provide the most basic means by which a local government can control the use of land within its jurisdiction. Through various land use regulatory powers, a local government can control the amount, timing, density, quality, and location of new development. All of these characteristics of growth can determine the level of vulnerability of the county in the event of a natural hazard. Land use regulatory powers include the power for counties

and municipalities to engage in planning, and enact and enforce zoning regulations/ordinances, subdivision controls, and floodplain regulations/ordinances. Each local community possesses great power to prevent unsuitable development in hazard-prone areas. The Town of Alma has adopted a land use regulation.

(A) Planning

According to State statutes, local governments in Colorado may create or designate a planning agency. The planning agency may perform a number of duties including: make studies of the area; determine objectives; prepare and adopt plans for achieving those objectives; develop and recommend policies, ordinances, and administrative means to implement plans; and perform other related duties. The importance of the planning powers of local governments is illustrated by the requirement that zoning regulations be made in accordance with a comprehensive plan. While the regulation/ordinance itself may provide evidence that zoning is being conducted “in accordance with a plan,” the existence of a separate planning document ensures that the government is developing regulations and ordinances that are consistent with the overall goals of the community. The Town of Alma has established a Planning Department and Commission.

(B) Zoning

Zoning is the traditional and most common tool available to local governments to control the use of land. Broad enabling authority is granted for municipalities and counties in Colorado to engage in zoning. Land “uses”, which are controlled by zoning, include the type of use (e.g., residential, commercial, industrial) as well as minimum specifications for use such as lot size, building height and setbacks, density of population, etc. Local governments are authorized to divide their territorial jurisdiction into districts, and to regulate and restrict the erection, construction, reconstruction, alteration, repair or use of buildings, structures, or land within those districts. Districts may include general use districts, overlay districts, and special use districts or conditional use districts. Zoning regulations/ordinances consist of maps and written text. The Town of Alma enforces a zoning regulation.

(C) Subdivision Regulations

Subdivision regulations control the division of land into parcels for the purpose of building development or sale. Flood-related subdivision controls typically require that sub-dividers install adequate drainage facilities and design water and sewer systems to minimize flood damage and contamination. They prohibit the subdivision of land subject to flooding unless flood hazards are overcome through filling or other measures, and they prohibit filling of floodway areas. Subdivision regulations require that subdivision

plans be approved prior to the division or sale of land. Subdivision regulations are a more limited tool than zoning and only indirectly affect the type of use made of land or minimum specifications for structures. Subdivision is defined as all divisions of a tract or parcel of land into two or more lots and all divisions involving a new street. In Park County, the definition of subdivision does not include the division of land into parcels greater than 35 acres. The Town of Alma has adopted subdivision regulations as part of the Land Use Regulations.

The Subdivision Regulations controls divisions of two or more parcels as a subdivision. The term “subdivision” does not apply to any division of land that creates parcels of land where each parcel is 35 acres or more in size or a subdivision of land that is approved as a Subdivision Exemption. All proposed subdivisions must go through an approval process. Subdivision plats are required for review and must include a graphic description of areas subject to flooding. Lands subject to flooding, irregular drainage conditions, excessive erosion and other reasons considered unsuitable for residential use shall not be permitted for residential use unless the hazards can be and are corrected. Plats are also reviewed by the Town Council to determine whether the property has other environmental concerns, and specifies what permits are required. Final plats shall be prepared by a registered or licensed professional land surveyor. The Town staff, attorney and engineer also review plats to identify matters of topography and drainage concern. Although not designed specifically for hazard mitigation purposes, this regulation will prevent flood losses in tandem with the Floodplain Regulations. It will also minimize the adverse effects that development can have on storm water drainage through impervious surface requirements and through sedimentation and erosion control. Through its roadway requirements, the ordinance also provides for adequate ingress and egress to subdivisions by emergency vehicles for fires or severe weather events. The mitigation effectiveness of this regulation is moderate.

(D) Storm water Regulations

Storm water regulations are most often used to control runoff and erosion potential which results from small-scale development of less than five acres. A reduction in damage from small-scale development is achieved through requirements such as on-site retention/detention ponds, etc. The State of Colorado encourages local governments to adopt storm water regulations under land use authorities. The Town of Alma has adopted storm water regulations.

(E) Floodplain Regulation

Colorado State statutes provide cities and counties land use authority. In particular, issues such as floodwater control are empowered through State Statute. The Town of Alma has adopted floodplain regulations.

(F) State of Emergency Regulation

Park County does not have an Emergency Regulation.

5.2.2.5.2 Acquisition

The power of acquisition can be a useful tool for pursuing local mitigation goals. Local governments may find the most effective method for completely “hazard proofing” a particular piece of property or area is to acquire the property (either in fee or a lesser interest, such as an easement), thus removing the property from the private market and eliminating or reducing the possibility of inappropriate development occurring. Colorado legislation empowers cities, towns, and counties to acquire property for public purpose by gift, grant, devise, bequest, exchange, purchase, lease, or eminent domain. The Town of Alma has not undertaken acquisition as a mitigation measure/tool.

5.2.2.5.3 Taxation

The power to levy taxes and special assessments is an important tool delegated to local governments by Colorado law. The power of taxation extends beyond merely the collection of revenue, and can have a profound impact on the pattern of development in the county. Communities have the power to set preferential tax rates for areas which are more suitable for development in order to discourage development in otherwise hazardous areas. Local units of government also have the authority to levy special assessments on property owners for all or part of the costs of acquiring, constructing, reconstructing, extending or otherwise building or improving flood protection works within a designated area. This can serve to increase the cost of building in such areas, thereby discouraging development. Because the usual methods of apportionment seem mechanical and arbitrary, and because the tax burden on a particular piece of property is often quite large, the major constraint in using special assessments is political. Special assessments seem to offer little in terms of control over land use in developing areas. They can, however, be used to finance the provision of necessary services within municipal or county boundaries. In addition, they are useful in distributing to the new property owners the costs of the infrastructure required by new development. The Town of Alma does levy property taxes.

5.2.2.5.4 Spending

The fourth major power that has been delegated from the Colorado General Assembly to local governments is the power to make expenditures in the public interest. Hazard mitigation principles can be made a routine part of all spending decisions made by the local government, including the adoption annual budgets and a Capital Improvement Plan (CIP). A CIP is a schedule for the provision of municipal or county services over a specified period of time. Capital programming, by itself, can be used as a growth management technique, with a view to hazard mitigation. By tentatively committing itself to a timetable for the provision of capital to extend services, a county can control growth, to some extent, especially in areas where the provision of on-site sewage disposal and water supply are unusually expensive. In addition to formulating a timetable for the provision of services, a local county can regulate the extension of and access to services. A CIP that is coordinated with extension and access policies can provide a significant degree of control over the location and timing of growth. These tools can also influence the cost of growth. If the CIP is effective in directing growth away from environmentally sensitive or high hazard areas, for example, it can reduce environmental costs. The Town of Alma prepares an annual budget and a capital improvement plan.

5.2.2.6 Political Willpower

Most residents of Alma are knowledgeable about the potential hazards that their town faces, and in recent years, they have become more familiar with the practices and principles of mitigation. Because of this fact, coupled with their awareness of the history of natural disasters throughout Park County, it is expected that the current and future political climates are favorable for supporting and advancing future mitigation strategies.

5.2.3 Town of Fairplay

5.2.3.1 Staff and Organizational Capability

The Town of Fairplay has a staff and organizational capability to implement hazard mitigation strategies. The town is administered by a five-person town council form of government. The Council oversees the day-to-day operations of town government and manages the various departments. They also direct and supervise the administration of all town offices, boards, and agencies under the general direction and control of the Council. Responsibilities include:

- Approval of the annual budget,
- Coordination of public relations programs,
- Provision of administrative services to the county,
- Administration of equal employment opportunity and affirmative action policies and programs,
- Human resource management and payroll,
- Risk management,
- Facilities management, and
- A number of delegated programs.

The Town of Fairplay has a number of professional staff departments to serve the residents of the town and to carry out day-to-day administrative activities. These include the following:

- Land Use Administrator
- Public Works Director
- County Clerk and Recorder
- Human Services (in cooperation with Park County Government)
- Planning and Zoning (in cooperation with Park County Government)
- Police Department
- Assessor (in cooperation with Park County Government)
- Treasurer
- Library

There are also Boards and Committees that provide administrative support to the town including a Planning Commission and Board of Adjustment. The Park County Emergency Management Department is responsible for mitigation, preparedness, response, and recovery operations within Park County, with the assistance from the Planning Department and emergency services agencies including law enforcement agencies and fire districts. The County Office of Emergency Management works closely with the town of Fairplay to meet town and county emergency management goals. The Planning Department is also responsible for addressing land use planning as well as developing mitigation strategies. The Planning Department has been involved in the development of this mitigation plan to identify gaps, weaknesses or opportunities for enhancement with existing mitigation programs. For the most part, it was determined that the town departments are adequately staffed and trained to accomplish their missions, but they lack adequate funding.

5.2.3.2 *Technical Capability*

The Town of Fairplay has the technical capability to implement hazard mitigation strategies.

5.2.3.2.1 **Technical Expertise**

The Town of Fairplay works cooperatively with the County Office of Emergency Management, and the floodplain official on staff to administer its hazard mitigation programs. It also relies on outside contractors/consultants to perform required technical work where the town does not have the expertise.

5.2.3.2.2 **Geographic Information Systems**

GIS systems can best be described as a set of tools (hardware, software, and trained staff) used to collect, manage, analyze and display spatially-referenced data. Many local governments are now incorporating GIS systems into their existing planning and management operations. The Town of Fairplay utilizes the Park County Mapping/GIS Department in several town emergency planning activities, and has the capability to assist in furthering hazard mitigation goals.

5.2.3.2.3 **Internet Access**

The Town of Fairplay provides its employees with dial-up internet service, but is currently transitioning to a satellite high-speed service. However, employees have personal internet accounts which they can utilize while at work. The town does have a website which electronically connects with its constituents. This provides an enormous opportunity for local officials to keep abreast of the latest information relative to their work and makes receiving government services more affordable and convenient. Additionally, Park County has an emergency management webpage that gives citizens the opportunity to remain informed during disasters and to prepare for emergencies before they occur. Information technology also offers increased economic opportunities, higher living standards, more individual choices, and wider and more meaningful participation in government and public life. Simply put, information technology can make distance – a major factor for town officials and residents - far less important than in the past. Internet access will help further the town’s hazard mitigation awareness programs, but should be supplemented with more traditional (and less technical) means as well.

5.2.3.3 Fiscal Capability

The Town of Fairplay has fiscal capability to implement hazard mitigation strategies. For Fiscal Year 2007, the town has budgeted total annual expenditures of \$740,795.00. The majority of these funds are obligated to general fund expenditures. The Town receives most of its revenues through property taxes, grant monies, and other restricted intergovernmental contributions (Federal and State pass through dollars). The Town also has a sales tax of 4%. It is likely that the Town of Fairplay could afford to provide the cost share for the existing hazard mitigation grant programs. However, current budget deficits at both the State and local government level in Colorado, combined with the apparent increased reliance on local accountability by the Federal government, creates a significant and growing concern for the town regarding possible future directions for mitigation programs. Under the DMA 2000, FEMA has made special accommodations for "small and impoverished communities," who will be eligible for a 90% Federal share, 10% non-Federal cost share for projects funded through the Pre-Disaster Mitigation (PDM) grant program. According to the current Interim Final Rule for Section 322 of the Act, Park County will not qualify as a small and impoverished county. The definition is restricted to "communities of 3,000 or fewer individuals that is identified by the State as a rural county."

5.2.3.4 Policy and Program Capability

This part of the capabilities assessment includes the identification and evaluation of existing plans, policies, practices, programs, or activities that either increase or decrease the county's vulnerability to hazards. Positive activities, which decrease hazard vulnerability, will be sustained and enhanced to the fullest extent possible. Negative activities, which increase hazard vulnerability, will be targeted for reconsideration and will be thoroughly addressed within the Mitigation Strategy for the Town of Fairplay.

5.2.3.4.1 Recent Hazard Mitigation Efforts

Park County has developed a Community Wildfire Protection Plan that has been approved by the Board of Commissioners and the State and Federal land managers that outlines mitigation projects to decrease wildfire danger throughout the County. Many of Park County's local communities have also become FireWise Communities, allowing citizens to participate in wildfire mitigation. The Town of Fairplay is included in the County plan.

5.2.3.4.2 CRS (Community Rating System) Activities

Communities that regulate development in floodplains are able participate in the NFIP. In return, the NFIP makes federally backed flood insurance policies available for properties in the county. The CRS was implemented in 1990 as a program for recognizing and encouraging county floodplain management activities that exceed the minimum NFIP standards. There are ten CRS classes: class 1 requires the most credit points and gives the largest premium reduction; class 10 receives no premium reduction. The Town of Fairplay does not currently participate in the CRS.

5.2.3.4.3 Emergency Operations Plans

Park County has developed and adopted an Emergency Operations Plan which predetermines actions to be taken by government agencies and private organizations in response to an emergency or disaster event. The Plan describes the County's capabilities to respond to emergencies and establishes the responsibilities and procedures for responding effectively to the actual occurrence of a disaster. The plan does not specifically address hazard mitigation, but it does identify the specific operations to be undertaken by the County to protect lives and property immediately before, during and immediately following an emergency. There are no foreseeable conflicts between this Hazard Mitigation Plan and Park County's Emergency Operations Plan, primarily because they are each focused on two separate phases of emergency management (mitigation vs. preparedness and response). The Plan identifies the County Commission as having the lead role in the long-term recovery phase following a disaster – which presents a unique window of opportunity for implementing hazard mitigation strategies. However, none are specified within the Emergency Operations Plan. The Town of Fairplay does not currently have an Emergency Operations Plan separate from the County, but they are in the process of writing and adopting one.

5.2.3.4.4 Floodplain Management Plan

The Town of Fairplay does not currently have a floodplain management plan for NFIP purposes. This Hazard Mitigation Plan is intended to fulfill the CRS planning requirement, if and when, the town decides to participate in the CRS.

5.2.3.4.5 Storm water Management Plan

The Town of Fairplay does not currently have an adopted storm water management plan; however, Park County is an agent of the State of Colorado for storm water

management purposes under the Federal Clean Water Act, which addresses the discharge of pollutants to surface waters from "point sources" and "non-point sources".

5.2.3.4.6 Watershed Protection Plan

The Town of Fairplay currently has a separate watershed protection plan, adopted in 2002.

5.2.3.4.7 Open Space Plan

The Town of Fairplay has an open space plan in their Zoning Regulations, adopted in 2006.

5.2.3.4.8 Comprehensive Plan

The Town of Fairplay has adopted a Strategic Master Plan. The plan provides the future vision for the town regarding growth and development. Hazard mitigation planning is not specifically addressed in the plan.

5.2.3.5 Legal Authority

Local governments in Colorado have a wide range of tools available to them for implementing mitigation programs, policies, and actions. A hazard mitigation program can utilize any or all of the four broad types of government powers granted by the State of Colorado, which are (a) regulation (by ordinance in the case of cities and towns), (b) acquisition, (c) taxation, and (d) spending. The scope of this local authority is subject to constraints, however, as Colorado's political subdivisions must not act without proper delegation from the State. All power is vested in the State and can only be exercised by local governments to the extent it is delegated. Thus, this portion of the capabilities assessment will summarize Colorado's enabling legislation that grants the four types of government powers listed above within the context of available hazard mitigation tools and techniques.

5.2.3.5.1 Regulation

(1) General Police Power

Colorado's local governments have been granted broad regulatory powers in their jurisdictions. Colorado State Statutes bestow the general police power on local governments, allowing them to enact and enforce ordinances that define, prohibit, regulate or abate acts, omissions, or conditions detrimental to the health, safety, and

welfare of the people, and to define and abate nuisances (including public health nuisances). Since hazard mitigation can be included under the police power (as protection of public health, safety and welfare), towns, cities and counties may include requirements for hazard mitigation in local ordinances. Local governments may also use their regulation/ordinance-making power to abate “nuisances,” which could include, by local definition, any activity or condition making people or property more vulnerable to any hazard. The Town of Fairplay has enacted and enforces ordinances designed to promote the public health, safety and general welfare of its citizenry and that are, therefore, relevant to hazard mitigation.

(2) Building Codes and Building Inspection

Many structural mitigation measures involve constructing and retrofitting homes, businesses, and other structures according to standards designed to make the buildings more resilient to the impacts of natural hazards. Many of these standards are imposed through building codes. Municipalities and counties may adopt codes for their respective areas, if approved by the state, as providing “adequate minimum standards.” Local regulations cannot be less restrictive than the State code. Local governments in Colorado are also empowered to carry out building inspections. It empowers cities and counties to create an inspection department, and enumerates its duties and responsibilities which include enforcing State and local laws relating to the construction of buildings, installation of plumbing, electrical, heating systems, etc.; building maintenance; and other matters. The Town of Fairplay has adopted the 2006 building code and has established a Building/ Inspections Office to carry out its building inspections.

(3) Land Use

Regulatory powers granted by the State to local governments provide the most basic means by which a local government can control the use of land within its jurisdiction. Through various land use regulatory powers, a local government can control the amount, timing, density, quality, and location of new development. All of these characteristics of growth can determine the level of vulnerability of the county in the event of a natural hazard. Land use regulatory powers include the power for counties and municipalities to engage in planning, and enact and enforce zoning regulations/ordinances, subdivision controls, and floodplain regulations/ordinances. Each local possesses great power to prevent unsuitable development in hazard-prone areas. The Town of Fairplay has adopted a land use regulation.

(A) Planning

According to State statutes, local governments in Colorado may create or designate a planning agency. The planning agency may perform a number of duties including: make studies of the area; determine objectives; prepare and adopt plans for achieving those objectives; develop and recommend policies, ordinances, and administrative means to implement plans; and perform other related duties. The importance of the planning powers of local governments is illustrated by the requirement that zoning regulations be made in accordance with a comprehensive plan. While the regulation/ordinance itself may provide evidence that zoning is being conducted “in accordance with a plan,” the existence of a separate planning document ensures that the government is developing regulations and ordinances that are consistent with the overall goals of the community. The Town of Fairplay has established a Town Planner.

(B) Zoning

Zoning is the traditional and most common tool available to local governments to control the use of land. Broad enabling authority is granted for municipalities and counties in Colorado to engage in zoning. Land “uses”, which are controlled by zoning, include the type of use (e.g., residential, commercial, industrial) as well as minimum specifications for use such as lot size, building height and setbacks, density of population, etc. Local governments are authorized to divide their territorial jurisdiction into districts, and to regulate and restrict the erection, construction, reconstruction, alteration, repair or use of buildings, structures, or land within those districts. Districts may include general use districts, overlay districts, and special use districts or conditional use districts. Zoning regulations/ordinances consist of maps and written text. The Town of Fairplay enforces a zoning regulation.

(C) Subdivision Regulations

Subdivision regulations control the division of land into parcels for the purpose of building development or sale. Flood-related subdivision controls typically require that sub-dividers install adequate drainage facilities and design water and sewer systems to minimize flood damage and contamination. They prohibit the subdivision of land subject to flooding unless flood hazards are overcome through filling or other measures, and they prohibit filling of floodway areas. Subdivision regulations require that subdivision plans be approved prior to the division or sale of land. Subdivision regulations are a more limited tool than zoning and only indirectly affect the type of use made of land or minimum specifications for structures. Subdivision is defined as all divisions of a tract or parcel of land into two or more lots and all divisions involving a new street. In Park

County, the definition of subdivision does not include the division of land into parcels greater than 35 acres. The Town of Fairplay adopted subdivision regulations in 2006 as part of the Land Use Regulations.

The Park County Subdivision Regulations control divisions of two or more parcels as a subdivision. The term “subdivision” does not apply to any division of land that creates parcels of land where each parcel is 35 acres or more in size or a subdivision of land that is approved as a Subdivision Exemption. All proposed subdivisions must go through an approval process. Subdivision plats are required for review and must include a graphic description of areas subject to flooding. Lands subject to flooding, irregular drainage conditions, excessive erosion and other reasons considered unsuitable for residential use shall not be permitted for residential use unless the hazards can be and are corrected. Plats are also reviewed by the local permit officer to determine whether the property has other environmental concerns, and specifies what permits are required. Final plats shall be prepared by a registered or licensed professional land surveyor. The Land Use Administrator and Code Enforcement Office also review plats to identify matters of topography and drainage concern. Although not designed specifically for hazard mitigation purposes, this regulation will prevent flood losses in tandem with the Floodplain Regulations. It will also minimize the adverse effects that development can have on storm water drainage through impervious surface requirements and through sedimentation and erosion control. Through its roadway requirements, the ordinance also provides for adequate ingress and egress to subdivisions by emergency vehicles for fires or severe weather events. The mitigation effectiveness of this regulation is moderate.

(D) Storm water Regulations

Storm water regulations are most often used to control runoff and erosion potential which results from small-scale development of less than five acres. A reduction in damage from small-scale development is achieved through requirements such as on-site retention/detention ponds, etc. The State of Colorado encourages local governments to adopt storm water regulations under land use authorities. The Town of Fairplay has not adopted storm water regulations.

(E) Floodplain Regulation

Colorado State statutes provide cities and counties land use authority. In particular, issues such as floodwater control are empowered through State Statute. The Town of Fairplay has adopted floodplain regulations. They were adopted in 2002 and can be found in Article 24, Section 16.24.90 of the Zoning Regulations.

