



Community Wildfire Protection Plan

August 2008

Prepared for:

**Clear Creek County, Colorado
Office of Emergency Management**



Submitted by:

Walsh Environmental Scientists and Engineers, LLC

4888 Pearl East Circle, Suite 108

Boulder, CO 80301

Walsh Project Number 7938-010

CWPP Certification

The Clear Creek County, Colorado Community Wildfire Protection Plan was developed in accordance with the guidelines set forth by the Healthy Forests Restoration Act (2003) and the Colorado State Forest Service's Minimum Standards for Community Wildfire Protection Plans (2004). This plan;

- was collaboratively developed – interested parties and federal land management agencies managing land in the region of Clear Creek County have been consulted; and
- identifies and prioritizes areas for hazardous fuels reduction treatments and recommends the types and methods of treatment to reduce the wildfire threat to values at risk in the county; and
- recommends measures to reduce the ignitability of structures throughout the area addressed by the plan.

The following entities mutually agree with the contents of this Community Wildfire Protection Plan:

Print, sign, date

USDA Forest Service, Clear Creek Range District

Colorado State Forest Service, Golden District

Clear Creek County Office of Emergency Management

Clear Creek Fire Authority

Executive Summary

“By failing to prepare you are preparing to fail.” ~ Ben Franklin

Wildfire is a naturally occurring and important component of the Montane and Subalpine ecosystems that dominate much of Clear Creek County (CCC), Colorado. However, since the early 20th century land and forest management practices for this same region were designed around a simple protocol, “Prevent Wildfires.” While originally intended to protect human settlement and forest resources, the practice of fire exclusion proved to be short-sighted and has led to the accumulation of hazardous fuels and weakened, overgrown timber, in these same “fire-dependent” regions. In recent years unprecedented urban and suburban expansion all along Colorado’s Front Range, including CCC, has positioned extensive development directly in the face of this growing threat of catastrophic wildfire.

This conflagration is not unique to Clear Creek County, the Front Range, or even the Rocky Mountain Region. Wildfires, losses associated with wildfires, as well as suppression costs have been growing more catastrophic nationally every year. To better address this growing crisis the federal government, since 2000, has been building a legislative framework and financial incentives to promote and assist the reduction of hazardous fuels on public and private lands around communities at risk and support the improvement of local emergency preparedness.

In order for communities to take advantage of this assistance, a Community Wildfire Protection Plan (CWPP) must be prepared. These plans assist at-risk communities, neighborhoods, and subdivisions, and address such issues as wildfire response, hazard mitigation, community preparedness, and structure protection. Completed CWPPs can be used by communities to gain access to grant funding for wildfire prevention and protection projects. They can also be used to help guide forest and land management activities on adjoining public lands.

This CWPP is essentially a strategic plan for CCC that delineates Wildland-Urban Interface (WUI) communities and neighborhoods within the county, identifies wildfire threats facing these areas, and prioritizes mitigation actions that are designed to reduce those threats. The plan also takes into account headwater resources the county maintains and recognizes downstream municipal water users located outside the primary assessment. The CCC CWPP was collaboratively developed according to the guidelines of *Preparing a Community Wildfire Protection Plan: A Handbook for Wildland-Urban Interface Communities* (Communities Committee, Society of American Foresters, National Association of Counties, National Association of State Foresters). This CCC CWPP meets the requirements of the Healthy Forests Restoration Act (HFRA) by:

- Having been developed collaboratively by multiple agencies at the state and local level in consultation with federal agencies and other interested parties;
- Prioritizing and identifying fuel reduction treatments and recommending the types and methods of treatments to protect at-risk communities and pertinent infrastructure;
- Suggesting multi-party mitigation, monitoring, and outreach;
- Recommending measures and action items that residents and communities can take to reduce the ignitability of structures; and
- Facilitating public information meetings to educate and involve the community to participate in and contribute to the development of the CWPP.

Field surveys were conducted to assess predominant community characteristics pertaining to wildfire hazards, community design, as well as structural ignitability. Survey results established relative hazard ratings for each identified WUI. Detailed neighborhood surveys also served as the basis for specific mitigation and emergency response recommendations. Comprehensive fire behavior modeling was completed to aid in the determination of which areas within the county are at highest risk of catastrophic wildfire, supporting CWPP mitigation recommendations, and providing a valuable tactical fire management tool for future wildfire incidents.

The CCC CWPP provides:

- Collaborative development of WUI boundaries within the county;
- Documentation of collaborative CWPP development activities including strategic planning meetings, public outreach, and a comprehensive summary of the results of the county questionnaire;
- A general profile analysis of CCC;
- A wildland fire primer;
- An analysis of the county's critical infrastructure;
- A regional wildfire risk assessment including historical fire occurrence;
- A comprehensive community wildfire hazard survey and hazard ranking of all identified WUIs;
- A county-wide wildfire risk analysis based on potential wildfire behavior. This analysis will utilize regional fire behavior analysis utilizing LANDFIRE data and FLAMMAP/FARSITE computer modeling;
- An integrated wildfire hazard and risk assessment of all identified WUIs within the county;

- Prioritized mitigation recommendations including fuel reduction, defensible space, and structural ignitability on a county-wide basis;
- Analysis of county emergency response capacity; and
- CWPP implementation, monitoring, and evaluation plan.