The Floodplain Regulations are designed to minimize public and private losses due to flood conditions in specific areas. It requires a development permit to be submitted to the town prior to any construction or substantial improvement activities. Permits will only be approved if they meet the provisions of the ordinance, which include development standards that will minimize the potential for flood losses. Standards are established for construction materials, equipment, methods, practices and uses. Most importantly, the ordinance establishes the requirements for elevation and flood proofing (non-residential) to the base flood elevation. This ordinance requires the minimum standards of the NFIP. The County's floodplain areas were last studied in 1991. No floodplain areas in the County are currently being re-studied as part of the State's Floodplain Mapping Program. It is possible floodplain areas will be redelineated with updated topography, and that base flood elevations will be recalculated at some point in the future, as funding becomes available. The mitigation effectiveness of this ordinance is high.

The Town of Fairplay participates in the National Flood Insurance Program (NFIP).

TOWN OF FAIRPLAY NATIONAL FLOOD INSURANCE PROGRAM PARTICIPATION DETAILS

JURISDICTION	INITIAL MAP	CURRENT MAP EFFECTIVE
Fairplay, Town of	7/18/75	4/1/87

As of 12/31/2007, the Town of Fairplay did not have any flood insurance policies in effect.

(F) State of Emergency Regulation

The Town of Fairplay does not have an Emergency Regulation.

(G) Ordinances/Regulations

Colorado law prescribes that counties adopt regulations and that cities and towns adopt ordinances. The Town of Fairplay has adopted several ordinances that are relevant to hazard mitigation, as described in more detail below.

5.2.3.5.2 Acquisition

The power of acquisition can be a useful tool for pursuing local mitigation goals. Local governments may find the most effective method for completely “hazard proofing” a particular piece of property or area is to acquire the property (either in fee or a lesser

interest, such as an easement), thus removing the property from the private market and eliminating or reducing the possibility of inappropriate development occurring. Colorado legislation empowers cities, towns, and counties to acquire property for public purpose by gift, grant, devise, bequest, exchange, purchase, lease, or eminent domain. The Town of Fairplay has not undertaken acquisition as a mitigation measure/tool.

5.2.3.5.3 Taxation

The power to levy taxes and special assessments is an important tool delegated to local governments by Colorado law. The power of taxation extends beyond merely the collection of revenue, and can have a profound impact on the pattern of development in the county. Communities have the power to set preferential tax rates for areas which are more suitable for development in order to discourage development in otherwise hazardous areas. Local units of government also have the authority to levy special assessments on property owners for all or part of the costs of acquiring, constructing, reconstructing, extending or otherwise building or improving flood protection works within a designated area. This can serve to increase the cost of building in such areas, thereby discouraging development. Because the usual methods of apportionment seem mechanical and arbitrary, and because the tax burden on a particular piece of property is often quite large, the major constraint in using special assessments is political. Special assessments seem to offer little in terms of control over land use in developing areas. They can, however, be used to finance the provision of necessary services within municipal or county boundaries. In addition, they are useful in distributing to the new property owners the costs of the infrastructure required by new development. The Town of Fairplay does levy property taxes.

5.2.3.5.4 Spending

The fourth major power that has been delegated from the Colorado General Assembly to local governments is the power to make expenditures in the public interest. Hazard mitigation principles can be made a routine part of all spending decisions made by the local government, including the adoption annual budgets and a Capital Improvement Plan (CIP). A CIP is a schedule for the provision of municipal or county services over a specified period of time. Capital programming, by itself, can be used as a growth management technique, with a view to hazard mitigation. By tentatively committing itself to a timetable for the provision of capital to extend services, a county can control growth, to some extent, especially in areas where the provision of on-site sewage disposal and water supply are unusually expensive. In addition to formulating a timetable for the provision of services, a local county can regulate the extension of and access to services. A CIP that is coordinated with extension and access policies can provide a significant degree of control over the location and timing of growth. These

tools can also influence the cost of growth. If the CIP is effective in directing growth away from environmentally sensitive or high hazard areas, for example, it can reduce environmental costs. The Town of Fairplay does not have a CIP.

5.2.3.6 Political Willpower

Most residents of Fairplay are knowledgeable about the potential hazards that their town faces, and in recent years, they have become more familiar with the practices and principles of mitigation. Because of this fact, coupled with their awareness of the history of natural disasters throughout Park County, it is expected that the current and future political climates are favorable for supporting and advancing future mitigation strategies.

5.3 HAZARD PREPAREDNESS MEASURES PRACTICED IN PARK COUNTY

5.3.1 Flooding

Water and snow levels are monitored prior to spring thaw. Those levels are reviewed and if it is determined that high water may occur with the spring run-off the following steps are taken:

1. Public Awareness.
2. Evaluation of waterways to see where trouble spots may be so they may be mitigated. Special attention to those spots with history of problems.
3. Ensure the storage of adequate numbers of sand bags.
4. Ensure evacuation points are ready.
5. Alert property owners to the need of flood insurance in advance.
6. Alert private property owners of need for safe storage of valuables, stocking up on necessities, notification lists, etc.

5.3.2 Wildfires.

Extreme drought conditions monitored and the following steps taken:

1. Alerts to both private and public entities.
2. Literature on defensible space and other protective measures.
3. Burn Bans.
4. Wildfire orientation meetings with all assisting agencies with resources checked.

5.3.3 Colorado Emergency Fire Fund.

The Colorado Emergency Fire Fund (EFF), which was established in 1967, assists the payment of expenses when catastrophic wildfires exceed a participating county's resources. 35 Colorado counties contribute to EFF. A county's annual assessment for EFF is calculated using a formula based on the acreage of private watershed and the annual property tax valuation. Counties with large amounts of private watershed land and a high assessed valuation pay more into the fund than rural counties with large acreage of federal lands and low assessed valuation. Emergency funding requests must originate from the county sheriff and State Forester approval is required. The fund has paid for nearly 3 million dollars of suppression costs since its inception (*Source: Colorado State Forest Service*).

5.3.4 County Wildfire Safety Program.

Colorado State Forest Service, USFS, BLM, Elk Creek Fire Protection District, Hartsel Fire Protection District, Jefferson/Como Fire Protection District, Lake George Fire Protection District, North-West Fire Protection District, Platte Canyon Fire Protection District, Southern Park County Fire Protection District, citizens and Park County have initiated an effort to mitigate wildfires within Park County. While saving lives is their first priority, a firefighter's second mandate is to save structures in the event of a wildfire. The purpose of this Wildfire Safety Program is to assist homeowners, firefighters, and the community in the event of a wildfire by providing them with the following information:

- For the homeowner, specific information about how to make their homes less susceptible to wildfire,
- For the firefighter, an assessment of the structure with respect to access, materials and vegetation- specific information to make fighting fires safer for all emergency personnel, and
- For the community, the ability to map structures and access in wildfire-prone areas of the county.

The premise of the Wildfire Safety Program is to educate homeowners about Home Fire Protection in a region where wildfire is an integral part of the ecosystem. As Park County grows, property owners encroach more and more on wildlands, making their susceptibility to fire greater. Park County is using protocols from the **FireWise** program, as well as several other programs, to provide homeowners with information about how they can protect themselves; this includes information about Access, Vegetation and Topography, Defensible Space, Structure Information, Utilities, and Water Sources.

In 2007, Park County completed the first step in this process, which was the development of a Community Wildfire Protection Plan (CWPP) for the county. This plan includes extensive GIS data and mapping to illustrate the greatest areas of need, along with survey information from individual fire districts about high hazard areas. Additional information about this plan can be found on the emergency management website at: www.parkco.us/oem.htm.

Since that time, Park County fire districts have been working on various fire mitigation projects, ranging from slash programs to neighborhoods becoming **FireWise** communities.

5.3.5 State Geologic Hazard Review Process.

The Colorado Geological Survey (CGS) performs subdivision development reviews to ensure that potential geologic problems have been identified, and if so, adequately addressed. These reviews are required to be submitted by County planning departments for new subdivisions (voluntary for cities or towns) as required by Senate Bill 35 (1972). School sites must be submitted by school districts as directed by House Bill 1045 (1984). Other proposed uses including airports, landfills, water treatment plants, utility rights of way, highway rights of way, as well as the effects of large developments such as mines and ski areas are required to be reviewed under House Bill 1041 (1974).

SECTION 6 MITIGATION STRATEGY

Park County Mitigation Advisory Committee (MAC) attended a workshop on January 8th 2007-2008, to discuss the results of the hazard identification and risk assessments, review mitigation goals and objectives based on the priority areas and hazard types, discuss community strengths and weaknesses, and begin developing the mitigation strategy. Subsequent meetings took place to develop Mitigation goals, objectives and actions, and to prioritize those actions. The following is a complete list of Mitigation Strategy work sessions:

Table 6-1 Mitigation Advisory Committee Meetings	
Date	Meeting Purpose
January 8, 2008	HIRA Review
January 29, 2008	MAC Work Session – Developing Mitigation Goals and Objectives
February 5, 2008	MAC Work Session – Developing Mitigation Actions
February 26, 2008	MAC Work Session – Prioritizing Mitigation Actions
March 11, 2008	MAC Work Session - Finalizing Mitigation Actions

This chapter of the Hazard Mitigation Plan describes the most challenging part of any such planning effort – the development of a **Mitigation Strategy**. It is a process of:

1. Setting mitigation goals,
2. Developing objectives
3. Considering a full range of mitigation actions,
4. Developing and prioritizing specific mitigation actions, and
5. Deriving a comprehensive mitigation action plan

Essentially these five elements comprise this mitigation strategy.

6.1 SETTING MITIGATION GOALS

The Hazard Mitigation Planning process followed by the Mitigation Advisory Committee is a typical problem-solving methodology:

- Describe the problem (Hazard Identification),
- Estimate the impacts the problem could cause (Risk Assessment),
- Assess what safeguards already exist that could/should lessen those impacts (Capability Assessment), and
- Using this information, determine if you should do something (Determine Acceptable Risk), and if so, what that something should be (Develop a Mitigation Action Plan).

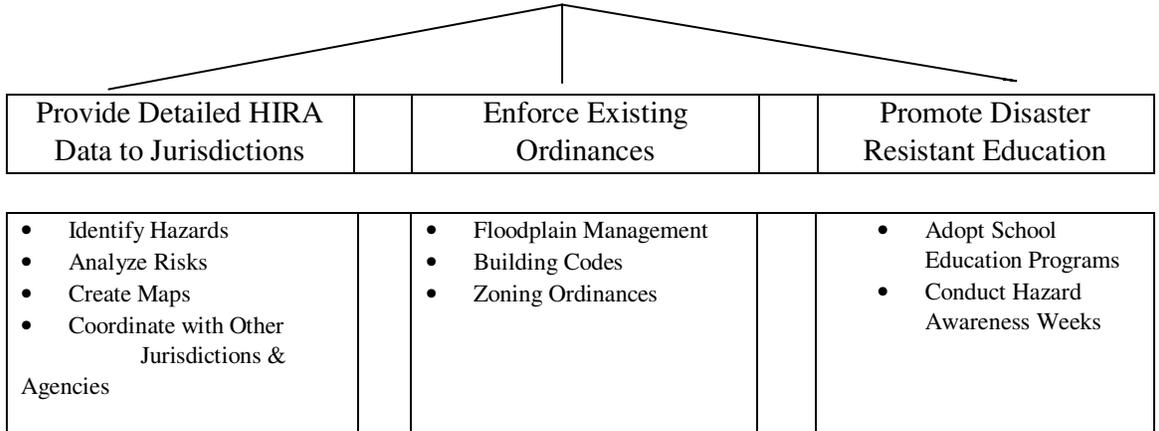
When a community decides that certain risks are unacceptable and that certain mitigation actions may be achievable, the development of Goals and Objectives takes place. Goals and Objectives help to describe what should occur, using increasingly more narrow descriptors. Initially, broad-based Goals are developed, which are long-term and general statements. Goals are accomplished by meeting Objectives, which are activities that are more specific and more clearly achievable. In most cases there is a third level, called Recommended Actions (or Implementation), which are very detailed and specific ways of meeting specific components of the Objectives in a finite time period.

When developing the Goals and Objectives for this plan, the MAC was provided with the model below as an example of this relationship.



GOAL

Improve Park County Jurisdictions Capabilities
To
Address Hazard Risks and Vulnerabilities



The MAC discussed Goals and Objectives for this plan at two points in the planning process. First, early in the planning process, the MAC established general Goals and Objectives to set the initial tone and direction for the overall plan. Then, after the problem solving as described above took place, the Goals and Objectives were revisited to confirm that the data collection process supported them. Lastly, Recommended Actions (or Implementation) were developed as a logical extension of the plan’s Objectives. Most of these actions are dynamic and can change. These actions have been utilized to develop a Mitigation Action Plan for the County and it is contained as a part of the overall all-hazards mitigation plan.

The data collection supports the Goals, Objectives and Recommended Actions (Implementation) in three ways:

The Hazard Identification/Vulnerability Assessment data identifies:

- Areas exposed to hazards,
- At-risk critical facilities, and
- Future development at risk.

The HIRA identification of specific hazards and particular locations subject to those hazards is explicitly linked to the need for Mitigation Actions to address those risks.



For example, the HIRA identifies specific jurisdictions that need to update portions of their NFIP floodplain ordinances. This plan provides Recommended Actions (Implementation) for the jurisdictions to accomplish those ordinance updates.

The Capability Assessment data identifies;

- Areas for Emergency Management improvements.

The Capability Assessment does not identify many existing procedures or capabilities to prepare for potential severe winter weather events. The county's experience with severe winter weather events in the winters of 2006-2007, the HIRA discussion of severe winter weather risk, and the importance that the Mitigation Advisory Committee assigned to severe winter weather preparedness actions all point to the need to develop such capabilities. In response, this plan develops Recommended Actions to develop such severe winter weather preparedness capabilities. For example, the plan puts forth a Recommended Actions (Implementation) to create a winter-weather preparedness education program for residents and to work with FEMA to revise its winter weather policy to open up more resources to the county during such events. This action will lessen the likelihood or loss of life, road closures, and business closures when severe winter weather events occur in the area.

The Hazard History data identifies;

- Protective measures that could prevent past damages from becoming repetitive.

For example, this plan puts forth Recommended Actions (Implementation) concerned with mapping areas with a history of hazard events to better discern where mitigation projects need to be implemented within the County and its jurisdictions.

Each town and the county used the results of the data collection efforts to examine the appropriateness of the goals that were developed and the prioritized mitigation actions for their particular jurisdiction. The priorities differed slightly from jurisdiction to jurisdiction. Overall, for the entire planning area, protecting new and existing development from the effects of hazards is the top priority because it is can be achieved on an individual community-by-community basis but at the same time be integrated into an overarching plan goal. For each jurisdiction, additional priorities were developed based on past damages, existing exposure to risk, other community goals, and weaknesses identified by the local government capability assessments.

Following the final Public Meeting, held on April 7, 2008, the following goals for the County were accepted by the Mitigation Advisory Committee. The goals and their associated objectives form the basis for the development of a mitigation action plan and specific mitigation projects to be considered for the County. The Mitigation Action Plan, located at the end of this chapter, contains recommended mitigation projects. The goals are separated into four categories: Planning and Collaboration, Community Awareness Training, Hazard Reduction, and Emergency Services.

Perhaps the most personal way in which hazards can affect the lives of citizens is by endangering the buildings where those citizens live, work, conduct business, and recreate. For that reason, it is important that the Mitigation Action Plan specifically address the risk faced by existing and future buildings in the three Park County jurisdictions from the identified hazards. Within the following four categories of mitigation goals two categories, Category I and Category III, address the need to reduce the impacts those hazards pose to existing and future buildings.

6.1.1 CATEGORY I: PLANNING AND COLLABORATION

Planning and Collaboration focuses on revising or commissioning, creating, approving and implementing plans that will reduce the county's vulnerability to all hazards addressed in the Hazard Mitigation Plans. An emphasis will be placed on ensuring the participation of all jurisdictions within Park County.

Goal 1: Ensure hazard awareness and risk reduction principles are institutionalized into the Park County jurisdictions daily activities, processes and functions, by incorporating them into policy documents and initiatives.

Goal 2: Increase the county jurisdictions floodplain management activities and participation in the National Flood Insurance Program.

Goal 3: Develop support for mitigation among local jurisdictions and local officials.

6.1.2 CATEGORY II: COMMUNITY AWARENESS AND TRAINING

Community Awareness Training focuses on ways to best make citizens aware of the risk of a hazard affecting them, and how best to mitigate against and prepare for said hazards.

Goal 4: Enhance countywide understanding and awareness of community preparedness needs.

Goal 5: Conduct exercises and training regarding the prevention and mitigation of Park County hazards.

Goal 6: Explore diverse public notification systems for impending hazards.

6.1.3 CATEGORY III: HAZARD REDUCTION

Hazard Reduction focuses on ways to reduce risk through structural projects and participation in regional, state or federal hazard reduction programs.

Goal 7: Enhance the safety of residents and businesses by protecting public and private infrastructure and critical facilities from the affects of natural and human-caused hazards.

6.1.4 CATEGORY IV: EMERGENCY SERVICES

Emergency Services focuses on best preparing emergency services to mitigate against and to respond to all hazards through the use of redundant exercises and policy and procedure reviews.

Goal 8: Improve emergency services capabilities.

Goal 9: Enhance interagency collaboration through mutual aid agreements and long-term planning.

6.1.5 General Observations — Strengths

The county and two towns approved their Community Wildfire Protection Plan in 2007. The plan includes comprehensive mitigation initiatives that will significantly reduce risk to private properties, businesses and critical facilities within the county.

The county and the two towns have implemented comprehensive land-use, zoning and building regulations that enhance its mitigation capabilities. Subdivision regulations require that new subdivisions must take evaluate for flood and drainage related risk. Approval of development will be contingent on either demonstrating that there is no risk, or correcting that risk. It will also minimize the adverse effects that development can have on storm water drainage through impervious surface requirements and through sedimentation and erosion control.

6.1.6 General Observations — Weaknesses

The winters of 2006-2007 and 2007-2008 have brought severe winter events that have overwhelmed county resources and left residents stranded in their homes. In the winter of 2007-2008, the county was forced to declare a State of Emergency in order to activate mutual aid agreements with the State of Colorado and other counties to bring in resources and manpower to plow roads and provide direct aid to stranded residents and livestock. Without generous donations of manpower and equipment, the county's resources would have been strained beyond capacity.

While the county's mapping capabilities and programs through its GIS office are strong, the county's floodplain mapping is out of date. The last time the county's floodplains were studied was 1991. The county recently digitized its floodplain maps; however, the maps have no topographic delineations. The county does not have the current resources to be able to update the majority of its floodplain mapping to include topographic delineations. Though county regulations are in place to enforce the lowest standards of the NFIP, the county does not currently participate in the Community Rating System. Participating in the Community Rating System could provide resources to the county in the form of federally subsidized flood insurance in exchange for compliance with the NFIP's development regulations.

While it has been determined that the county is adequately staffed and trained for emergency operations, the county's budget constricts the county's ability to expand mitigation, preparation and response operations. The Disaster Mitigation Act of 2000 provides that communities who qualify as "small and impoverished communities" would qualify for 90% federal, 10% non-federal funding for mitigation programs. The county does not qualify as a small and impoverished community, making it more difficult to find the resources to implement mitigation initiatives.

6.1.7 Initiating Prioritization of Actions

During the presentation of findings for the hazard identification and risk assessment workshop, the Mitigation Advisory Committee was asked to provide their preliminary

input and ideas. Ranges of actions were then considered by the Mitigation Advisory Committee based on their comments and suggestions.

The Mitigation Advisory Committee was asked to review the STAPLE/E criteria to rank the mitigation alternatives. The MAC utilized the STAPLE/E process to guide its rankings, tempered by the preliminary comments below:

1. *Top priorities for the area were public safety, public education, and reducing potential economic impacts of disasters.*
2. *Alternatives should consider the impacts on the jurisdictions as a whole.*
3. *Alternatives must not conflict with other community programs.*
4. *Floodplain management policies and activities should be a priority; ideas from the Community Rating System (CRS) should be considered for enhancing local floodplain management programs.*
5. *Experiences from disasters should be built upon.*
6. *The success of past mitigation projects should be used as a base for alternatives.*
7. *Outreach and other efforts should be focused on properties and locations subject to repetitive damages from drought, wildfire, floods and other hazards.*
8. *The Project Impact program was an effective public outreach tool; even though it is no longer in effect, the ideas from that program should be built upon.*

6.2 DEVELOPING OBJECTIVES

This section describes the Mitigation Objectives, which were developed by the Mitigation Advisory Committee to enhance the Goals that were set in the prior section. The Objectives were developed utilizing the information and data contained in the Hazard Identification and Risk Assessment (HIRA). The Goals and Objectives were designed to foster the development of community-derived Mitigation Actions by the Mitigation Advisory Committee (MAC) and other interested local officials and citizens. The Mitigation Actions are the basis of the comprehensive Mitigation Action Plan for Park County and the Towns of Alma and Fairplay. The Objectives also served as a catalyst for further public participation in the development of this plan. If additional Goals and Objectives are developed for the county in the future, they will need to tie directly back to the HIRA.

6.2.1 Overarching County Goal

“To develop and maintain a disaster resistant community that is less vulnerable to the economic and physical devastation associated with all hazard events.”

This overarching goal is intended to represent the vision of the Park County jurisdictions’ future as it relates to all hazards, safety, and economic prosperity.

6.2.2 Derivation of Objectives from Goals and Future Vision

The MAC developed Mitigation Objectives from the goals and the future vision for each goal. The Objectives are more specific and more clearly achievable than the Goals. Following each Goal Statement is a future oriented vision in italics, describing what the jurisdictions will look like when these Goals, and the Objectives for those Goals, are accomplished. Community officials should consider the Goals, the future vision for each Goal, and the Objectives before making community policies, public investment programs, economic development programs, or community development decisions for their jurisdictions.

The following are a series of tables outlining the goals, future vision of the goals and objectives as created by the MAC. The goals are separated into four categories: Planning and Collaboration, Community Awareness Training, Hazard Reduction, and Emergency Services. Planning and Collaboration focuses on revising or commissioning, creating, approving and implementing plans that will reduce the county’s vulnerability to all hazards addressed in the Hazard Mitigation Plans. An emphasis will be placed on ensuring the participation of all jurisdictions within Park County. Community Awareness

Training focuses on ways to best make citizens aware of the risk of a hazard affecting them, and how best to mitigate against and prepare for said hazards. Hazard Reduction focuses on ways to reduce risk through structural projects and participation in regional, state or federal hazard reduction programs. Emergency Services focuses on best preparing emergency services to mitigate against and to respond to all hazards through the use of redundant exercises and policy and procedure reviews.

6.2.2.1 Category 1: Planning and Collaboration

<p>Goal 1: Ensure hazard awareness and risk reduction principles are institutionalized into the Park County jurisdictions daily activities, processes and functions, by incorporating them into policy documents and initiatives.</p>	
<p>Future Vision: The Park County jurisdictions recognize that a requirement for communities to be safe and economically sustainable is that they must protect the life and property of citizens, businesses, and the day-to-day functions of the jurisdiction itself. This philosophy will be implemented by institutionalizing mitigation as a priority in any future planning processes and functions and by incorporating them into policy.</p>	<p>Objective 1A: Formally adopt the county’s all-hazard pre-disaster mitigation plan at a public meeting within each participating jurisdiction.</p>
	<p>Objective 1B: Consistent efforts will be made so that studies, plans, hazard assessments and other actions that affect long term planning by the county are maintained and updated as necessary in order to ensure the appropriate information and requirements are current.</p>



Goal 2:
Increase the county jurisdictions floodplain management activities and participation in the National Flood Insurance Program.

<p>Future Vision: The Park County jurisdictions are incorporating a range of techniques to reduce exposure and increase awareness to protect their jurisdictions from flood hazards. Additionally, all NFIP-participating jurisdictions have updated and adopted their amended floodplain ordinances. High-risk properties such as FEMA’s Repetitive Loss Properties are routinely targeted for outreach and education opportunities and the property owners are aware of potential mitigation options that are available to reduce future damages from flooding. The Park County jurisdictions are participating in the Community Rating System, which provides discounts on annual insurance premiums to citizens and businesses throughout the community. The Colorado Water Conservation Board and the Colorado Division of Emergency Management representatives continue to work with the Park County jurisdictions to evaluate other opportunities and best practices for floodplain management, training, and mitigation funding opportunities.</p>	<p>Objective 2A: Assess jurisdictional plans and documents regarding flood management to determine changes or additions that will be required in future revisions.</p>
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Goal 3: Develop support for mitigation among local jurisdictions and local officials.	
<p>Future Vision: The success of mitigation planning is greatly influenced by strong participation from all local jurisdictions, including the towns of Alma and Fairplay. Local participation guarantees a more comprehensive and nuanced approach to mitigation planning in the county.</p>	<p>Objective 3A: Continually assess ongoing disaster preparedness programs and activities to implement changes that improve disaster preparedness for Park County.</p>

6.2.2.2 Category II – Community Awareness Training

Goal 4: Enhance countywide understanding and awareness of community preparedness needs.	
<p>Future Vision: As a result of the Park County jurisdictions’ consistent outreach efforts, citizens, businesses, visitors, local officials, and other stakeholders are more aware of potential community hazards and vulnerable locations. Stakeholders seeking information about hazards and hazard-reduction techniques are able to easily find resources to help them.</p>	<p>Objective 4A: Educate the public about preparedness activities and mitigation goals, allowing each citizen the opportunity to reduce personal risk and to increase property protection.</p>





Goal 5: Conduct exercises and training regarding the prevention and mitigation of Park County hazards.	
<p>Future Vision: The County conducts frequent exercises to stay prepared to respond to any future hazards and to mitigate their potential impacts. These exercises lead to a significantly more disaster resistant community and make any response operations more comprehensive and efficient.</p>	<p>Objective 5A: Hold annual or semi-annual tabletop exercises involving public officials and community members regarding the identified hazards, to improve long-term planning and mitigation activities.</p> <p>Objective 5B: Park County will periodically assess its progress towards reducing the effects of disasters and the positive lessons learned from these reviews will be evaluated and integrated back into the county’s institutional processes and procedures.</p>

Goal 6: Explore diverse public notification systems for impending hazards.	
<p>Future Vision: Residents, businesses, and motorists have easy access to information warning about any potential hazards. The redundant nature of these warning systems ensures that the majority of people in the county have knowledge of any impending hazard.</p>	<p>Objective 6A: Ensure that the public has more than one means of obtaining information about emergencies and disasters in the county through development of redundant notification systems.</p>



6.2.2.3 Category III Hazard Reduction

Goal 7: Enhance the safety of residents and businesses by protecting public and private infrastructure and critical facilities from the affects of natural and human-caused hazards.	
<p>Future Vision: Park County implements measures to reduce risk in areas most susceptible to hazards identified in the Park County Hazard Mitigation plans. Actions include developing hazard reduction plans, infrastructure improvements and participation in federal and state hazard reduction programs. The county also participates in exercises to better prepare itself to protect infrastructure during disasters.</p>	<p>Objective 7A: Create a countywide plan addressing specific risks to infrastructure posed by identified hazards and the resultant critical infrastructure needs and develop a funding mechanism for the priority areas.</p>

6.2.2.4 Category IV – Emergency Services

Goal 8: Improve emergency services capabilities.	
<p>Future Vision: Park County participates in all regional emergency services assessment exercises to determine weaknesses and improve its capability to respond during an emergency. Frequent practice and candid critiques make all operations more seamless during emergency conditions.</p>	<p>Objective 8A: Enhance interagency operations by strengthening the EOC capabilities across jurisdictional boundaries.</p>
	<p>Objective 8B: Improve emergency communications by developing redundancy, emergency plans, and training in evacuation procedures and radio procedures.</p>



Goal 9: Enhance interagency collaboration through mutual aid agreements and long-term planning.	
<p>Future Vision: Park County continues to pursue mutual-aid agreements to prepare for any emergency situation in which county resources are not sufficient. The County’s Emergency Services Council creates subcommittees to address all hazard issues identified by the Park County Hazard Mitigation Plan.</p>	<p>Objective 9A: Continue to work with the Emergency Services Council in Park County to address emergency and disaster-related issues and concerns.</p>

6.3 CONSIDERING A FULL RANGE OF MITIGATION ACTIONS

6.3.1 General Multi-Hazard Mitigation Alternatives

The mitigation alternatives selected should be linked to the County’s goals and objectives, and must address each jurisdiction’s hazard risks and vulnerability outlined in the plan’s Hazard Identification and Risk Assessment. The following is a list of potential mitigation measures not specific to one hazard, which can benefit a community’s overall hazard reduction efforts.

6.3.1.1 Comprehensive Plans

Comprehensive plans address how and where a community should grow by guiding the rate, intensity, form, and quality of physical development. These plans address land use, economic development, transportation, recreation, environmental protection, the provision of infrastructure, and other municipal functions. Comprehensive plans help to guide other local measures such as capital improvement programs, zoning ordinances, subdivision ordinances and other community policies and programs. By integrating hazard considerations into the plan, mitigation would become integrated with community functions and could therefore be an institutionalized part of a jurisdiction’s planning efforts.

Density and development patterns should reflect the County jurisdictions’ ability to protect their communities, the environment, and the ability to evacuate the area. Development management tools should be incorporated into the local policies that address the location, density, and use of land, with a particular emphasis on development within high-risk areas. Efforts should be made to keep people and



property out of high-hazard areas whenever possible. Particularly hazardous areas could be used for recreational uses, open space, or wildlife refuges.

6.3.1.2 Capital Budget Plans

Capital budget plans typically provide for the future and ongoing provision of public facilities and infrastructure. These plans can be vital tools in keeping new development out of high-hazard areas by limiting the availability of public infrastructure. Public facilities can often be relocated to less hazardous areas in the aftermath of a disaster. Public utilities can also be relocated, or they can be upgraded or flood proofed. Power and telephone lines can be buried underground. New locations for critical facilities should not be in hazard-prone areas, or in areas where their function may be impaired by a given hazard event (i.e., where water can flood the access roads). Critical facilities should be designed and/or retrofitted in order to remain functional and safe before, during, and after a hazard event.

6.3.1.3 Zoning Regulations

Zoning is by far the most common land-use control technique used by local governments. While a useful tool for regulating and restricting undesirable land uses, zoning has a somewhat more limited benefit when it comes to mitigation. Zoning is most effective on new development rather than existing development, which does little to address the pre-existing development in hazardous areas. Jurisdictions with a large amount of undeveloped land will benefit much more than older, more established jurisdictions. Even for new development, the issuance of variances, special use permits, rezoning, and the failure to enforce existing codes, however, will weaken zoning's ability to prevent certain types of building practices.

6.3.1.4 Building Codes

Building codes regulate the design, construction, and maintenance of construction within most jurisdictions. These regulations prescribe standards and requirements for occupancy, maintenance, operation, construction, use, and appearance of buildings. Building codes are an effective way to ensure that new and extensive re-development projects are built to resist natural hazards. In Colorado, jurisdictions are encouraged to adopt and enforce the International Building Code (IBC) 2003, which has provisions for wind, water, and seismicity.

6.3.1.5 Public Outreach and Education Programs

Educating the public about what actions they can take to protect themselves and their property from the effects of natural hazards can be an effective means for reducing

losses. These types of programs could target public officials, citizens, businesses, or the local construction trade. The program could cover preparedness, recovery, mitigation, and general hazard awareness information. The information could be presented in a variety of ways, from workshops, brochures, advertisements, or local media. Potential outreach and education topics include:

1. Code Awareness Training
2. Sheltering and Evacuation
3. Flood Insurance
4. School Information (Primary, Secondary, Colleges, and Universities)
5. New Homeowner/Resident Information
6. Emergency Preparedness for Families, Businesses, and Tourists
7. Driver Safety in Disasters
8. Special Needs Outreach
9. Hazard Mitigation for Homeowners (Including Manufactured Homes and Trailers), Renters, and Businesses
10. Hazard Specific Workshops in conjunction with Homeowners Associations

6.3.1.6 Vegetative Maintenance

Vegetative maintenance is the pruning and maintenance of trees, bushes, and other vegetation that could increase threats to power lines during storms, or could act as fuels during wildfires. In areas of high wildfire risk, other strategies can include mechanical and burning fuel hazard reduction strategies. This could be applied in limited areas that have a significant vulnerability to these hazards, such as an easement or along the wildland-urban interface.

6.3.1.7 Vegetative Planting and Treatment

Vegetative planting and treatments can help to capture and filter runoff and can reduce landslides. Perennial vegetation includes grass, trees, and shrubs, which cover the soil, reduce water pollution, slow the rate of runoff, increase filtration, and prevent erosion. This type of land treatment includes maintaining trees, shrubberies, and the vegetative cover, terracing (a raised bank of earth with vertical sloping sides and a flat top to reduce surface runoff), stabilizing slopes, grass filter strips, contour plowing, and strip farming (the growing of crops in rows along a contour). Other potential options include vegetated swales, infiltration ditches, and permeable paving blocks.

6.3.2 Hazard-Specific Alternatives

The following is a list of potential mitigation measures that tend to work better when applied to a specific hazard.

6.3.2.1 Wildfire

6.3.2.1.1 Fuel Loads

Fuel loads are anything that may contribute to the life of a fire, and include accumulated masses of dead or dry vegetation, such as grasses, branches, leaves, pine needles and shrubs. In developed areas, check for and clear fuel loads created by downed trees to prevent the formation of natural fuel loads that give rise to rampant forest fire. It is costly to suppress even modest forest fires, and that cost multiplies when aircraft watering is necessitated. Dried trees, particularly those that have fallen and piled, create fuel-loading situations. The most important time to check for fuel loads is after periods of relative drought that can dry accumulated, dead vegetation and cause old and less hearty trees to crack and fall. Wildfires typically start in forest, woodland or prairie areas. They can occur naturally though they are often exacerbated by human activities. Wildfires can be hard to control as they often threaten homes and communities located in wildland wildfire interface areas. Although preventing or controlling wildfires is preferable, there are many mitigation efforts can be taken to prevent or alleviate damage to homes and communities when fires inevitably occur.

6.3.2.1.2 Public Education

Outreach efforts can promote such items as non-combustible building materials and roof coverings, ample access for firefighters to properties, dry hydrants, and the importance of clearing brush and grass away from buildings. It is important to promote public education on smoking hazards and the risks of recreational fires.

6.3.2.1.3 Neighborhood Groups

Citizens may organize neighborhood wildfire safety coalitions to plan how their neighborhoods can work together to prevent a wildfire. Community wildfire protection planning is a key process to effective wildfire mitigation.

6.3.2.1.4 GIS Mapping

GIS mapping and identification of high risk wildfire areas based on vegetative coverage and other fire burning characteristics/factors can facilitate analysis and planning decisions through comparison with topography, zoning, developments, infrastructure, or other markers.

6.3.2.1.5 Insurance Company Promotions

Insurance companies often include fire mitigation incentives in their policies and can include wildfire safety information in materials provided to area residents.

Community zoning and permitting related to building in high wildfire risk areas is an effective way to effectively mitigate wildfire and reduce risk to life and property as well. It often can work hand in hand with insurance providers.

6.3.2.1.6 Property Maintenance

Maintenance of property in or near wildfire prone areas can go a long way toward preventing or reducing the spread of fire. Maintenance includes fuel management techniques such as pruning and clearing dead vegetation, selective logging, keeping grass short, planting fire-resistant vegetation, and creating fuel/fire breaks, i.e., areas where the spread of wildfires will be slowed or stopped by the removal of fuels. Other helpful techniques include use of fire resistant roofing and building materials; use of functional shutters on windows; keeping flammables such as curtains secured away from windows, or using heavy fire-resistant drapes; taking advantage of the fire department's home safety inspections; sweeping/cleaning dead or dry leaves, needles, twigs, and combustibles from roofs, decks, eaves, porches and yards; keeping woodpiles and other combustibles away from structures; use of boxed or enclosed eaves on a house; thorough clean-up of spilled flammable fluids; and keeping garage areas protected from blowing embers, whether from a chimney or outdoor fire place.

6.3.2.1.7 Road and Driveway Clearance

Roads and driveways should be kept accessible to emergency vehicles and fire equipment. Driveways should be relatively straight and flat, with at least some open spaces to turn. Bridges should be strong enough to support emergency vehicles, with clearance wide and high enough for two-way traffic and emergency vehicle access. Addresses should be visible from the road, and keys to gates around property should be provided to the local fire department.

6.3.2.1.8 Evacuation

Residents should be instructed on proper evacuation procedures, such as wearing protective clothing (e.g., sturdy shoes, cotton or woolen clothing, long pants, a long-sleeved shirt, gloves and a handkerchief to protect the face); taking a Disaster Supplies Kit; and choosing a route away from fire hazards. Residents must also be instructed on how to best handle pets and livestock during evacuations. Information regarding pets and livestock can be obtained from the Animal Emergency Response Working Group (AERWG).

6.3.2.1.9 Individual Response

Fire emergency telephone numbers should be posted at every telephone. Residents should plan several escape routes away from their homes, by car and foot. It is a good idea to keep a set of hand tools that can be used as fire tools, such as a rake, axe, hand/chainsaw, bucket and shovel. When wildfire threatens, residents should be instructed to carry and listen to battery-operated radios for reports and evacuation information, and follow instructions from local officials. Cars should be backed into garages or parked in open space facing the direction of escape, with doors and windows closed and the key in the ignition. Garage windows and doors should be closed but left unlocked. If residents have time, they can take steps to protect their homes by closing windows, vent doors, Venetian blinds and heavy drapes; removing lightweight curtains; shutting off natural gas at the meter; turning off pilot lights; closing fireplace screens; and moving flammable furniture into the center of the home away from windows and sliding-glass doors. Outside, residents can seal attic and ground vents with pre-cut plywood or commercial seals; turn off propane tanks; place combustible patio furniture inside; connect garden hose to outside taps; set up a portable gasoline-powered pump; place lawn sprinklers on the roof and near above-ground fuel tanks; wet the roof, wet or remove shrubs within 15 feet of the home; and gather fire tools.

6.3.2.2 Severe Winter Weather

Proper preparation can decrease the risks of injury that can occur during cold weather and snowstorms in particular. When temperatures reach levels that are extremely low and severe weather conditions exist, they pose dangers that can be alleviated by planning for how to handle such situations.

6.3.2.2.1 Family and Traveler Emergency Preparedness

A local or state government can produce and distribute family and traveler emergency preparedness information relating to severe winter weather hazards.

6.3.2.2.2 Driver Safety

Safety strategies for severe weather events can be included in driver education classes and materials.

6.3.2.2.3 Shelters/Heating Centers

A community can establish heating centers or shelters for vulnerable populations and special needs populations, not only for residents, but also for stranded motorists/travelers.

6.3.2.2.4 Outreach

A local government can pre-plan to identify and systematically contact isolated, vulnerable, or special-needs populations during significant snowstorms or periods of extreme cold, including establishing and promoting accessible shelters/heating centers in the community.

6.3.2.2.5 Animal Protection

Farmers and other animal custodians should plan for addressing livestock or other animal needs.

6.3.2.2.6 Communication Hotline

Establish a pre-event communication hotline that will operate in sync with a 911 system or other emergency means of communication for winter weather coordination and emergency related purposes.

6.3.2.2.7 Agreements to Provide Equipment and Manpower

Negotiate mutual aid agreements with neighboring communities to send equipment and workers to provide assistance during severe weather events that could overwhelm the county's resources. Negotiate contracts with private companies to bring in extra equipment and manpower *before* and *during* severe winter weather events to ensure that roads remain open and ensure that residents and livestock do not get trapped by drifting and ground-blizzards.

6.3.2.3 Flooding

Flood mitigation measures can be classified as structural or non-structural. In simple terms, structural mitigation attempts to eliminate the possibility of flooding at a particular location. Non-structural mitigation removes the potentially effected people or property from the potentially flooded area. The following is a list of potential mitigation measures.

6.3.2.3.1 Floodplain Management Ordinances

Floodplain management ordinances are weakened by development pressures, a lack of suitable sites outside of the floodplain, community desires to be near the water, inability to effectively monitor floodplain management activities, or by land-use planning policies that are encouraging development into floodplain areas. Plans or policies that place more properties at risk are also reducing the storage capacity and functions of the natural floodplains. Degradation of the floodplain in this way increases flood depths and affects the reliability of Flood Insurance Rate Maps (FIRMs). Structures built in floodplains, particularly those that do not utilize a freeboard (that exceeds the minimum Base Flood Elevation), are consequently even more vulnerable to damage by floods.

6.3.2.3.2 Acquisition

Acquisition involves the purchasing of a property that is cleared and permanently held as open space. Acquisition permanently moves people and property out of harm's way, increases floodplain capacities, recreation areas and open space, and can help to preserve wetlands, forests, estuaries and other natural habitats. Participation in federally funded grant programs requires voluntary participation by the owner. Acquisition programs can be expensive to undertake, and the property will no longer accrue taxes for the community and must be maintained, but it is by far the most effective and permanent mitigation technique. Acquisition is most effective when targeting repetitive loss structures, extremely vulnerable structures, or other high-hazard areas.

6.3.2.3.3 Elevation

Elevation is the raising of a structure above the Base Flood Elevation. Elevation is often the best alternative for structures that must be built or remain in flood prone areas, and is less costly than acquisition or relocation. However, elevating a structure does not eliminate the continued need for emergency related services at the flood hazard site and can increase its vulnerability to high winds and other hazards such as earthquakes. Some building types are either unsuitable or cost-prohibitive to elevate.

6.3.2.3.4 Relocation

Relocation involves the moving of a building or facility to a less hazardous area, on either the same parcel or another parcel. This measure also moves people and property out of harm's way, and is a very effective measure overall. Some building types are either unsuitable or cost-prohibitive to relocate.

6.3.2.3.5 Storm water Management Plans

New development that increases the amount of impervious surfaces affects the land's ability to absorb the water and can intensify the volume of peak flow runoff. Without efficient storm water management, runoff could cause flooding, erosion, and water quality problems. Storm water management plans should incorporate both structural and nonstructural measures in order to be most effective. Structural measures include retention and detention facilities that minimize the increase of runoff due to impervious surfaces and new development. Retention facilities allow storm water to seep into the groundwater. Detention systems accumulate water during peak runoff periods that will be released at off-peak times. Nonstructural measures include establishing impervious surface limit policies and maintenance programs for existing drainage systems.

6.3.2.3.6 Dry Flood proofing

Dry flood proofing involves making all areas below the flood protection level watertight by strengthening walls, sealing openings, using waterproof compounds, or applying plastic sheeting on the walls. This method is not recommended for residential structures, but may work well for new construction, retrofitting, or repairing a non-residential structure. Due to pressure exerted on walls and floors by floodwater, dry flood proofing is effective on depths less than 2 to 3 feet. Flood proofing of basements is not recommended.

6.3.2.3.7 Wet Flood proofing

Opposite of dry flood proofing, wet flood proofing lets the floodwater actually enter a structure. This technique is effective on deeper flood depths, as it does not have the same potential to build up exterior pressure. Again, this method is not recommended for residential structures and may not be used for basements under new construction, substantial improvements, or substantially damaged structures.

6.3.2.3.8 Storm Drainage Systems

Mitigation efforts include the installation, re-routing, or increasing the capacity of storm drainage systems. Examples include the separation of storm and sanitary sewers, addition or increase in size of drainage or retention ponds, drainage easements, or creeks and streams.

6.3.2.3.9 Drainage Easements

Easements can be granted that enable regulated public use of privately owned land for temporary water retention and drainage areas.

6.3.2.3.10 Structural Flood Control Measures

Water can be channeled away from people and property with structural control measures such as levees, dams, or floodwalls. These measures may also increase drainage and absorption capacities. These structural control measures may also increase Base Flood Elevations and could create a false sense of security.

6.3.2.3.11 Basement Backflow Prevention

County jurisdictions should encourage the use of check valves, sump pumps, and backflow prevention devices in homes and buildings, if the infrastructure allows.

6.3.2.4 Drought

6.3.2.4.1 Drought Preparedness Action Guides

With technical assistance from NRCS, NWS, CWCB and other federal or state agencies, County officials can develop a Drought Preparedness Action Guide that provides a streamlined process to help anticipate the onset of drought and then implement a specific set of predetermined actions, once measured values of particular drought parameters meet scientifically established thresholds, in order to mitigate the potential impacts of drought as much as possible. Climatic indices can be identified that are useful for predicting the likelihood of drought conditions in Park County. These indices include *MEI, NAO, SNOTEL Snow Water Equivalent, NRCS stream flow forecast, and NOAA precipitation data* in different areas of the county. By reviewing the data for these indices after it becomes available on the Internet in January or February, the Emergency Manager can initiate appropriate drought preparation actions. Threshold values for the indices to trigger a drought mitigation response and the specific drought mitigation actions can be developed by Park County with the help of the Natural Resources Conservation Service. The mitigation actions begin in March, and should be executed throughout the spring and summer as conditions dictate. Such a Drought Preparedness Action Guide was already developed for Costilla County, Colorado.

6.3.2.5 Earthquake

Some regions are particularly susceptible to earthquake damage. Risks of injury and damage from earthquake events can be determined and managed via use of earthquake hazard identification and loss estimation.

6.3.2.5.1 Seismic Hazard Mapping

Information gained from seismic hazard mapping can be used to assess risk. The first step is collection of geologic information on seismic sources, soil conditions, and related potential hazards. The second step is to prepare a map showing the approximate locations of various hazards.

6.3.2.5.2 Building Codes

Although land use management that avoids building on hazardous sites is an effective way to reduce earthquake risk, there may be times when it is necessary to build on such sites. Engineers and architects have designed buildings in ways that reduce the impact of ground shaking. Encouraging all local governments to adopt and enforce updated building code provisions is one effective way to reduce earthquake damage risk.

6.3.2.5.3 Infrastructure Hardening

Identification and hardening of critical lifeline systems, i.e., critical public services such as utilities and roads, to meet "Seismic Design Guidelines and Standards for Lifelines," or equivalent standards, may distinguish a manageable earthquake from a social and economic catastrophe.

6.3.2.5.4 Bridge Strengthening

State and local highway departments should review construction plans for all bridges in high-risk seismic areas to determine their susceptibility to collapse. Questionable bridges should be retrofitted. After the Interstate 35 truss bridge in Minnesota collapsed on August 1, 2007, bridge inspections in Colorado have become more detailed and more frequent, at the direction of Governor Bill Ritter. "About 17 percent of the bridges in the state of Colorado are either structurally deficient or functionally obsolete. In other words, they are not able to do the job we're asking them to do," said Mark Mehalko, who sits on Gov. Bill Ritter's transportation panel. In cooperation with the Colorado Department of Transportation (CDOT), local governments can initiate the process of examining seismic risk bridges by looking at those bridges within their jurisdictions that CDOT has rated as structurally deficient or functionally obsolete and determine whether any of those face seismic risks.

6.3.3 General Categories of Mitigation Techniques

Hazard mitigation techniques generally fall into the following four categories:

- *Planning and Collaboration*
- *Community Awareness Training*
- *Hazard Reduction*
- *Emergency Services*

6.3.3.1 Planning and Collaboration

Planning and collaboration activities involve creating, commissioning, or revising plans to reduce vulnerability to hazards and subsequently approving and implementing those plans. These activities also involve collaboration among individual communities in developing revising and implementing the plans.

6.3.3.2 Community Awareness and Training

Community awareness and training activities are used to advise residents, business owners, potential property buyers, and visitors about hazards, hazardous areas, and mitigation techniques they can use to protect themselves and their property. Examples of measures to educate and inform the public include:

- Outreach projects
- Speaker series / demonstration events
- Hazard mapping, including Geographic Information Systems (GIS)
- Real estate disclosure
- Library materials
- School education programming
- Hazard expositions
- Websites

6.3.3.3 Hazard Reduction

Hazard reduction activities reduce risk through structural and non-structural projects and through participation in regional, state or federal hazard reduction programs. They fall into four subcategories (*Prevention; Property Protection; Natural Resource Protection; Structural Projects*)

6.3.3.3.1 Prevention

Preventive activities are intended to keep hazard problems from getting worse. They are particularly effective in reducing a community's future vulnerability, especially in areas where development has not occurred or where capital improvements have not been substantial. Examples of preventive activities include:

- Planning and zoning
- Open space preservation
- Floodplain regulations
- Storm water management
- Drainage system maintenance
- Capital improvements programming
- Riverine / fault zone setbacks

6.3.3.2 Property Protection

Property protection measures protect existing structures by modifying the building to withstand hazardous events, by removing structures from hazardous locations, or by insuring buildings and their contents. Examples include:

- Acquisition
- Relocation
- Elevation (raising) of buildings
- Protection of critical facilities
- Retrofitting of existing structures (i.e., wind proofing, flood proofing, seismic design standards, etc.)
- Insurance
- Safe rooms

6.3.3.3 Natural Resource Protection

Natural resource protection activities reduce the impact of natural hazards by preserving or restoring natural areas and their mitigation functions. Such areas include floodplains, wetlands, dunes and forest communities. Parks, recreation or conservation agencies and organizations often implement these measures. Examples include:

- Floodplain protection
- Riparian buffers
- Fire resistant landscaping
- Fuel breaks

- Erosion and sediment control
- Wetland preservation and restoration
- Habitat preservation
- Slope stabilization
- Living snow fences

6.3.3.3.4 Structural Projects

Structural mitigation projects are intended to lessen the impact of a hazard by modifying the environmental natural progression of the hazard event. They are usually designed by engineers and managed or maintained by public works staff. Examples include:

- Reservoirs
- Levees / dikes / floodwalls
- Diversions / detention / retention
- Channel modification
- Storm sewers
- Wind retrofitting
- Utility protection/upgrades

6.3.3.4 Emergency Services

Although not typically considered a “mitigation technique,” emergency service measures do minimize the impact of a hazard event on people and property. These commonly are actions taken or implemented shortly before, during, or in response to a hazard event. Examples include:

- Warning systems
- Evacuation planning and management
- Sandbagging for flood protection
- Installing shutters for wind protection

6.4 DEVELOPING AND PRIORITIZING SPECIFIC MITIGATION ACTIONS

After reviewing their Mitigation Goals, the Future Visions for those Goals and the Mitigation Objectives and then considering the full range of potential alternatives, the MAC developed specific Mitigation Actions to meet the Goals and Objectives. The MAC subsequently prioritized the Mitigation Actions.

6.4.1 Developing Mitigation Actions

The following series of tables contains the Mitigation Actions as developed by the MAC in accordance with its stated Goals and Objectives. The Mitigation Actions are organized by the four categories.

As previously stated in Section 6.1, two categories of mitigation goals, Category I and Category III, address the need to reduce the impacts of hazards to existing and future buildings. Category I (*Planning and Collaboration*) includes Goal 1 (particularly Mitigation Actions 2, 6, 8, and 10), Goal 2 (particularly Mitigation Actions 11, 12, and 13) and Goal 3 (particularly Mitigation Action 14). Category III (*Hazard Reduction*) includes Goal 7 (particularly Mitigation Actions 26, 27, and 31).

6.4.1.1 Category I – Planning and Collaboration

Goal 1: Hazard Awareness and Risk Reduction Principles

Ensure hazard awareness and risk reduction principles are institutionalized into the Park County jurisdictions daily activities, processes and functions, by incorporating them into policy documents and initiatives.

Table 6-2 Objectives		
Objective	Mitigation Action	Mitigation Action Description
<p>Objective 1A: Formally adopt the county’s all-hazard pre-disaster mitigation plan at a public meeting within each participating jurisdiction.</p>	<p><i>Recognize MAC</i></p>	<p>Mitigation Action 1: All three Park County jurisdictions officially recognize the Mitigation Advisory Committee (MAC) and specify ongoing responsibilities of the MAC.</p>
	<p><i>Adopt wildfire development standards</i></p>	<p>Mitigation Action 2: Adopt land and building standards for future development in the county’s mapped areas of high wildfire risk.</p>
<p>Objective 1B: Studies, plans, hazard assessments and other actions that affect long term planning by the county should be maintained and updated as necessary in order to ensure the appropriate information and requirements are current.</p>	<p><i>Assess snow measurement activities</i></p>	<p>Mitigation Action 3: Assess various snow data measurement activities for snow depth, wind velocity, and depth of snow drifting currently available within the county.</p>
	<p><i>Encourage changes to FEMA snow policies</i></p>	<p>Mitigation Action 4: Encourage changes to the current FEMA snow policy to reflect more than one way to measure impacts of snowfall and severe blizzard conditions, including providing comments during FEMA’s snow policy comment period, which ends 8/25/08.</p>
	<p><i>Identify and prepare shelters for severe winter weather</i></p>	<p>Mitigation Action 5: Identify hazard areas for snowstorms or blizzards, and prepare shelters in those areas for residents and travelers in the event of severe winter weather incidents.</p>
	<p><i>Identify unburned areas with high wildfire risk</i></p>	<p>Mitigation Action 6: Identify the priority areas for high wildfire risk that have not burned in the last five years. Encourage and assist neighborhoods and HOAs in developing local wildfire plans, allowing for mitigation project development in the high hazard areas and technical input to future land use decisions.</p>
	<p><i>Develop improved thunderstorm warning system</i></p>	<p>Mitigation Action 7: Develop a program to better receive, coordinate and distribute information about likely thunderstorms, with assistance from NOAA and NWS.</p>
	<p><i>Define high landslide risk areas</i></p>	<p>Mitigation Action 8: In conjunction with CGS and/or USGS, define the high priority areas for landslides in Park County to guide future land use decisions and future mitigation decisions.</p>
	<p><i>Install warning system for high risk dam failure areas</i></p>	<p>Mitigation Action 9: Work with the Division of Water Resources to rank high priority dams within Park County and for installation of dam failure warning systems and plans.</p>

	<i>Adopt seismic risk zoning</i>	Mitigation Action 10: Adopt zoning and subdivision regulations for proposed development in or adjacent to areas of high seismic risk.
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Goal 2: Increase the County Jurisdiction Floodplain Management Activities and Participation

Increase the county jurisdictions floodplain management activities and participation in the National Flood Insurance Program.

Table 6-3 Objectives		
Objective	Mitigation Action	Mitigation Action Description
Objective 2A: Assess jurisdictional plans and documents regarding flood management to determine changes or additions that will be required in future revisions.	<i>Enroll all jurisdictions in the NFIP</i>	Mitigation Action 11: Ensure all jurisdictions in Park County are in the National Flood Insurance Program through education and by assisting the towns through the process.
	<i>Adopt flood mitigation measures</i>	Mitigation Action 12: Identify flood values at risk, cross-referenced with hazards, and by the end of 2010, update county Land Use Regulations to include mitigation measures for flooding in order to lessen flood damages to existing and future buildings.
	<i>Identify high priority floodplain mapping needs</i>	Mitigation Action 13: Identify the highest priority floodplain mapping needs for Park County jurisdictions and fund those priorities to complete floodplain mapping in those areas, providing improved technical information for future land use decisions.

Goal 3: Support Mitigation Efforts

Develop support for mitigation among local jurisdictions and local officials.

Table 6-4 Objectives		
Objective	Mitigation Action	Mitigation Action Description
Objective 3A: Continually assess ongoing disaster preparedness programs and activities to implement changes that improve disaster preparedness for the three Park County jurisdictions and ensure that local officials are informed about the need for those improvements.	<i>Update landslide regulations</i>	Mitigation Action 14: Update the county land use regulations to mitigate against landslides after providing technical information to local officials from the three Park County jurisdictions about the need for landslide mitigation to lessen the risk to the existing and future structures.
	<i>Identify stream reaches not meeting water quality standards</i>	Mitigation Action 15: Identify stream reaches that do not meet water quality standards, specifically those with sediment buildup and provide technical information to local officials from the three Park County jurisdictions about the significance and consequences of sediment buildup in local streams.

6.4.1.2 Category II – Community Awareness Training

Goal 4: Enhance Understanding and Awareness

Enhance countywide understanding and awareness of community preparedness needs.

Table 6-5 Objectives		
Objective	Mitigation Action	Mitigation Action Description
Objective 4A: Educate the public about preparedness activities and mitigation goals, allowing each citizen the opportunity to reduce personal risk and to increase property protection.	<i>Create winter-weather preparedness education program</i>	Mitigation Action 16: Create an education program regarding winter weather preparedness for citizens. Ensure that ranch owners and pet owners are included in this process, and specific strategies for protecting livestock and pets from severe winter weather events are addressed.
	<i>Educate public about thunderstorms</i>	Mitigation Action 17: Educate the public about thunderstorm awareness and safety precautions and participate in the StormReady program sponsored by the National Weather Service.
	<i>Facilitate community-wide investment in preparedness and mitigation planning activities</i>	Mitigation Action 18: Continue to build a broad-based grass roots campaign amongst the public, businesses, non-profit organizations, government and regulatory agencies through public education programs related to preparedness and mitigation; work to improve awareness and provide the information needed to recognize issues related to hazards, make

		informed decisions and take positive actions.
	<i>Conduct fire risk reduction workshops for homeowners</i>	Mitigation Action 19: Conduct workshops to educate property owners at risk from wildfire about specific maintenance strategies to reduce their risk from wildfire, and develop a list of the components of a homeowner’s wildfire emergency evacuation kit and publicize the need for such kits.
	<i>Educate public about drought</i>	Mitigation Action 20: Educate the public about ways to lessen the effects of drought, and the need to be water-wise.

Goal 5: Conduct Mitigation Exercises and Training

Conduct exercises and training regarding the prevention and mitigation of Park County hazards.

Table 6-6 Objectives		
Objective	Mitigation Action	Mitigation Action Description
Objective 5A: Hold annual or semi-annual tabletop exercises involving public officials and community members regarding the identified hazards, to improve long-term planning and mitigation activities.	<i>Conduct emergency management exercises for public</i>	Mitigation Action 21: Conduct one exercise annually, involving members of the public, regarding the four phases of emergency management, to increase understanding of each person’s role during a disaster, including public health issues such as Pandemic Flu.
	<i>Conduct dam failure exercises</i>	Mitigation Action 22: Conduct regular exercises for dam failure and dam preparedness. Work with those partners who maintain dams in Park County to ensure they are maintained and that emergency exercises for simulated dam failure response are conducted.
Objective 5B. Park County will periodically assess its progress towards reducing the effects of disasters and the positive lessons learned from these reviews will be evaluated and integrated back into the county’s institutional processes and procedures.	<i>Produce written After Action Reports for exercises and disasters</i>	Mitigation Action 23: Continually produce a written After Action Report for every exercise and disaster in Park County, and make those results known to all involved so that processes and procedures can be improved in future operations.

Goal 6: Public Notification Systems

Explore diverse public notification systems for impending hazards.

Table 6-7 Objectives		
Objective	Mitigation Action	Mitigation Action Description
Objective 6A: Ensure that the public has more than one means of obtaining information about emergencies and disasters in the county through development of redundant notification systems.	<i>Create severe weather notification system</i>	Mitigation Action 24: Create a public notification program for severe thunderstorms and lightning, winter weather, and flash flooding.
	<i>Warn public of road hazards with Variable Message Sign (VMS) boards</i>	Mitigation Action 25: Utilize additional Variable Message Sign (VMS) boards on Highways, as well as county roads, to warn the public about possible hazards in the area.

6.4.1.3 Category III Hazard Reduction

Goal 7: Protect Public and Private Infrastructure

Enhance the safety of residents and businesses by protecting public and private infrastructure and critical facilities from the effects of natural and human-caused hazards.

Table 6-8 Objectives		
Objective	Mitigation Action	Mitigation Action Description
Objective 7A: Create a countywide plan addressing critical infrastructure needs and develop a funding mechanism for the priority areas.	<i>Implement 2007 Community Wildfire Plan</i>	Mitigation Action 26: Implement the recommendations of the 2007 Community Wildfire Protection Plan to lessen the likelihood that future fires will cause harm to existing and future buildings.
	<i>Implement specific strategies from FEMA’s Community Rating System</i>	Mitigation Action 27: Select specific strategies from FEMA’s Community Rating System for improving local floodplain management programs, adopt those strategies and implement them to lessen the likelihood that future floods will cause harm to existing and future buildings.
	<i>Identify areas susceptible to impacts of severe thunderstorms</i>	Mitigation Action 28: Identify specific locations where each one of the three major impacts of thunderstorms (lightning causing wildfire, rain causing flooding, high wind) will have the highest impact.

	<i>Develop infrastructure protection strategies for wildfire risk areas</i>	Mitigation Action 29: Identify infrastructure at greatest risk from wildfire. Develop infrastructure protection strategies and implement those strategies.
	<i>Develop risk profiles for critical facilities</i>	Mitigation Action 30: Identify and map the specific locations of Critical Facilities in the Park County jurisdictions and develop detailed risk profiles for each facility, keeping in mind security needs and vulnerabilities in order to make buildings more secure, especially those critical during an emergency response.
	<i>Implement flood hazard reduction plans</i>	Mitigation Action 31: Identify those areas of Park County most in need of flood hazard reduction plans with detailed engineering analyses. Identify specific drainage “hot spots” in the Park County jurisdictions, develop engineering plans to improve bridges, culverts, channels and other infrastructure in those areas, fund the projects and complete them to lessen the likelihood that future floods will cause harm to existing and future buildings.
	<i>Map high-priority seismic risk areas</i>	Mitigation Action 32: With the assistance of CGS and USGS, map highest priority locations for detailed Seismic Risk Studies in Park County and identify bridges and other infrastructure subject to the greatest seismic risk.
Objective 7B: Create community plans to combat drought.	<i>Implement Community Water Conservation Plans for drought risk areas</i>	Mitigation Action 33: Identify those municipalities and unincorporated communities in Park County most at risk due to drought, develop Community Water Conservation Plans, and alternate water supply locations for those communities, and implement those plans.



	<i>Implement drought monitoring program</i>	Mitigation Action 34: Identify specific locations and specific parameters for a long-term drought monitoring program and implement the monitoring program. Obtain assistance and technical recommendations from the Natural Resources Conservation Service for an improved program of drought preparedness and drought response.
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6.4.1.4 Category IV – Emergency Services

Goal 8: Emergency Services

Improve emergency services capabilities.

Table 6-9 Objectives		
Objective	Action Name	Mitigation Action
Objective 8A: Enhance interagency operations by strengthening the EOC capabilities across jurisdictional boundaries.	<i>Complete EOC policies and procedures manual; participate in county, state and regional exercises</i>	Mitigation Action 35: Complete the EOC policies and procedures manual for all county employees and emergency responders by December 2008. Participate in county, regional, and statewide exercises to determine strengths and weaknesses in EOC operations, enhancing support activities during an actual disaster.
	<i>Participate in regional communications assessment</i>	Mitigation Action 36: Participate in the South Central regional communications assessment to determine areas of improvement or collaboration to enhance emergency communications within the county and region.
Objective 8B: Improve emergency communications by developing redundancy, emergency plans, and training in evacuation procedures and radio procedures.	<i>Conduct annual evacuation drill of 911 Communications Center</i>	Mitigation Action 37: Conduct an evacuation drill of the Park County 911 Communications Center at least once annually to ensure the safety of all employees, and to ensure a seamless communications system during an emergency.

Goal 9: Collaboration and Mutual Agreements

Enhance interagency collaboration through mutual aid agreements and long-term planning.



Table 6-10 Objectives

Objective	Mitigation Action	Mitigation Action Name
<p>Objective 9A: Continue to work with the Emergency Services Council in Park County to address emergency and disaster-related issues and concerns.</p>	<p><i>Create Severe Weather ES Council subcommittee</i></p>	<p>Mitigation Action 38: Create an ES Council subcommittee to address weather-related mitigation issues (drought, flooding and winter storms).</p>
	<p><i>Create HAZMAT ES Council subcommittee</i></p>	<p>Mitigation Action 39: Create an ES Council subcommittee for HAZMAT issues, and develop a HAZMAT mitigation plan for Park County.</p>
	<p><i>Have ES Council research landslide mitigation</i></p>	<p>Mitigation Action 40: In conjunction with CGS and/or USGS and/or DEM, have the Emergency Services Council research options for landslide mitigation.</p>

6.4.2 Prioritizing Mitigation Actions

The Mitigation Advisory Committee used the STAPLE/E Criteria (Social, Technical, Administrative, Political, Legal, Economic, and Environmental) as a guide in selecting and prioritizing the most appropriate mitigation alternatives for the jurisdictions. This methodology requires that the social, technical, administrative, political, legal, economic, and environmental considerations be taken into account when reviewing potential actions for the communities to undertake. This process was used to help ensure that the most cost-effective, equitable and technically feasible actions would be undertaken based on the three jurisdictions’ capabilities.

Below provides information regarding the review and selection criteria for alternatives.



STAPLE/E Review and Selection Criteria

Social

- IS THE PROPOSED ACTION SOCIALLY ACCEPTABLE TO THE COMMUNITY(S)?
- ARE THERE EQUITY ISSUES INVOLVED THAT WOULD MEAN THAT ONE SEGMENT OF A COMMUNITY IS TREATED UNFAIRLY?
- WILL THE ACTION CAUSE SOCIAL DISRUPTION?

Technical

- WILL THE PROPOSED ACTION WORK?
- WILL IT CREATE MORE PROBLEMS THAN IT SOLVES?
- DOES IT SOLVE A PROBLEM OR ONLY A SYMPTOM?
- IS IT THE MOST USEFUL ACTION IN LIGHT OF OTHER COMMUNITY(S) GOALS?

Administrative

- CAN THE COMMUNITY(S) IMPLEMENT THE ACTION?
- IS THERE SOMEONE TO COORDINATE AND LEAD THE EFFORT?
- IS THERE SUFFICIENT FUNDING, STAFF, AND TECHNICAL SUPPORT AVAILABLE?
- ARE THERE ONGOING ADMINISTRATIVE REQUIREMENTS THAT NEED TO BE MET?

Political

- IS THE ACTION POLITICALLY ACCEPTABLE?
- IS THERE PUBLIC SUPPORT BOTH TO IMPLEMENT AND TO MAINTAIN THE PROJECT?

Legal

- IS THE COMMUNITY(S) AUTHORIZED TO IMPLEMENT THE PROPOSED ACTION? IS THERE A CLEAR LEGAL BASIS OR PRECEDENT FOR THIS ACTIVITY?
- ARE THERE LEGAL SIDE EFFECTS? COULD THE ACTIVITY BE CONSTRUED AS A TAKING?
- IS THE PROPOSED ACTION ALLOWED BY A COMPREHENSIVE PLAN, OR MUST A COMPREHENSIVE PLAN BE AMENDED TO ALLOW THE PROPOSED ACTION?
- WILL THE COMMUNITY(S) BE LIABLE FOR ACTION OR LACK OF ACTION?
- WILL THE ACTIVITY BE CHALLENGED?

Economic

- WHAT ARE THE COSTS AND BENEFITS OF THIS ACTION?
- DO THE BENEFITS EXCEED THE COSTS?
- ARE INITIAL, MAINTENANCE, AND ADMINISTRATIVE COSTS TAKEN INTO ACCOUNT?
- HAS FUNDING BEEN SECURED FOR THE PROPOSED ACTION? IF NOT, WHAT ARE THE POTENTIAL FUNDING SOURCES (PUBLIC, NON-PROFIT, AND PRIVATE)?
- HOW WILL THIS ACTION AFFECT THE FISCAL CAPABILITY OF THE COMMUNITY(S)?
- WHAT BURDEN WILL THIS ACTION PLACE ON THE TAX BASE OR LOCAL ECONOMY?
- WHAT ARE THE BUDGET AND REVENUE EFFECTS OF THIS ACTIVITY?
- DOES THE ACTION CONTRIBUTE TO OTHER COMMUNITY GOALS, SUCH AS CAPITAL IMPROVEMENTS OR ECONOMIC DEVELOPMENT?



<ul style="list-style-type: none"> WHAT BENEFITS WILL THE ACTION PROVIDE?
Environmental
<ul style="list-style-type: none"> HOW WILL THE ACTION AFFECT THE ENVIRONMENT? WILL THE ACTION NEED ENVIRONMENTAL REGULATORY APPROVALS? WILL IT MEET LOCAL AND STATE REGULATORY REQUIREMENTS? ARE ENDANGERED OR THREATENED SPECIES LIKELY TO BE AFFECTED?

In order to ensure the most inclusive process possible, Park County scheduled several meetings to develop and prioritize a comprehensive list of Mitigation Actions. First, the process was introduced at **Workshop # 3** on November 27, 2007 and the development of Mitigation Actions began. At this meeting that the MAC drafted over 20 Mitigation Actions and ranked those actions using the **STAPLE/E** criteria as their guide. After the initial discussion of the **Mitigation Strategy**, the MAC and the Local Emergency Planning Commission (LEPC) conducted **Presentation of Findings** meetings on January 8th, January 29th and February 5th, 2008, to build upon the initial findings and to re-prioritize as needed. Discussions held during the meetings resulted in the generation of a range of potential mitigation goals, objectives and actions to address the hazards. In addition to the **STAPLE/E** criteria, the MAC members were advised to pay particular attention to selecting those actions that were simultaneously cost-effective, equitable and technically feasible.

Once the MAC had developed 40 Mitigation Actions, the LEPC met and prioritized the actions. All categories, goals, objectives and actions were first pasted on a white wall with tape. The first goal was to group the goals, actions, and objectives as appropriate on the wall by moving them around until everyone was in agreement that they were in the right categories. At the end of this exercise, the LEPC members began the process of prioritizing actions based on the **STAPLE/E** criteria, ensuring that each action was given due consideration. In the end, the MAC had a list showing every action within an objective, goal and category, and they had a list of all Mitigation Actions prioritized with 1 being the highest priority and 40 being the lowest priority.

The following table contains prioritized Mitigation Actions in the order that the MAC deemed to be the most cost-effective, equitable and technically feasible hazard mitigation options for Park County, the Town of Alma and the Town of Fairplay. In selecting these Mitigation Actions, the MAC gave them three priority levels; high, medium and low. Lower rankings generally denote a less urgent timeframe in completing the Mitigation Action in conjunction with findings from the Hazard Identification and Risk Assessment.

Prioritized Mitigation Action List



The 40 Mitigation Actions developed and prioritized by the MAC are listed below in order of priority. The initial list of potential Mitigation Actions was compiled by the Park County Emergency Director into a master list for the MAC to rank. Ranking was done in order of relative priority based on the STAPLE/E criteria and the potential action's ability to reduce vulnerability to hazards. Prior to the STAPLE/E ranking, the MAC members were advised to pay particular attention to selecting those actions that were simultaneously cost-effective, equitable and technically feasible. Priorities for each Mitigation Action were based on the collective STAPLE/E scores of all participants for those actions. The collective scores were computed on a scale of 1 to 10. Scores from 1.0 to 3.9 were Low Priority; scores from 4.0 to 6.9 were Medium Priority; scores from 7.0 to 10.0 were High Priority. The STAPLE/E scoring was conducted at the final Presentation of Findings meeting on February 5th, 2008.

Table 6-11 High Priority Mitigation Actions

Mitigation Action	Rank	Priority Level	Jurisdiction	Implementation Timeline
<i>Implement 2007 Community Wildfire Plan</i>	1	High	Park County, Alma, Fairplay	1-2 Years
<i>Recognize MAC</i>	2	High	Park County, Alma, Fairplay	1-2 Years
<i>Adopt wildfire development standards</i>	3	High	Park County, Alma, Fairplay	1-2 Years
<i>Create winter-weather preparedness education program</i>	4	High	Park County, Alma, Fairplay	1-2 Years
<i>Complete EOC policies and procedures manual; participate in county, state and regional exercises</i>	5	High	Park County, Alma, Fairplay	1-2 Years
<i>Enroll all jurisdictions in the NFIP</i>	6	High	Park County, Alma, Fairplay	1-2 Years
<i>Warn public of road hazards with VMS boards</i>	7	High	Park County, Alma, Fairplay	1-2 Years
<i>Identify unburned areas with high wildfire risk</i>	8	High	Park County, Alma, Fairplay	1-2 Years
<i>Encourage changes to FEMA snow policies</i>	9	High	Park County, Alma, Fairplay	1-2 Years
<i>Create severe weather notification system</i>	10	High	Park County, Alma, Fairplay	1-2 Years

Section 6

Mitigation Strategy

Table 6-11 High Priority Mitigation Actions				
Mitigation Action	Rank	Priority Level	Jurisdiction	Implementation Timeline
<i>Produce written After Action Reports for exercises and disasters</i>	11	High	Park County	1-2 Years
<i>Conduct annual evacuation drill of 911 Communications Center</i>	12	High	Park County, Fairplay	1-2 Years

Table 6-12 Medium Priority Mitigation Actions				
Mitigation Action	Rank	Priority Level	Jurisdiction	Implementation Timeline
<i>Create Severe Weather ES Council subcommittee</i>	13	Medium	Park County	1-2 Years
<i>Implement specific strategies from FEMA's Community Rating System</i>	14	Medium	Park County, Alma, Fairplay	2-3 Years
<i>Educate public about thunderstorms</i>	15	Medium	Park County, Alma, Fairplay	2-3 Years
<i>Identify and prepare shelters for severe winter weather</i>	16	Medium	Park County, Alma, Fairplay	1-2 Years
<i>Assess snow measurement activities</i>	17	Medium	Park County, Alma, Fairplay	1-2 Years
<i>Adopt flood mitigation measures</i>	18	Medium	Park County, Alma, Fairplay	2-3 Years
<i>Identify high priority floodplain mapping needs</i>	19	Medium	Park County, Alma, Fairplay	2-3 Years
<i>Develop improved thunderstorm warning system</i>	20	Medium	Park County, Alma, Fairplay	1-2 Years
<i>Create HAZMAT ES Council subcommittee</i>	21	Medium	Park County, Alma, Fairplay	2-3 Years
<i>Facilitate community-wide investment in preparedness and mitigation planning activities</i>	22	Medium	Park County, Alma, Fairplay	1-2 Years
<i>Conduct fire risk reduction workshops for homeowners</i>	23	Medium	Park County, Alma, Fairplay	1-2 Years

Table 6-12 Medium Priority Mitigation Actions				
<i>Participate in regional communications assessment</i>	24	Medium	Park County, Alma, Fairplay	1-2 Years
<i>Educate public about drought</i>	25	Medium	Park County, Alma, Fairplay	2-3 Years
<i>Install warning system for high risk dam failure areas</i>	26	Medium	Park County, Alma, Fairplay	1-2 Years
<i>Conduct dam failure exercises</i>	27	Medium	Park County, Alma, Fairplay	2-3 years
<i>Identify stream reaches not meeting water quality standards</i>	28	Medium	Park County, Alma, Fairplay	2-3 years
<i>Conduct emergency management exercises for public</i>	29	Medium	Park County, Alma, Fairplay	1-2 years
<i>Identify areas susceptible to impacts of severe thunderstorms</i>	30	Medium	Park County, Alma, Fairplay	2-3 years
<i>Develop infrastructure protection strategies for wildfire risk areas</i>	31	Medium	Park County, Alma, Fairplay	2-3 years
<i>Develop risk profiles for critical facilities</i>	32	Medium	Park County, Alma, Fairplay	2-3 years
<i>Implement flood hazard reduction plans</i>	33	Medium	Park County, Alma, Fairplay	2-3 years

Table 6-13 Low Priority Mitigation Actions				
Mitigation Action	Rank	Priority Level	Jurisdiction	Implementation Timeline
<i>Implement Community Water Conservation Plans for drought risk areas</i>	34	Low	Park County, Alma, Fairplay	2-3 years
<i>Define high landslide risk areas</i>	35	Low	Park County, Alma, Fairplay	2-3 years
<i>Update landslide regulations</i>	36	Low	Park County, Alma, Fairplay	3-5 years
<i>Have ES Council research landslide mitigation</i>	37	Low	Park County, Alma, Fairplay	3-5 years
<i>Implement drought monitoring program</i>	38	Low	Park County, Alma, Fairplay	3-5 years
<i>Adopt seismic risk zoning</i>	39	Low	Park County, Alma, Fairplay	3-5 years
<i>Map high-priority seismic risk areas</i>	40	Low	Park County, Alma, Fairplay	3-5 years

6.5 DERIVING A COMPREHENSIVE MITIGATION ACTION PLAN

In formulating a mitigation strategy, a wide range of activities were considered in order to help achieve the goals and to lessen the vulnerability of the Park County jurisdictions in the most cost-effective manner possible. The Mitigation Action Plan is comprised of proactive mitigation actions designed to reduce or eliminate future losses from natural hazards in the three participating jurisdictions.

The mitigation actions proposed for the Park County jurisdictions to undertake are listed on the pages that follow. Each has been designed to achieve the goals and objectives identified in this multi-jurisdictional all-hazards mitigation plan. Each proposed action includes:

- (1) the appropriate category for the mitigation technique;
- (2) the hazard it is designed to mitigate;
- (3) the objective(s) it is intended to help achieve;
- (4) some general background information;
- (5) the priority level for its implementation (high, moderate or low);
- (6) potential funding sources, if applicable;
- (7) the agency(ies)/person(s) assigned responsibility for carrying out the strategy;
- (8) a target completion date.

6.5.1 Process for Deriving a Comprehensive Action Plan

The draft mitigation action items listed below have been developed specifically from the draft goals and objectives for the *Park County All-Hazards Mitigation Plan*. These action items are designed to foster the development of community-derived mitigation actions and projects, which will be considered for inclusion in the final plan following a thorough review by the Mitigation Advisory Committee (MAC) and other interested local officials and citizens. They will also serve as a catalyst for further public participation in the development and future updating of this local all-hazards mitigation plan. Additional action items developed for Park County, the Town of Alma and the Town of Fairplay will need to tie directly back to specific goals and objectives which either 1) currently exist in the draft plan, or 2) have been subsequently added to the draft plan.

Because the MAC membership included representatives from the Town of Alma and the Town of Fairplay, in addition to representatives from unincorporated portions of Park County, the MAC agreed that there was not a need for a separate Mitigation Strategy for each jurisdiction. In order to address the unique concerns of each community within

a unified countywide Mitigation Strategy, the MAC chose to develop an overall strategy that simultaneously considered the needs of the county as a whole and the individual needs of the separate communities. All three communities considered and addressed all 9 hazards, but each community identified 2 or 3 hazards that were of especially high concern to their jurisdiction. In unincorporated Park County and its two incorporated towns, the hazards that caused the greatest concern were Wildfire, Severe Winter Storms and HAZMAT. The Town of Alma prioritized Landslide and Dam Failure as moderate hazards whereas the county and the Town of Fairplay categorized those hazards as limited. In Fairplay, all hazard priorities overlapped with those of the County, save for a lower prioritization of Drought. While unincorporated, the Bailey area is the most populous in the county and therefore hazards were separately prioritized for that part of the county. The end result was the same prioritizations as the county except for the designation of Dam Failure as None. The strategy below addresses the variation and the overlap in these profiles of community concerns.

Because these action items have been derived specifically from the plan’s Goals and Objectives, each one is referenced in Objective(s) Addressed (below). Specific mitigation projects have been finalized by the Mitigation Advisory Committee following the *public participation process*, which was a key element of the overall hazard mitigation planning process.

6.5.2 Comprehensive Action Plan

6.5.2.1 Wildfire

Table 6-14 Wildfire Mitigation Actions			
Action	Category	Goal, (Objective) Addressed	Priority
<i>Implement 2007 Community Wildfire Plan</i>	III	7, (7A)	H-1
<i>Adopt wildfire development standards</i>	I	1, (1A)	H-3
<i>Identify unburned areas with high wildfire risk</i>	I	1, (1B)	H-8
<i>Conduct fire risk reduction workshops for homeowners</i>	II	4, (4A)	M-23
<i>Develop infrastructure protection strategies for wildfire risk areas</i>	III	7, (7A)	M-31

6.5.2.1.1 ACTION #1

Implement the recommendations of the 2007 Community Wildfire Protection Plan.

Category: III

Hazard: Wildfire

Objective(s) Addressed: 7A

Background: The 2007 Park County Community Wildfire Protection Plan provides a comprehensive blueprint for mitigating against potential future impacts from wildfire hazards. Sufficient resources must be put into ensuring that the adopted measures are implemented. Park County officials will coordinate with homeowners associations to enact defensible space strategies. Park County officials will also coordinate with state and federal land managers to implement mechanical and burning fuel hazard reduction strategies outlined in the plan, particularly in high-risk areas identified by the Park County Community Wildfire Protection Plan.

Priority: High

Funding Sources: Park County, Colorado State Forest Service, U.S. Forest Service

Responsibility Assigned to: Park County Emergency Manager, Local Fire Officials

Target Completion Date: 1-2 Years

6.5.2.1.2 ACTION #2

Adopt land and building standards for future development in the county's mapped areas of high wildfire risk

Category: I

Hazard: Wildfire

Objective(s) Addressed: 1A

Background: Land and building standards are some of the most effective tools in mitigating the impacts of wildfire on future development. Implementing these new standards, and ensuring that all agencies involved in the review and approval of proposals for new development are aware of the new standards, will reduce the potential expense of future retrofitting or wildfire mitigation actions and decrease the potential impacts of wildland-urban interface fire events on new development and reduce the potential for loss of property or life.

Priority: High

Funding Sources: Park County, Town of Alma, Town of Fairplay

Responsibility Assigned to: Park County Commissioners, Town Boards, Park County Emergency Manager

Target Completion Date: 1-2 Years

6.5.2.1.3 ACTION #3

Identify the priority areas for high wildfire risk that have not burned in the last five years. Encourage and assist neighborhoods and HOAs in developing local wildfire plans, allowing for mitigation project development in the high hazard areas.

Category: I

Hazard: Wildfire

Objective(s) Addressed: 1B

Background: Having already completed the Park County Community Wildfire Protection Plan in 2007, Park County has the technical knowledge, skills and awareness of risks to help communities develop wildfire mitigation strategies tailored specifically to their community. GIS can help to develop, analyze and disseminate the most current information about wildfire risks in Park County. With this information, specific measures can be taken to mitigate the impact of wildfire on lives, property, and existing and future development, including defensible space initiatives, mechanical or burning fuel hazard reduction strategies, and a deliberate and thorough process for the review and approval of proposals for new development and/or infrastructure. When communities work with wildfire experts to identify un-burned high-risk areas, and to develop the most appropriate outreach measures to communicate the risks, they enhance local capabilities to plan and respond effectively to their wildfire risks and to guide future development to minimize exposure to these risks.

Priority: High

Funding Sources: Park County, CDEM, USFS, CSFS

Responsibility Assigned to: Park County Emergency Manager, Park County GIS

Target Completion Date: 1-2 Years

6.5.2.1.4 ACTION #4

Conduct workshops to educate property owners at risk from wildfire about specific maintenance strategies to reduce their risk from wildfire, and develop a list of the components of a homeowner's wildfire emergency evacuation kit and publicize the need for such kits.

Category: II

Hazard: Wildfire

Objective(s) Addressed: 4A

Background: Park County has significant knowledge and planning procedures in place through the Park County Community Wildfire Protection Plan to assist its residents in mitigating risk to their properties and lives due to wildfire. Developing a standardized list of simple actions residents can put into practice in regards to wildfire risk will boost overall awareness and lessen risk to property and lives. By distributing this information, through publication of measures and by conducting workshops with homeowners associations in high-risk areas of the county, Park County will give its residents important information to keep them prepared at all times.

Priority: Medium

Funding Sources: Park County, CSFS, USFS
Responsibility Assigned to: Park County Emergency Manager
Target Completion Date: 1-2 Years

6.5.2.1.5 ACTION #5

Identify infrastructure at greatest risk from wildfire. Develop infrastructure protection strategies and implement those strategies.

Category: III

Hazard: Wildfire

Objective(s) Addressed: 7A

Background: Through the use of its GIS department and wildfire planning strategies already in place, Park County can identify infrastructure at risk to wildfire and develop protection strategies that can be implemented in an efficient and cost-effective manner. Examples include land use planning and zoning, mandating ample ingress and egress for fire firefighting equipment, provision of defensible space, installation of dry hydrants, retrofitting of non-flammable roofing materials on buildings that are part of the county's infrastructure, implementation of fuel breaks and fuels reduction measures, and utilization of insurance incentives among others.

Priority: Medium

Funding Sources: Park County, CSFS, USFS, CDEM

Responsibility Assigned to: Park County Emergency Manager, Park County GIS

Target Completion Date: 2-3 Years

6.5.2.2 Severe Winter Weather

Table 6-15 Severe Winter Weather Mitigation Actions			
Action	Category	Goal, (Objective) Addressed	Priority
<i>Create winter-weather preparedness education program</i>	II	4, (4A)	H-4
<i>Encourage changes to FEMA snow policies</i>	I	1, (1B)	H-9
<i>Identify and prepare shelters for severe winter weather; pursue “standby” contracts to ensure access to ample heavy equipment and manpower</i>	I	1, (1B)	M-16
<i>Assess snow measurement activities</i>	I	1, (1B)	M-17
Multi- Hazards Actions Applicable to Severe Winter Weather (See Mitigation Actions 30, 31)			
<i>Create severe weather and road hazards notification system</i>	II	6, (6A)	H-10
<i>Create Severe Weather ES Council subcommittee</i>	IV	9, (9A)	M-13

6.5.2.2.1 ACTION #6

Create an education program regarding winter weather preparedness for citizens. Ensure that ranch owners and pet owners are included in this process, and specific strategies for protecting livestock and pets from severe winter weather events are addressed.

Category: II

Hazard: Severe Winter Weather

Objective(s) Addressed: 4A

Background: Planning efforts will be made to identify specific geographic risk areas and locations prone to severe winter weather impacts where special needs populations exist. These planning efforts will be followed up with an aggressive campaign to inform the public, including special needs populations, of their particular severe winter weather risks. Residents need further information to be prepared in case they are stranded during severe winter weather events, including stockpiling food, medication and heating oil or propane. Ranchers need more comprehensive information to plan on getting livestock adequate food and shelter during severe winter weather events.

Priority: High

Funding Sources: Park County, Town of Alma, Town of Fairplay, CDEM, NWS

Responsibility Assigned to: Park County Emergency Manager

Target Completion Date: 1-2 Years

6.5.2.2.2 ACTION #7

Encourage changes to the current FEMA snow policy to reflect more than one way to measure impacts of snowfall and severe blizzard conditions.

Category: I

Hazard: Severe Winter Weather

Objective(s) Addressed: 1B

Background: Due to the overwhelming nature of the winters of 2006-2007 and 2007-2008, and limited budgetary resources within the county, Park County was forced to execute mutual aid agreements with other communities to provide snow-plows, man-power, communications equipment and other resources to provide adequate aid to stranded residents and livestock. By working with other impacted Colorado counties, CDEM and FEMA staff to update FEMA's severe winter weather criteria, Park County can help to make indispensable resources available to communities in crisis in Park County and throughout the country more quickly and efficiently.

Priority: High

Funding Sources: Park County, CDEM, FEMA

Responsibility Assigned to: Park County Emergency Manager

Target Completion Date: 1-2 Years

6.5.2.2.3 ACTION #8

Identify hazard areas for snowstorms or blizzards, and prepare shelters in those areas for residents and travelers in the event of severe winter weather incidents. Pursue "standby" contracts to ensure access to ample heavy equipment and manpower in the event of severe winter weather. Mobilize resources in advance of predicted winter weather events.

Category: I

Hazard: Severe Winter Weather

Objective(s) Addressed: 1B

Background: Studying severe winter weather history, including documentation of the severe winters of 2006-2007 and 2007-2008, will help the county to determine areas that will likely be most affected by a severe winter weather event. The identification of these hazard areas through GIS analysis, in conjunction with determining locations for potential shelters (i.e. schools, county government buildings) will help to define locations for potential shelters for travelers and residents during severe winter weather events. Identifying these hazard areas will also help county and town staff and CDOT anticipate specific locations where future severe winter weather events may cause impacts to residents and travelers. Defining the depth and width of historic snowdrifts and the severity of winds will allow staff and residents to anticipate specific impacts of future events. Pursuing contracts with state, federal agencies and private companies will ensure access to ample heavy equipment and manpower in the event of a severe winter storm or extended periods of severe winter weather. Mobilizing resources in advance of predicted winter weather events will improve responsiveness.

Priority: Medium

Funding Sources: Park County, Town of Alma, Town of Fairplay, CDEM, NWS, FEMA

Responsibility Assigned to: Park County Emergency Manager, Park County GIS

Target Completion Date: 1-2 Years

6.5.2.2.4 ACTION #9

Assess various snow data measurement activities for snow depth, wind velocity, and depth of snow drifting currently available within the county.

Category: I

Hazard: Severe Winter Weather

Objective(s) Addressed: 1B

Background: The winters of 2006-2007 and 2007-2008 have shown the county's susceptibility to extended severe weather events. Evaluating current capabilities for measuring snow depth, wind velocity, height and width of snow drifting, implementing any appropriate data collection equipment improvements, and developing a comprehensive GIS-based data collection and analysis system will help the county to better determine what resources are needed to keep roads open and prevent residents from being stranded during severe weather events. If necessary, it will also help the county to determine whether to execute mutual aid agreements with other communities to make more equipment and manpower available for providing aid to residents.

Priority: Medium

Funding Sources: Park County, Town of Alma, Town of Fairplay, CDEM, NWS, NRCS, FEMA

Responsibility Assigned to: Park County Emergency Manager, Park County Road and Bridge, Park County GIS, Town of Alma, Town of Fairplay

Target Completion Date: 1-2 Years

6.5.2.3 HAZMAT

Table 6-16 HAZMAT Mitigation Actions			
Action	Category	Goal, (Objective) Addressed	Priority
<i>Create HAZMAT ES Council subcommittee; subcommittee negotiate Mutual Aid agreements with surrounding communities</i>	IV	9, (9A)	M-21
All-Hazards Action Applicable to HAZMAT (See Action 34)			
<i>Create severe weather and road hazards notification system</i>	II	6, (6A)	H-7

6.5.2.3.1 ACTION #10

Create an ES Council subcommittee for HAZMAT issues, and develop a HAZMAT mitigation plan for Park County. **Subcommittee help negotiate Mutual Aid agreements with surrounding communities.**

Category: IV

Hazard: HAZMAT

Objective(s) Addressed: 9A

Background: The Park County Emergency Services Council can improve response and mitigation capabilities for HAZMAT hazards through increased planning efforts and by pursuing more comprehensive training for such hazards from the appropriate state and federal agencies. Other efforts can include traffic control measures, preparing for potential HAZMAT spills into water sources, and planning for potential evacuations. The subcommittee can help the county negotiate Mutual Aid agreements with surrounding communities with more resources to respond to HAZMAT events to ensure rapid response.

Priority: Medium

Funding Sources: CDOT

Responsibility Assigned to: Park County Emergency Manager, Park County Emergency Services Council

Target Completion Date: 2-3 Years

6.5.2.4 Flooding

Table 6-17 Flood Mitigation Actions			
Action	Category	Goal, (Objective) Addressed	Priority
<i>Enroll all jurisdictions in the NFIP</i>	I	2, (2A)	H-6
<i>Implement specific strategies from FEMA's Community Rating System</i>	III	7, (7A)	M-14
<i>Adopt flood mitigation measures</i>	I	2, (2A)	M-18
<i>Identify high priority floodplain mapping needs</i>	I	2, (2A)	M-19
<i>Identify stream reaches not meeting water quality standards</i>	I	3, (3A)	M-28
<i>Implement flood hazard reduction plans</i>	III	7, (7A)	M-33
Multi-Hazard Actions Applicable to Flood (See Action 31)			
<i>Create severe weather and road hazards notification system</i>	II	6, (6A)	H-10

6.5.2.4.1 ACTION #11

Ensure all jurisdictions in Park County are in the National Flood Insurance Program through education and by assisting the Town of Alma through the process.

Category: I

Hazard: Flooding

Objective(s) Addressed: 2A

Background: By enrolling in the National Flood Insurance Program, the Town of Alma, which is the only community in Park County not already participating in the program, can pursue funding not currently available for flood mitigation projects and provide the county with specific strategies to reduce risk from flooding. Meeting NFIP requirements will help jurisdictions reduce flood damage by counting improvement and repair projects cumulatively, so that existing and future buildings will be brought into compliance with flood protection standards earlier in their life cycle. This will require the Town of Alma to maintain a permit history so when cumulative repairs or improvements equal 50% of the building value, the building must be brought up to current codes for floodplain development. By enforcing NFIP standards for new development, Alma will ensure careful review and approval of proposals for new development in or near flood prone areas of the town. The Colorado Water Conservation Board and FEMA provide potential sources of floodplain management training for local governments. The Town of Alma can request such training assistance for their floodplain administrator to enhance their community's floodplain management capabilities.

Priority: High

Funding Sources: FEMA, CWCB

Responsibility Assigned to: Town of Alma
Target Completion Date: 1-2 Years

6.5.2.4.2 ACTION #12

Select specific strategies from FEMA's Community Rating System for improving local floodplain management programs, adopt those strategies and implement them.

Category: III

Hazard: Flooding

Objective(s) Addressed: 7A

Background: The objective of the FEMA's Community Rating System (CRS) is to reward communities that are doing more than meeting the minimum NFIP requirements to help their citizens prevent or reduce flood losses and to provide an incentive for communities to initiate new flood protection activities. The CRS uses flood insurance premium adjustments to encourage community and State activities beyond those required by the National Flood Insurance Program. The CRS guidance materials include specific strategies that can help communities that are not necessarily interested in applying to the CRS in improving their local floodplain management programs. These strategies fall into four categories. **Public Information** programs advise people about the flood hazard, flood insurance, and ways to reduce flood damage. **Mapping and Regulations** programs provide increased protection to new development through activities including mapping areas not shown on the FIRM, preserving open space, enforcing higher regulatory standards, managing storm water, and a more thorough process for the technical review and approval of proposals for new development and/or infrastructure in or near flood prone areas. **Flood Damage Reduction** programs address areas in which existing development is at risk through activities such as a comprehensive floodplain management plan, relocating or retrofitting flood prone structures, and maintaining drainage systems. **Flood Preparedness** activities include flood warning, levee safety, and dam safety programs. The Park County jurisdictions can review the CRS strategies, select those that best meet their local floodplain management needs, and implement them.

Priority: Medium

Funding Sources: Park County, CDEM, CWCB, FEMA

Responsibility Assigned to: Park County Floodplain Administrator, Town of Alma, Town of Fairplay

Target Completion Date: 2-3 Years

6.5.2.4.3 ACTION #13

Identify flood values at risk, cross-referenced with hazards, and by the end of 2010, update county Land Use Regulations to include mitigation measures for flooding.

Category: I

Hazard: Flooding

Objective(s) Addressed: 2A

Background: None of the Park County jurisdictions have detailed, technical floodplain analyses available to them. Relying on historic descriptions of prior flood events, county and town staff can categorize the specific kinds of impacts that have been experienced from past floods. With the help of CDEM, CWCB and FEMA, a list of possible mitigation measures to address those impacts and regulatory language to encourage and/or mandate some of those measures can be developed. Some specific mitigation measures that could be encouraged and/or mandated include stream setbacks for new development based on a careful review of proposals for new development in or near flood prone areas (both mapped and unmapped), extra freeboard for the lowest floor of new buildings near streams, extra freeboard for new bridges or culverts, flood proofing of non-residential buildings in flood prone locations, and retrofitting of flood proofing measures for basements and first floors of existing buildings in flood prone locations.

Priority: Medium

Funding Sources: Park County, CDEM, CWCB, FEMA

Responsibility Assigned to: Park County Emergency Manager, Park County Floodplain Administrator, Park County Planning Director, Town of Alma, Town of Fairplay

Target Completion Date: 2-3 Years

6.5.2.4.4 ACTION #14

Identify the highest priority floodplain mapping needs for Park County jurisdictions and find funding for those priorities to complete floodplain mapping in those areas.

Category: I

Hazard: Flooding

Objective(s) Addressed: 2A

Background: Park County has recently begun the process of digitizing its FIRMs. These maps, however, contain no topographic or engineering analyses. Funding may be available from the Colorado Water Conservation Board, FEMA and other federal agencies to update floodplain mapping with technical engineering analyses for specific stream reaches. After identifying high risk flood areas, Park County can work with these agencies to develop detailed floodplain mapping. Having access to detailed floodplain mapping that is based on thorough engineering analyses will facilitate a careful review of proposals for new development in or near flood prone areas.

Priority: Medium

Funding Sources: Park County, CWCB, FEMA, USACOE

Responsibility Assigned to: Park County Floodplain Administrator, Town of Alma, Town of Fairplay

Target Completion Date: 2-3 Years

6.5.2.4.5 ACTION #15

Identify stream reaches that do not meet water quality standards, specifically those with sediment buildup.

Category:

Hazard: Flooding

Objective(s) Addressed: 3A

Background: With the help of CDPHE, Park County can identify specific stream reaches that do not currently meet state water quality standards. In particular, some of those stream reaches fail to meet state standards because of sediment accumulation. Once the stream reaches that have sediment accumulation problems have been identified, the county can begin the process of determining possible causes of the sediment accumulation. Those causes may include historic wildfires in the watershed upstream, naturally erosive soils, destabilizing agricultural practices, upstream urbanization and the application of traction sand on adjacent highways. The county can approach various state and federal agencies to provide possible technical and financial assistance in identifying the causes of sediment accumulation and potential of mitigation measures.

Priority: Medium

Funding Sources: Park County, CWCB, CDPHE, FEMA, USACOE, NRCS, EPA

Responsibility Assigned to: Park County Floodplain Administrator

Target Completion Date: 2-3 Years

6.5.2.4.6 ACTION #16

Identify those areas of Park County most in need of flood hazard reduction plans with detailed engineering analyses. Identify specific drainage “hot spots” in the Park County jurisdictions, develop engineering plans to improve bridges, culverts, channels and other infrastructure in those areas, fund the projects and complete them.

Category: III

Hazard: Flooding

Objective(s) Addressed: 7A

Background: Park County and its jurisdictions periodically experience flooding problems (sometimes caused by severe thunderstorms, sometime caused by rapid snowmelt) that can endanger existing buildings and infrastructure, future buildings and infrastructure and human

life. Within the floodplains in Park County are specific locations facing more severe flooding hazards. Park County staff can discuss with the USACE, the CWCB and FEMA the possibility of funding and/or technical assistance for watershed flood hazard reduction plans. For each of the county's watersheds, such a plan will identify specific flooding problems and potential structural and/or non-structural flood hazard reduction projects for those problems. These flood hazard reduction plans can include studying the possible benefits of improved forecasting of severe thunderstorms and rapid snowmelt, the possible benefits of guiding future development to minimize its exposure to flood risk, acquisition and relocation of buildings subject to serious flood risk, replacement of undersize bridges and culverts, and other channel improvements. Developing and implementing watersheds flood hazard reduction plans will reduce the flood risks potentially faced by proposals for new development and/or infrastructure in or near flood prone areas.

Priority: Medium

Funding Sources: CWCB, FEMA, USACE

Responsibility Assigned to: Park County Floodplain Administrator, Park County Emergency Manager, Town of Alma, Town of Fairplay

Target Completion Date: 2-3 Years

6.5.2.5 Drought

Table 6-18 Drought Mitigation Actions			
Action	Category	Goal, (Objective) Addressed	Priority
<i>Educate public about drought</i>	II	4, 4A	M-25
<i>Implement Community Water Conservation Plans for drought risk areas</i>	III	7, 7B	L-34
<i>Implement drought monitoring program</i>	III	7, 7B	L-38
Multi-Hazards Actions Applicable to Drought (See Action 31)			
<i>Create Severe Weather ES Council subcommittee</i>	IV	9, 9A	M-13

6.5.2.5.1 ACTION #17

Educate the public about ways to lessen the effects of drought, and the need to be water-wise.

Category: II

Hazard: Drought

Objective(s) Addressed: 4A

Background: With the help of appropriate federal and state agencies, Park County can develop a program to make its residents aware of water-wise strategies that can be implemented during years of drought and years of low to normal precipitation. Implementation of such a program

could occur through workshops, publications and electronic information dissemination. Encouraging water-wise strategies at all times could help to reduce the need for more severe restrictions in times of drought and better prepare the community for times of drought.

Priority: Medium

Funding Sources: NRCS, NWS, Park County

Responsibility Assigned to: Park County Emergency Manager

Target Completion Date: 2-3 Years

6.5.2.5.2 ACTION #18

Identify those municipalities and unincorporated communities in Park County most at risk due to drought, develop Community Water Conservation Plans, and alternate water supply locations for those communities, and implement those plans.

Category: III

Hazard: Drought

Objective(s) Addressed: 7B

Background: In cooperation with appropriate state and federal agencies, Park County can use mapping and drought prediction techniques to determine areas in need of drought mitigation measures. Capabilities to predict drought impacts have become more accurate and can be utilized to proactively reduce the effects of drought in a given year. Mitigation measures could include water conservation incentives, information about low-water-consumption appliances and other means for homeowners to reduce their use of water, water restrictions, alternate water supply locations, and fire bans among others.

Priority: Low

Funding Sources: Park County, Town of Alma, Town of Fairplay, CWCB, CDEM, NWS, NOAA

Responsibility Assigned to: Park County Emergency Manager, Town of Alma, Town of Fairplay

Target Completion Date: 3-5 Years

6.5.2.5.3 ACTION #19

Identify specific locations and specific parameters for a long-term drought-monitoring program and implement the monitoring program. Obtain assistance and technical recommendations from the Natural Resources Conservation Service for an improved program of drought preparedness and drought response.

Category: III

Hazard: Drought

Objective(s) Addressed: 7B

Background: Based on work already performed in other Colorado communities, Park County can identify climatic indices that are useful for predicting the likelihood of drought conditions in Park County. These indices include *MEI, NAO, SNOTEL Snow Water Equivalent, NRCS stream flow forecast, and NOAA precipitation data at Alma and Fairplay*. Between January 1 and February 15 of each year, data pertinent to these indices becomes available on the Internet. By reviewing the data available on the Internet for these indices, the Park County Emergency Manager can initiate appropriate drought preparation actions. Threshold values for the indices to trigger a drought mitigation response and the specific drought mitigation actions can be developed by Park County with the help of the Natural Resources Conservation Service. The mitigation actions begin in March, and should be executed throughout the spring and summer as conditions dictate.

Priority: Low

Funding Sources: Park County, CDEM, NRCS

Responsibility Assigned to: Park County Emergency Manager

Target Completion Date: 3-5 Years

6.5.2.6 Severe Thunderstorms and Lightning

Table 6-19 Severe Thunderstorm and Lightning Mitigation Actions			
Action	Category	Goal, (Objective) Addressed	Priority
<i>Educate public about thunderstorms</i>	II	4, (4A)	M-15
<i>Develop improved thunderstorm warning system</i>	I	1, (1B)	M-20
<i>Identify areas susceptible to impacts of severe thunderstorm</i>	III	7, (7A)	M-30
Multi- Hazards Actions Applicable to Severe Thunderstorms and Lightning (See Mitigation Actions 30, 31)			
<i>Create severe weather and road hazards notification system</i>	II	6, (6A)	H-10
<i>Create Severe Weather ES Council subcommittee</i>	IV	9, (9A)	M-13

6.5.2.6.1 ACTION #20

Educate the public about thunderstorm awareness, flooding and safety precautions, and participate in the *StormReady* program sponsored by the National Weather Service.

Category: II

Hazard: Severe Thunderstorms and Lightning

Objective(s) Addressed: 4A

Background: The National Weather Service's *StormReady* program serves over 1300 communities in the United States, providing essential information to help communities prepare for and mitigate against the impacts of severe weather. By acquiring information regarding prediction, preparation and mitigation from this program, Park County will be better able to prepare its citizens, emergency responders and employees.

Priority: Medium

Funding Sources: NWS

Responsibility Assigned to: Park County Emergency Manager

Target Completion Date: 2-3 Years

6.5.2.6.2 ACTION #21

Develop a program to better receive, coordinate and distribute information about likely thunderstorms, with assistance from NOAA and NWS.

Category: I

Hazard: Severe Thunderstorms and Lightning

Objective(s) Addressed: 1B

Background: Park County, with the assistance of appropriate outside agencies, should review current severe thunderstorm and lightning forecasting, detection and warning capabilities, including the suitability of radar coverage to provide adequate information and warning to the citizens of Park County. The status of communications between the county the National Weather Service and NOAA should be investigated. Emergency management officials must also examine the need for more stringent building codes to account for severe thunderstorms and lightning and associated high winds. Targeted training could address issues such as the latest severe thunderstorm/hailstorm construction codes, wind-proofing methods, group shelters and safe rooms.

Priority: Medium

Funding Sources: Park County, NOAA, NWS, CDEM

Responsibility Assigned to: Park County Emergency Manager

Target Completion Date: 1-2 Years

6.5.2.6.3 ACTION #22

Identify specific locations where each one of the three major impacts of thunderstorms (lightning causing wildfire, rain causing flooding, high wind) will have the highest impact.

Category: III

Hazard: Severe Thunderstorms and Lightning

Objective(s) Addressed: 7A

Background: By evaluating specific Severe Thunderstorm and Lightning hazard history, Park County can discern what areas of the county may require specific mitigation measures to reduce potential storm impacts. GIS mapping can help to determine past hazard areas and potential future hazard areas (i.e. unburned high-risk wildfire areas, floodplains, high wind corridors) and help in the prioritization of mitigation needs. The development of GIS mapping of potential future hazard areas would facilitate the careful review and approval of proposals for new development in or near those potential future hazard areas.

Priority: Medium

Funding Sources: Park County, Town of Alma, Town of Fairplay, CDEM, CWCB, FEMA, NWS, USFS

Responsibility Assigned to: Park County Emergency Manager, Park County GIS, Town of Alma, Town of Fairplay

Target Completion Date: 2-3 Years

6.5.2.7 Landslides

Table 6-20 Landslide Mitigation Actions			
Action	Category	Goal, (Objective) Addressed	Priority
<i>Define high landslide risk areas; in Alma, prepare a detailed evaluation of the risk of landslide</i>	I	1, (1B)	L-35
<i>Update landslide regulations</i>	I	3, (3A)	L-36
<i>Have ES Council research landslide mitigation</i>	IV	9, (9A)	L-37

6.5.2.7.1 ACTION #23

In conjunction with CGS and/or USGS, define the high priority areas for landslides in Park County. In Alma, prepare a detailed evaluation of the risk of landslide, develop effective mitigation measures to address landslide risk, and pursue options to fund and implement mitigation.

Category: I

Hazard: Landslide

Objective(s) Addressed: 1B

Background: Researching landslide history, with the help of the CGS and USGS, as well as evaluating slope stability throughout the county, Park County and the Town of Alma will be able to determine what areas are in greatest need of landslide mitigation measures. By determining high priority areas, including areas where the landslide risk has been exacerbated by recent wildfires, Park County and the Town of Alma can then determine the feasibility and effectiveness of potential landslide mitigation measures. The Town of Alma can prepare a detailed evaluation of the risks of landslide to infrastructure, property and businesses. Alma and Park County can then develop effective mitigation measures to address landslide risks, and pursue options, including grants, to fund and implement those mitigation measures. The development of GIS mapping of areas with a high potential for future landslides would facilitate the careful review and approval of proposals for new development and/or infrastructure in or near those potential landslide hazard areas, both in the Town of Alma and in unincorporated Park County.

Priority: Low

Funding Sources: Park County, Town of Alma, CDEM, CGS, USGS

Responsibility Assigned to: Park County Emergency Manager, Town of Alma

Target Completion Date: 2-3 Years

6.5.2.7.2 ACTION #24

Update the county land use regulations to mitigate against landslides

Category: I

Hazard: Landslide

Objective(s) Addressed: 3A

Background: Once high-risk landslide areas in Park County and the Town of Alma have been successfully defined, planning officials can review land use regulations and update them to better address landslide risks. Updated land use regulations, based on technical recommendations from the CGS and USGS, could help to prevent development in high risk areas and better protect infrastructure and critical facilities from landslides, through the careful review and

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approval of proposals for new development and/or infrastructure in or near the mapped potential landslide hazard areas, both in the Town of Alma and in unincorporated Park County..

Priority: Low

Funding Sources: Park County, Town of Alma, CDEM, CGS, USGS

Responsibility Assigned to: Park County Planning Director, Park County Emergency Manager, Town of Alma

Target Completion Date: 3-5 Years

6.5.2.7.3 ACTION #25

In conjunction with CGS and/or USGS and/or DEM, have the Emergency Services Council research options for landslide mitigation.

Category: IV

Hazard: Landslide

Objective(s) Addressed: 9A

Background: Aside from land use regulations, there are a number of effective structural and nonstructural landslide mitigation measures that could be researched by the Park County Emergency Services Council and the Town of Alma, with technical assistance from the USGS and CGS. Potential projects could include training for Emergency Services Providers, development and execution of engineering projects, and fostering relationships with businesses, developers and citizens to make the community more aware of landslide risks and potential mitigation strategies. The development of GIS mapping of specific areas in the Town of Alma and in unincorporated Park County with a high potential for future landslides would enhance the awareness of businesses, developers, citizens and government agency staff regarding the risks faced by proposals for new development in or near those potential landslide hazard areas, and the need for appropriate mitigation measures..

Priority: Low

Funding Sources: Park County, Town of Alma, CDEM, CGS, USGS

Responsibility Assigned to: Park County Emergency Manager, Park County Emergency Services Council, Town of Alma

Target Completion Date: 3-5 Years

6.5.2.8 Dam Failure

Table 6-21 Dam Failure Mitigation Actions			
Action	Category	Goal, (Objective) Addressed	Priority
<i>Install warning system for high risk dam failure areas</i>	I	1, (1B)	M-26
<i>Conduct dam failure exercises</i>	II	5, (5A)	M-27

6.5.2.8.1 ACTION # 26

Work with the Division of Water Resources to rank high priority dams within Park County and for installation of dam failure warning systems and plans

Category: I

Hazard: Dam Failure

Objective(s) Addressed: 1B

Background: With the assistance of the Dam Safety Branch of the Colorado Division of Water Resources, Park County and the Towns of Alma and Fairplay can evaluate risks and develop strategies to mitigate against potential dam failures. Safety and security issues, such as the potential for terrorist acts, will need to be acknowledged. Mitigation strategies can include constant monitoring of structural stability, GIS mapping of hazard areas, and the installation of a comprehensive warning system.

Priority: Medium

Funding Sources: Park County, Town of Alma, Town of Fairplay, CDWR, FEMA

Responsibility Assigned to: Park County Emergency Manager, Town of Alma, Town of Fairplay

Target Completion Date: 1-2 Years

6.5.2.8.2 ACTION #27

Conduct regular exercises for dam failure and dam preparedness. Work with those partners who maintain dams in Park County to ensure they are maintained and that emergency exercises for simulated dam failure response are conducted.

Category: II

Hazard: Dam Failure

Objective(s) Addressed: 5A

Background: The implementation of regular, redundant exercises for dam failure will help the county to remain prepared to respond to any potential dam failure. These exercises will include utilizing warning systems, developing and simulating evacuation plans and mobilizing resources to respond to such a hazard.

Priority: Medium

Funding Sources: Park County, Town of Alma, Town of Fairplay, CDWR, FEMA

Responsibility Assigned to: Park County Emergency Manager, Town of Alma, Town of Fairplay

Target Completion Date: 2-3 Years

6.5.2.9 Earthquake

Table 6-22 Earthquake Mitigation Actions			
Action	Category	Goal, (Objective) Addressed	Priority
<i>Adopt seismic risk zoning</i>	I	1, (1B)	L-39
<i>Map high-priority seismic risk areas</i>	III	7, (7A)	L-40

6.5.2.9.1 ACTION #28

Adopt zoning and subdivision regulations for proposed development in or adjacent to areas of high seismic risk.

Category: I

Hazard: Earthquake

Objective(s) Addressed: 1B

Background: Zoning and subdivision regulations in regards to seismic hazards will help to ensure that new development meets standards appropriate to the seismic risk of the area, through the careful review and approval of proposals for new development and/or infrastructure in or near mapped potentially active fault zones. In locations where there is the need/potential for hardening of critical lifeline systems, i.e., critical public services such as utilities, roads, and bridges to meet “Seismic Design Guidelines and Standards for Lifelines,” or equivalent standards, ensuring appropriate engineering design can substantially reduce earthquake impacts. CDOT and Park County Road and Bridge can review construction plans for all bridges at risk to determine their susceptibility to collapse. Proposed infrastructure can be planned and designed to lessen its exposure to seismic hazards.

Priority: Low

Funding Sources: Park County, Town of Alma, Town of Fairplay, CDEM, CGS, USGS, FEMA

Responsibility Assigned to: Park County Planning Director, Park County Emergency Manager, Town of Alma, Town of Fairplay

Target Completion Date: 3-5 Years

6.5.2.9.2 ACTION #29

With the assistance of CGS and USGS, map highest priority locations for detailed Seismic Risk Studies in Park County and identify bridges and other infrastructure subject to the greatest seismic risk.

Category: III

Hazard: Earthquake

Objective(s) Addressed: 7A

Background: Seismic maps of earthquake hazards can be assembled utilizing data available from the U.S. Geologic Survey, the Colorado Geologic Survey and Park County GIS. These maps can be used for a careful review of proposals for new or enhanced infrastructure to determine where infrastructure and infrastructure corridors are threatened by earthquake hazards and where future infrastructure and infrastructure corridors may be threatened by earthquake hazards.

Priority: Low

Funding Sources: Park County, Town of Alma, Town of Fairplay, CDEM, CGS, USGS, FEMA

Responsibility Assigned to: Park County GIS, Park County Emergency Manager, Town of Alma, Town of Fairplay

Target Completion Date: 3-5 Years

6.5.2.10 Multiple Hazards

Table 6-23 Multi-Hazards Mitigation Actions			
Action	Category	Goal, (Objective) Addressed	Priority
Create severe weather and road hazards notification system	II	6, (6A)	H-10
Create Severe Weather ES Council subcommittee	IV	9, (9A)	M-13

6.5.2.10.1 ACTION #30

Create a public notification program for severe thunderstorms and lightning, winter weather, and flash flooding

Category: II

Hazard: Severe Winter Weather; Flooding; Severe Thunderstorms and Lightning

Objective(s) Addressed: 6A

Background: Planning efforts will be made to identify specific geographic risk areas and locations where special needs populations exist. These planning efforts will be followed up with an aggressive campaign to inform the public, including special needs populations, of their particular severe thunderstorms and lightning, winter weather and flash flooding risks.

Because of the dynamic nature of storms in relation to location and intensity, it is essential for populations to know where and when risks are elevated.

Priority: High

Funding Sources: Park County, Town of Alma, Town of Fairplay, CDEM, FEMA, NOAA, NWS

Responsibility Assigned to: Park County Emergency Manager, Park County GIS, Town of Alma, Town of Fairplay

Target Completion Date: 1-2 Years

6.5.2.10.2 ACTION #31

Create an ES Council subcommittee to address weather-related mitigation issues.

Category: IV

Hazard: Severe Winter Weather; Drought; Severe Thunderstorms and Lightning

Objective(s) Addressed: 9A

Background: The ES Council serves as a venue to bring all parties responsible for preparedness, response and mitigation functions together to comprehensively plan for weather-related issues. Currently a variety of agencies and public officials respond separately to severe winter storms and cold weather and to severe thunderstorms and hailstorms. Coordination of these various agencies will increase the likelihood of appropriate preparations for the citizens of the county. The agencies and officials include Fire Chiefs, CDOT, Law Enforcement Agencies, Ambulance Agencies, Park County’s automated emergency notification system (which is similar to Reverse 911), County Road and Bridge, Utilities Companies, Park County school districts, Colorado Division of Emergency Management, Park County Department of Public Health, the Town of Alma, the Town of Fairplay and the Red Cross. As part of this coordination effort, the county can produce and distribute family and traveler emergency preparedness information relating to severe winter weather hazards and to severe thunderstorm and hailstorm hazards. During periods of extreme cold and occurrences of severe thunderstorms and lightning, and during times facing potential flash floods, the county can also organize outreach to vulnerable populations in remote portions of the county.

Priority: Medium

Funding Sources: Park County

Responsibility Assigned to: Park County Emergency Manager, Park County Emergency Services Council

Target Completion Date: 1-2 Years

6.5.2.11 All Hazards

Table 6-24 All Hazards Mitigation Actions			
Action	Category	Goal, (Objective) Addressed	Priority

Section 6

Mitigation Strategy

<i>Recognize MAC</i>	I	1, (1A)	H-2
<i>Complete EOC policies and procedures manual; participate in county, state and regional exercises</i>	IV	8, (8A)	H-5
<i>Warn public of road hazards with VMS boards</i>	II	6, (6A)	H-7
<i>Produce written After Action Reports for exercises and disasters</i>	II	5, (5B)	H-11
<i>Conduct annual evacuation drill of 911 Communications Center</i>	IV	8, (8B)	H-12
<i>Facilitate community-wide investment in preparedness and mitigation planning activities</i>	II	4, (4A)	M-22
<i>Participate in regional communications assessment</i>	IV	8, (8A)	M-24
<i>Conduct emergency management exercises for public</i>	II	5, (5A)	M-29
<i>Develop risk profiles for critical facilities</i>	III	7, (7A)	M-32

6.5.2.11.1 ACTION #32

All three Park County jurisdictions officially recognize the Mitigation Advisory Committee (MAC) and specify ongoing responsibilities of the MAC.

Category: I

Hazard: All

Objective(s) Addressed: 1A

Background: After the passage of the Disaster Mitigation Act of 2000 (DMA2K), local governments are required to develop and to adopt all hazards mitigation plans to be eligible for certain types of future disaster assistance including funds for mitigation activities. Nationwide, many jurisdictions have formed committees, councils or citizen groups to assist in developing and implementing plans. In the case of multi-jurisdictional plans, “mitigation advisory committees” are often formed and are comprised of local officials and residents from the participating jurisdictions. One way to assure the effectiveness of such committees is to bestow official status to them.

Priority: High

Funding Sources: N/A

Responsibility Assigned to: MAC

Target Completion Date: 1-2 Years

6.5.2.11.2 ACTION #33

Complete the EOC policies and procedures manual for all county employees and emergency responders by December 2008. Participate in county, regional, and statewide exercises to determine strengths and weaknesses in EOC operations, enhancing support activities during an actual disaster.

Category: IV

Hazard: All Hazards

Objective(s) Addressed: 8A

Background: By completing the EOC policies and procedures manual for all county employees and emergency responders, Park County will significantly streamline its mitigation and response efforts. County, regional and statewide exercises will serve to make the county constantly aware of new strategies to improve its hazard related capabilities. Candid evaluation of its weaknesses will help to make its response and mitigation capacities more comprehensive and efficient.

Priority: High

Funding Sources: Park County, CDEM

Responsibility Assigned to: Park County Emergency Manager, Park County ES Council

Target Completion Date: 1-2 Years

6.5.2.11.3 ACTION #34

Utilize additional VMS boards on Highways, as well as county roads, to warn the public about possible hazards in the area.

Category: II

Hazard: All Hazards

Objective(s) Addressed: 6A

Background: VMS boards are an effective tool in warning motorists of impending hazards on roads, including flooding, wildfire, severe winter weather, landslides and HAZMAT incidents. They will provide the public with critical safety information, help to control traffic flow so that emergency services providers can effectively respond to road hazards, and reduce the impact of road closures on motorists.

Priority: High

Funding Sources: CDOT, CDEM

Responsibility Assigned to: Park County Emergency Manager, Park County Road and Bridge, Town of Alma, Town of Fairplay

Target Completion Date: 1-2 Years

6.5.2.11.4 ACTION #35

Continually produce a written After Action Report for every exercise and disaster in Park County, and make those results known to all involved so that processes and procedures can be improved in future operations.

Category: II

Hazard: All Hazards

Objective(s) Addressed: 5B

Background: Candid evaluations of emergency operations are some of the most important and influential tools in optimizing future operations. By discovering and reflecting upon weaknesses, the County can enhance policies and procedures as well as plan for a need for more resources for future hazards. They can also help to further enhance the understanding of the risks facing the county by officials and emergency responders.

Priority: High

Funding Sources: Park County, Town of Alma, Town of Fairplay, CDEM

Responsibility Assigned to: Park County Emergency Manager, Park County ES Council, Town of Alma, Town of Fairplay

Target Completion Date: 1-2 Years

6.5.2.11.5 ACTION #36

Conduct an evacuation drill of the Park County 911 Communications Center at least once annually to ensure the safety of all employees, and to ensure a seamless communications system during an emergency.

Category: IV

Hazard: All Hazards

Objective(s) Addressed: 8B

Background: Communications during a hazard event is essential to providing essential services to those impacted by those hazard events. Regular evacuations of the Park County 911 Communications Center will help to develop failsafe procedures to ensure that communications are not compromised during any hazard events.

Priority: High

Funding Sources: Park County, CDEM, FEMA

Responsibility Assigned to: Park County Emergency Manager, Park County ES Council

Target Completion Date: 1-2 Years

6.5.2.11.6 ACTION #37

Continue to build a broad-based grass roots campaign amongst the public, businesses, non-profit organizations, government and regulatory agencies through public education programs related to preparedness and mitigation; work to improve awareness and provide the information needed to recognize issues related to hazards, make informed decisions and take positive actions.

Category: II

Hazard: All Hazards

Objective(s) Addressed: 4A

Background: An effective mitigation program is dependent upon investment from all members of the community, including residents, businesses, non-profit organizations and government officials and employees. Building such a coalition of investors in mitigation will allow the county's mitigation programs to continually grow in depth, breadth and effectiveness. The development and dissemination of GIS mapping of specific areas with a high potential for future hazard incidents will enable the county and the two towns to increase awareness among businesses, developers and citizens of the risks faced by existing development and proposals for new development in or near those potential hazard areas, and the need for appropriate mitigation measures.

Priority: Medium

Funding Sources: Park County, Town of Alma, Town of Fairplay, CDEM, FEMA

Responsibility Assigned to: Park County Emergency Manager, Park County ES Council, Town of Alma, Town of Fairplay

Target Completion Date: 1-2 Years

6.5.2.11.7 ACTION #38

Participate in the South Central regional communications assessment to determine areas of improvement or collaboration to enhance emergency communications within the county and region.

Category: III

Hazard: All Hazards

Objective(s) Addressed: 8A

Background: Outside evaluation of Park County's emergency management and communications infrastructure will provide the county with valuable perspective to maximize its effectiveness. Watching and evaluating other communities in the South Central region will also provide the county with fresh ideas and increased perspective on its own programs. Participation in the communications assessment will also help to create effective lines of communication for circumstances when mutual aid agreements need to be activated.

Priority: Medium

Funding Sources: Park County, Town of Alma, Town of Fairplay, CDEM, FEMA

Responsibility Assigned to: Park County Emergency Manager, Town of Alma, Town of Fairplay

Target Completion Date: 1-2 Years

6.5.2.11.8 ACTION #39

Conduct one exercise annually, involving members of the public, regarding the four phases of emergency management, to increase understanding of each person's role during a disaster, including public health issues such as Pandemic Flu.

Category: II

Hazard: All Hazards

Objective(s) Addressed: 5A

Background: A well-informed and educated public will help to ensure the effectiveness of emergency operations. Annual exercises will help to provide the public with knowledge that will help them prepare for and respond to hazards, reduce risk to their property and lives, and work with the rest of the community and local officials to respond in times of disaster.

Priority: Medium

Funding Sources: Park County, Town of Alma, Town of Fairplay, CDEM, CDPHE, FEMA

Responsibility Assigned to: Park County Emergency Director, Park County Public Health, Town of Alma, Town of Fairplay

Target Completion Date: 1-2 Years

6.5.2.11.9 ACTION #40

Identify and map the specific locations of Critical Facilities in the Park County jurisdictions and develop detailed risk profiles for each facility, keeping in mind security needs and vulnerabilities in order to make buildings more secure, especially those critical during an emergency response.

Category: III

Hazard: All Hazards

Objective(s) Addressed: 7A

Background: In the event of an emergency, critical facilities must remain functional to the fullest extent possible. Critical facilities include buildings and infrastructure that are fundamental to the ongoing operation of community systems. They include police, fire, hospitals, EMS, nursing homes, electric systems, domestic water systems, wastewater systems, and communications systems. The county and two towns can create a list of existing critical facilities in Park County and work with Park County GIS to map all of them. Through GIS analysis those existing critical facilities that are in hazard risk zones can be identified and specific

mitigation needs can be evaluated, and the possibility that proposed new or enhanced critical facilities might be located in hazardous areas can be considered as part of their planning and design process and through a careful review and approval process for those proposals.

Priority: Medium

Funding Sources: Park County, Town of Alma, Town of Fairplay, CDEM, FEMA

Responsibility Assigned to: Park County Emergency Manager, Park County GIS, Town of Alma, Town of Fairplay

Target Completion Date: 2-3 Years

6.6 INCORPORATING THE RISK MAP LIFECYCLE CONCEPT INTO THE MITIGATION ACTION PLAN

6.6.1 Including the Risk MAP Lifecycle Concept in the Mitigation Strategy

FEMA described its Risk MAP Lifecycle concept as:

... a lifecycle with the purpose of constantly reducing losses to life and property. Flood mapping is used for risk assessments which are incorporated into mitigation plans where risk reduction measures are identified for future action. Future hazard identification requirements are developed and the cycle starts anew.

The “**Mapping**” component and the “**Assessment**” component of the Risk MAP Lifecycle have already been addressed in the Hazard Identification portion of the HIRA and in the Risk Assessment portion of the HIRA, respectively. The “**Planning**” component, as described below in FEMA’s words, is addressed in the Mitigation Strategy chapter of this plan.

***Planning** – Show demonstrated progress in State, Tribal, and local mitigation plans Mitigation plans rely on risk assessments information for communities to analyze, incorporate into plan updates, and to identify actionable strategies that reduce risks. There needs to be effective risk communications, incentives, and guidance ... to encourage effective action on the mitigation plan that result in true risk reduction.*

This portion of the Mitigation Strategy includes direct connections back to the HIRA chapter, listed below. These direct connections to the HIRA are intended to ensure, as appropriate, that “**Mapping**” data and “**Assessment**” analyses are updated when “**Planning**” mitigation compliance measurements dictate such an update, and they are also intended to ensure that specific mitigation projects called for in “**Planning**” are actually implemented so that risks identified in “**Assessment**” are ultimately reduced.



6.6.2 Direct Risk MAP Lifecycle Connections from the Mitigation Strategy Back to the Hazard Identification and Risk Assessment

6.6.2.1 *Show demonstrated progress in mitigation plans*

In order to demonstrate progress in mitigation plans to FEMA, to the Colorado Division of Emergency Management, to the Colorado Water Conservation Board, and the other applicable agencies, Park County, the Town of Alma, and the Town of Fairplay will need a formal mechanism for annual monitoring of progress and annual reporting of the findings of the monitoring. The Park County Emergency Manager will initiate and coordinate the monitoring and reporting effort by directing the Park County Mitigation Advisory Committee (MAC), working in conjunction with the Emergency Services Council, to provide:

- *An annual formal review of each of the three Mitigation Action Plans*
- *Annual progress reports for all of Park County on the individual Mitigation Action Plans*
- *Recommendations regarding the need for developing new mitigation initiatives due to previously unaddressed or “under-addressed” risks*

For each Mitigation Action the MAC will establish annual measures of success and five-year measures of success. These indicators will provide a means to measure the progress and success of implementation of the Mitigation Action Plans. On the basis of the indicators, the MAC can specify any deficiencies in implementation and any necessary corrective actions.

6.6.2.2 *Revisit need for hazard mapping updates*

Based on the findings of the annual formal review performed by the MAC, the Park County Emergency Manager and the Park County GIS Department will prepare an annual work plan for hazard mapping updates. For each hazard the proposed mapping updates will fall into one of the following categories:

- *no need for mapping update at present time*
- *update or enhance existing mapping*
- *replacing existing mapping*
- *create new mapping (no existing mapping, but mapping methodology already exists)*
- *develop methodology to create new mapping*

The status of hazard mapping as of the completion of this plan is briefly summarized below:



Table 6-25 Status of Hazard Mapping			
Hazard	Current Status of Mapping	Annual Review Question	Recommended Initial Mapping Update Action
Wildfire	<i>already mapped</i>	<i>Do we need to update or enhance?</i>	<i>map according to individual watersheds</i>
Severe Winter Weather	<i>no current mapping</i>	<i>Have we already developed a suitable mapping methodology?</i>	<i>review initial ideas about mapping methodology</i>
Drought	<i>no current mapping</i>	<i>Have we already developed a suitable mapping methodology?</i>	<i>review initial ideas about mapping methodology</i>
Flooding	<i>already mapped</i>	<i>Do we need to update or enhance?</i>	<i>map according to individual watersheds; need more detailed mapping</i>
Severe Thunderstorms and Lightning	<i>no current mapping</i>	<i>Can we develop a suitable mapping methodology?</i>	
HAZMAT	<i>no current mapping</i>	<i>Have we already developed a suitable mapping methodology?</i>	<i>review initial ideas about mapping methodology</i>
Dam Failure	<i>already mapped</i>	<i>Do we need to update or enhance?</i>	<i>map according to individual watersheds</i>
Landslide	<i>already mapped</i>	<i>we know how to map; have we or should we?</i>	<i>map according to individual watersheds</i>
Earthquake	<i>already mapped</i>	<i>we know how to map; have we or should we?</i>	

6.6.2.3 Revisit need for Risk Assessment updates

Based on the findings of the annual formal review performed by the MAC, the Park County Emergency Manager and the Park County GIS Department will prepare an annual work plan for Risk Assessment updates. For each of the nine (9) hazards the proposed Risk Assessment updates will fall into one of the following categories:

- no need for Risk Assessment update at present time
- update or enhance existing Risk Assessment
- replace existing Risk Assessment
- create new GIS-based Risk Assessment (no existing GIS-based Risk Assessment, but GIS-based methodology already exists)
- develop methodology to create new GIS-based Risk Assessment

6.6.2.4 Update Mitigation Action Plans by Adding Appropriate Actionable Strategies

Based on the findings of the annual formal review the MAC will determine whether an update of the individual Mitigation Action Plans is needed. If the MAC determines an update of the individual Mitigation Action Plans is needed, the MAC and the Park County Emergency Manager will pursue the following three steps regarding actionable strategies for each of the nine (9) hazards, as appropriate:

- ❖ *Analyze potential actionable strategies that reduce risks*
- ❖ *Identify specific actionable strategies*
- ❖ *Incorporate selected actionable strategies into plan updates*

Whenever the hazard mapping, the Risk Assessments and/or the Mitigation Action Plans are updated, the MAC and the Park County Emergency Manager will update the full Park County All-Hazards Mitigation Plan. During the update process, the MAC and the Park County Emergency Manager will consider the possible need to revise priorities assigned to individual Mitigation Actions. At a minimum, the Park County All-Hazards Mitigation Plan will be updated every five years. The 5-year written update will be submitted to the Colorado Division of Emergency, the Colorado Water Conservation Board and FEMA Region VIII, unless disaster or other circumstances lead to a different time frame. Any annual updates of the plan will also be submitted to those agencies.

6.6.2.5 Ensure continuation and enhancement of effective risk communications, incentives, and guidance

The annual formal review performed by the MAC will include an assessment of the effectiveness of:

- ❖ *Current strategies and materials for communicating risk to the citizens of Park County*
- ❖ *Current incentives to encourage risk averse behavior by the citizens of Park County*
- ❖ *Current programs and materials for providing guidance to the citizens of Park County regarding avoidance and mitigation of risk*

As appropriate, the MAC and the Park County Emergency Manager will develop specific recommendations for the continuation and the enhancement of:

- ❖ *Strategies and materials for communicating risk*
- ❖ *Incentives to encourage risk averse behavior*

- ❖ *Programs and materials for providing guidance regarding avoidance and mitigation of risk*

As part of the process of updating the Mitigation Action Plans, the MAC and the Park County Emergency Manager will incorporate the specific recommendations regarding risk communications, guidance and incentives into the Mitigation Action Plans.

In the event that risks that were previously unaddressed or “under addressed” manifest in a hazard event, the MAC will also undertake new risk evaluations and subsequent development of new mitigation strategies.

SECTION 7 PLAN MAINTENANCE PROCEDURES

The long-term success of the Park County mitigation plan depends in large part on routine monitoring, evaluating, and updating of the plan so that it will remain a valid tool for the communities to use. In selecting the projects described in the Mitigation Strategy, the MAC noted that in the future, as circumstances allow, more ambitious hazard mitigation projects can be considered.

7.1 FORMAL PLAN ADOPTION

Three local governments in Park County, Colorado participated in this planning process and formally adopted this plan by resolution of their governing Board. These local governments are the Town of Alma, the Town of Fairplay, and Park County.

The plan was completed under the auspices of the Park County Commissioners and the Park County Mitigation Advisory Committee. Sample adoption language was provided to the participating jurisdictions to facilitate the adoption process (see Appendix A).

The formal adoption of this plan by the three jurisdictions took several months, as significant coordination by the Mitigation Advisory Committee was necessary in order to 1) place the plan review and adoption on the appropriate meeting agendas in each jurisdiction, 2) produce and provide copies in official meeting packets, 3) facilitate the actual adoption, 4) collect the adoption resolutions, and 5) incorporate the adopted resolutions into the final Hazard Mitigation Plan.

The Park County Mitigation Advisory Committee appreciates the willingness that the Colorado Water Conservation Board, the Colorado Division of Emergency Management, and FEMA Region VIII have demonstrated by reviewing this plan concurrently and providing comments for revision prior to the adoption process. Not having done so would clearly have added more months to the adoption process.

7.2 IMPLEMENTATION

Upon adoption, the plan faces the biggest test: **implementation**. While this plan puts forth many worthwhile and “High” priority recommendations, the decision of which actions to undertake first will be the primary issue that the Park County communities face.

Funding is always an important and critical issue. Therefore, pursuing low or no-cost high-priority recommendations may be one approach that a community chooses to take. An example of a low-cost, high-priority recommendation would be to install flood level markers on bridges to warn of high water levels.

Another implementation approach is to prioritize those actions that can be completed in a relatively short amount of time. Being able to publicize a successful project can build momentum to implement the other parts of the plan. An example of an effective but easy-to-implement strategy is to participate in the National Weather Service's *StormReady* program.

It is important to the long-term implementation of the plan that the underlying principles of this Hazard Mitigation Plan are incorporated into other community plans and mechanisms, such as:

- *Comprehensive Planning*
- *Capital Improvement Program Budgeting*

The capability assessment chapter of this plan provides insight into the current comprehensive plans for each community. Communities will work to ensure that the appropriate information from this plan is incorporated into the next update of their comprehensive plan. Information from the hazard identification and risk assessment as well as mitigation goals and strategies may be directly included as a comprehensive plan element or will be included in other elements, as appropriate. Projects that require large investments, such as acquisition of flood-prone properties or road retrofits, are candidates for inclusion in capital improvement plans.

Mitigation is most successful when it is incorporated within the day-to-day functions and priorities of government and development. This integration is accomplished by a constant effort to network and to identify and highlight the multi-objective, "win-win" benefits to each program, the communities and their constituents. This effort is achieved through monitoring agendas, attending meetings, and sending memos.

Simultaneous to these efforts, it will be important to constantly monitor funding opportunities that can be utilized to implement some of the higher cost recommended actions. This will include creating and maintaining a repository of ideas on how any required local match or participation requirement can be met. Then, when funding does become available, the Park County communities will be in a position to take advantage of an opportunity. Funding opportunities that can be monitored include special pre- and post-disaster funds, special district budgeted funds, state or federal ear-marked funds, and grant programs, including those that can serve or support multi-objective applications.

With adoption of this plan, the Park County communities commit to:

- *Pursuing the implementation of the high-priority, low/no-cost recommended actions.*
- *Keeping the concept of mitigation in the forefront of community decision-making by identifying and stressing the recommendations of the Hazard Mitigation Plan when other community goals, plans and activities are discussed and decided upon.*
- *Maintaining a constant monitoring of multi-objective, cost-share opportunities to assist the participating communities in implementing the recommended actions of this plan for which no current funding or support exists.*

In addition, the communities of Park County remain committed to the National Flood Insurance Program. They will continue to enforce floodplain regulations and undertake other actions to remain in compliance with the program.

The Mitigation Strategy in this plan includes six specific actions that will enhance Park County's commitment to the National Flood Insurance Program by strengthening the compliance of the three jurisdictions with the requirements of the National Flood Insurance Program and by promoting a more comprehensive program of floodplain management activities in the county. These six actions are summarized below:

ACTION #11 - *Ensure all jurisdictions in Park County are in the National Flood Insurance Program through education and by assisting the Town of Alma through the process.*

By enrolling in the National Flood Insurance Program, the Town of Alma can pursue funding not currently available for flood mitigation projects and provide the community with specific strategies to reduce risk from flooding. Working diligently to meet NFIP requirements will help Alma, as well as Park County and Fairplay, reduce flood damage by counting improvement and repair projects cumulatively. By enforcing NFIP standards for new development, Alma and the other two communities will ensure careful review and approval of proposals for new development in or near floodprone areas of the town.

ACTION #12 - *Select specific strategies from FEMA's Community Rating System for improving local floodplain management programs, adopt those strategies and implement them.*

The FEMA's Community Rating System (CRS) rewards communities that are doing more than meeting the minimum NFIP requirements to prevent or reduce flood losses and to provide an incentive for communities to initiate new flood protection activities. The CRS

guidance materials include specific strategies that can help communities in improving their local floodplain management programs. These strategies fall into four categories: Public Information, Mapping and Regulations, Flood Damage Reduction, and Flood Preparedness. The Park County jurisdictions can review the CRS strategies, select those that best meet their local floodplain management needs, and implement them.

ACTION #13 - *Identify flood values at risk, cross-referenced with hazards, and by the end of 2010, update county Land Use Regulations to include mitigation measures for flooding.*

None of the Park County jurisdictions have detailed, technical floodplain analyses available to them. Based on a review of the county's flood history, a list of possible mitigation measures to address historic impacts from those past floods and regulatory language to encourage and/or mandate some of the mitigation measures can be developed. Some specific mitigation measures that could be encouraged and/or mandated include stream setbacks for new development, extra freeboard for the lowest floor of new buildings near streams, extra freeboard for new bridges or culverts, floodproofing of non-residential buildings in floodprone locations, and retrofitting of floodproofing measures for basements and first floors of existing buildings in floodprone locations.

ACTION #14 - *Identify the highest priority floodplain mapping needs for Park County jurisdictions and find funding for those priorities to complete floodplain mapping in those areas.*

Park County has recently begun the process of digitizing its FIRMs. These maps contain no topographic or engineering analyses. After identifying high risk flood areas, Park County can work with the Colorado Water Conservation Board, FEMA and other federal agencies to develop detailed floodplain mapping for specific stream reaches. Having access to detailed floodplain mapping that is based on thorough engineering analyses will facilitate a careful review of proposals for new development in or near floodprone areas.

ACTION #15 - *Identify stream reaches that do not meet water quality standards, specifically those with sediment buildup.*

Park County can identify specific stream reaches that do not currently meet state water quality standards, particularly those stream reaches that fail to meet state standards due to sediment accumulation. Once the stream reaches that have sediment accumulation problems have been identified, the county can begin to determine possible causes of the sediment accumulation, including historic wildfires in the

watershed upstream, naturally erosive soils, destabilizing agricultural practices, upstream urbanization and the application of traction stand on adjacent highways.

ACTION #16 - *Identify those areas of Park County most in need of flood hazard reduction plans with detailed engineering analyses. Identify specific drainage “hot spots” in the Park County jurisdictions, develop engineering plans to improve bridges, culverts, channels and other infrastructure in those areas, fund the projects and complete them.*

Within the floodplains in Park County are specific locations facing more severe flooding hazards. Park County staff can discuss with state and federal agencies the possibility of assistance for watershed flood hazard reduction plans. For each of the county’s watersheds, such a plan will identify specific flooding problems and potential flood hazard reduction projects for those problems. Developing and implementing watershed flood hazard reduction plans will reduce the flood risks potentially faced by proposals for new development and/or infrastructure in or near floodprone areas.

7.3 MAINTENANCE

Plan maintenance requires an ongoing effort to monitor and evaluate the implementation of the plan, and to update the plan as progress, roadblocks, or changing circumstances are recognized.

The county commissioners and town managers will be responsible for appointing one or more representatives (e.g., emergency manager, planning director) from their respective jurisdiction to the Park County Mitigation Advisory Committee (MAC), which was originally convened by Park County. It is expected that the MAC will work in conjunction with the Emergency Services Council that already meets on a regular basis to discuss hazards facing all Park County jurisdictions. The MAC will be responsible for monitoring and updating the plan.

The MAC will want to develop the following:

- *An annual formal review of each of the three Mitigation Action Plans*
- *Annual progress reports for all of Park County on the individual Mitigation Action Plans*
- *Recommendations regarding the need for developing new mitigation initiatives due to previously unaddressed or “under-addressed” risks, and*
- *A 5-year written update to be submitted to the state and FEMA Region VIII, unless disaster or other circumstances (e.g., changing regulations) lead to a different time frame*

The Park County Emergency Manager will initiate and coordinate the monitoring of this plan. The MAC will provide annual updates to the three Park County local governments on the progress of the implementation of their Mitigation Action Plans. The timing of the yearly reports should coincide with either the anniversary of the approval date of this plan or another date chosen by the MAC. The annual progress reports will be reviewed by the MAC who will determine what action, including an update of the plan, is needed.

For each Mitigation Action the MAC will be responsible for setting annual measures of success and a five-year measure of success. These indicators can be used to measure the progress and success of implementation of the Mitigation Action Plans. The MAC can use this information to determine if corrective action is needed. In addition, the MAC should review its composition annually and add members if needed.

The MAC will determine at the annual meeting if an update of the plan is needed. At a minimum, the plan will be updated every five years. Factors to consider when determining if an update is necessary include:

- *Decreased vulnerability as a result of implementing recommended actions, success stories where mitigation efforts have proven effective,*
- *Increased vulnerability as a result of failed or ineffective mitigation actions,*
- *Increased vulnerability as a result of growth and changes related to new development (and/or annexation),*

- *Determination that the feasibility of projects has decreased, based on a review of their consistency with STAPLE/E, the time frame, the community's priorities, and funding resources*
- *New hazards that may arise or that were previously overlooked or "under addressed"*
- *New data or studies on hazards and risks,*
- *New state/federal laws, policies, or programs,*
- *Changes in resource availability, new capabilities, or changes in capabilities (planning and zoning floodplain regulation changes, etc.),*
- *New project recommendations or changes in project prioritization,*
- *Applicability of goals/objectives/strategies.*

Projects that were not ranked high, but that were identified as potential Mitigation Actions in the original plan, should be reviewed during the monitoring and updating of the plan to determine the feasibility of their future implementation.

As detailed in Section 6.6.2 of this plan, the MAC and the Park County Emergency Manager will, with the assistance of other appropriate agencies, conduct the following review activities regarding potential updates to the plan to ensure direct Risk MAP Lifecycle connections from the Mitigation Strategy to the Hazard Identification and Risk Assessment:

- *Revisit need for hazard mapping updates*
- *Revisit need for Risk Assessment updates*
- *Update Mitigation Action Plans by Adding Appropriate Actionable Strategies*
- *Ensure continuation and enhancement of effective risk communications, incentives, and guidance*

A major event, such as a Presidentially-declared disaster, may trigger a need to review the plan. If such an event occurs in Park County, the MAC will coordinate to determine how best to review and update the plan. The updating of the plan will be by written changes and submissions, as the Park County communities and the MAC deem appropriate and necessary. Major changes to the plan will be submitted to the Colorado Division of Emergency Management, to the Colorado Water Conservation Board and to FEMA Region VIII.

Public notice will be given and public participation will be invited, at a minimum, through available web postings and press releases to the local media outlets, primarily newspapers and radio stations. In addition, an annual event will be held to publicize progress on implementing the mitigation plan. This event could be timed to coincide

with the anniversary of a significant event or annual awareness event (i.e., Wildfire Preparedness Week). Jurisdictions also should provide annual updates to the governing body to keep them informed about plan implementation.

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

- *Lessened 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).*

Updating of the plan will be by written changes and submissions, as the Park County communities and the MAC deem appropriate and necessary.

SECTION 8 REFERENCES

8.1 COMMUNITY PROFILE REFERENCES

Mitigation Plans

- Costilla County, CO Mitigation Plan
- Enid, OK. Mitigation Plan
- West Piedmont, VA Mitigation Plan

Websites

- Park County, Colorado Home Page (including Park County Strategic Master Plan)
www.parkco.us
- The Town of Alma <http://townofalma.com/>
- The Town of Fairplay <http://www.fairplayco.us>
- The United States Census Bureau. www.census.com/census2000
- Colorado Department of Local Affairs. www.dola.state.co.us

Other Websites

- <http://www.epodunk.com/cgi-bin/genInfo.php?locIndex=9644>
- http://www.city-data.com/county/Park_County-CO.html
- http://www.bankrate.com/brm/itax/Edit/state/profiles/state_tax_Colo.asp

Communities Providing Information

- Park County
- The Town of Alma
- The Town of Fairplay

HIRA REFERENCES

Mitigation and other Community Protection Plans

- Piedmont, VA Hazard Mitigation Plan
- Enid, OK Hazard Mitigation Plan
- Colorado Department of Emergency Management (CDEM). *State of Colorado's Standard Hazard Mitigation Plan* (2004)
- Costilla County, Colorado Hazard Mitigation Plan
- Park County Community Wildfire Protection Plan

Websites

- Colorado State Forest Service <http://www.colostate.edu/wildfire.htm>
- Colorado Water Conservation Board <http://www.cwcb.state.co.us>
- Colorado Geological Survey <http://www.geosurvey.state.co.us>
- Colorado Division of Emergency Management <http://www.dole.state.co.us/dem.html>
- Colorado Division of Water Resources <http://www.water.state.co.us>
- Colorado Division of Reclamation, Mining and Safety <http://www.mining.state.co.us>
- Colorado Department of Transportation <http://www.dot.state.co.us>
- Park County, Colorado <http://www.parkco.us>
- The Town of Alma <http://townofalma.com/>
- The Town of Fairplay <http://www.fairplayco.us>
- National Weather Service <http://www.nws.noaa.gov>
- National Climatic Data Center <http://www.ncdc.noaa.gov>
- Federal Emergency Management Agency (FEMA). <http://www.fema.gov>
- FEMA Risk MAP Information <http://www.fema.gov/plan/ffmm.shtm>
- United States Census Bureau. *American Fact Finder*. <http://www.census.gov>
- US EPA. *Envirofacts Data Warehouse*. http://oaspub.epa.gov/enviro/ef_home2.toxics
- United States Drought Monitor <http://www.cpc.ncep.noaa.gov>
- National Earthquake Information Center <http://neic.usgs.gov>
- U.S. Army Corps of Engineers, Albuquerque District <http://www.spa.usace.army.mil>
- Water Supply Outlook <http://cbrfc.noaa.gov>
- Colorado Tornado Information http://www.crh.noaa.gov/pub/svr/tornado_page_colorado.phb
- SHELDUS (Spatial Hazards Events and Losses Database) <http://webra.cas.sc.edu/hvri/products/sheldus.aspx>

Communities Providing Data

- Park County, Colorado
- Town of Alma
- Town of Fairplay

Other Data Sources

- FEMA Flood Insurance Study – for community descriptions and flooding events
- Colorado Water Conservation Board – for flooding descriptions in Flood Investigation studies and reports

News Outlets

- *Denver Post*
- *Rocky Mountain News* (Denver, Colorado)
- *The Fairplay Flume*
- *9 News* (Denver, Colorado)

SECTION 9 APPENDIX