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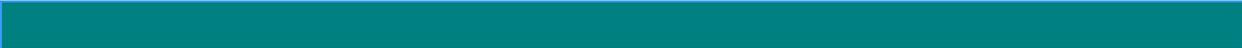
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List of Abbreviations and Acronyms

ADTC	Average Daily Traffic Count
AOP	Annual Operating Plan
BTU	British thermal unit
CAPCD	Colorado Air Pollution Control Division
CCC	Clear Creek County
CCCDC	Clear Creek County Dispatch Center
CCCOEM	Clear Creek County Office of Emergency Management
CCEMS	Clear Creek Emergency Medical System
CCFA	Clear Creek Fire Authority
CCSO	Clear Creek County Sheriff's Office
CDPHE	Colorado Department of Public Health and Environment
CF	Crown Fire
CRWB	Crew Bosses
CSFS	Colorado State Forest Service
CWPP	Community Wildfire Protection Plan
EFPD	Evergreen Fire Protection District
EFR	Evergreen Fire/Rescue
EMT	Emergency Medical Technician
ENGB	Engine Bosses
EOC	Emergency Operations Center
EOP	Emergency Operations Plan
ERC	Energy Release Component
ESD	Emergency Services District
F	Fahrenheit
FBAN	Fire Behavior Analyst
FBFM	Fire Behavior Fuel Model
FDO	Fire Duty Officer
FEMA	Federal Emergency Management Agency
FPD	Fire Protection District
FL	Flame Length
FRCC	Fire Regime Condition Class
GIS	Geographic Information System
HFRA	Healthy Forests Restoration Act
HOA	Homeowners Association
IC	Incident Command
ICS	Incident Command System
ICT	Incident Command Team
ICT3	Incident Commander Type 3
ISO	Insurance Service Office
IMT	Incident Management Team

JFDRS	Jefferson County Fire Danger Rating System
MACS	Multi-Agency Coordinating System
mph	miles per hour
NEPA	National Environmental Policy Act
NFDRS	National Fire Danger Rating System
NFPA	National Fire Protection Association
NIMS	National Incident Management System
NWCG	National Wildfire Coordinating Group
NWCG	National Wildfire Coordinating Group
POA	Property Owner Association
PPE	Personal Protective Equipment
PTB	Position Task Books
RAWS	Remote Automated Weather Stations
ROS	Rate of Spread
SOP	Standard Operating Procedure
STEN	Strike Team Leader Engine
TFLD	Taskforce Leader
US	United States
USDA	United States Department of Agriculture
USFS	United States Forest Service
WALSH	Walsh Environmental Scientists and Engineers, LLC
WFU	Wildland Fire Use
WUI	Wildland-Urban Interface

1

Introduction

1.1 The Purpose

The Community Wildfire Protection Plan (CWPP) is a strategic plan that identifies specific wildland fire risks facing communities and neighborhoods and provides prioritized mitigation recommendations designed to reduce those risks. Once the CWPP is certified and adopted, it is the community's responsibility to move forward and implement the action items and maintain the currency of the Plan's content. Implementation may require further planning at the project level, acquisition of funds, continued collaboration with public agencies, or simply motivating homeowner associations (HOA), property owner associations (POA), and individual homeowners

Community Wildfire Protection Plans are authorized and defined in Title I of the Healthy Forests Restoration Act (HFRA) passed by Congress on November 21, 2003 and signed into law by President Bush on December 3, 2003.

The HFRA places renewed emphasis on community planning by extending a variety of benefits to communities with a wildfire protection plan in place. Critical among these benefits is the option of establishing a localized definition and boundary for the wildland-urban interface (WUI) and the opportunity to help shape fuels treatment priorities for surrounding federal and non-federal lands.

The CWPP, as described in the Act, brings together diverse local interests to discuss their mutual concerns for public safety, community sustainability, and natural resources. It offers a positive, solution-oriented environment in which to address challenges such as local firefighting capability, the need for defensible space around homes and subdivisions, and where and how to prioritize land management – on both federal and non-federal land (Community Wildfire Protection Plans; Guidelines for Implementation, CSFS, No date).

The implementation of effective wildfire mitigation is a dynamic process. The characteristics of forests and interface communities are constantly changing. Flexibility is designed into the CWPP implementation process in order to accommodate this changing landscape. Regular plan maintenance and annual updates can document these changes and highlight progress.

1.2 The Need

Wildfire is a naturally occurring and important component of the Montane and Subalpine ecosystems that dominate much of Clear Creek County (CCC), Colorado. These pine forests, rangelands, and grasslands common to the western United States (US) are characterized as “fire-dependent” ecosystems that have evolved over thousands of years to be resilient to wildfire occurrence, and in the case of some species, dependent on wildfire to maintain stand health or even trigger reproduction.

Since the early 20th century land and forest management practices for these same regions were designed around a simple protocol, “Prevent Wildfires.” While originally intended to protect human settlement and forest resources, the practice of fire exclusion proved to be short-sighted. Naturally occurring fuels have accumulated to hazardous levels and historically diverse vegetation profiles have become dominated by more aggressive species affecting landscape scale ecosystems. These dense, weakened, and homogeneous stands are much more susceptible to widespread insect and pathogen infestations, as well as catastrophic scale wildfires.

Colorado’s record-setting growth has precipitated a significant population shift into these same forested regions that are at highest risk for catastrophic wildfire. With the county’s population nearly tripling since 1960, there are more structures, residents, and supporting infrastructure in fire-prone areas than ever before, directly impacting human welfare and compromising the safety of firefighters and emergency responders that serve the county.

CCC is situated in the heart of Colorado’s Redzone Interface (Figure 1). These are high hazard areas aggregated from hazard, risk, and values data through a Geographical Information System (GIS) by the Colorado State Forest Service (CSFS). In addition, all of the named communities within the county have been identified in the Federal Register as “Interface Communities within the Vicinity of Federal Lands that are at High Risk from Wildfire” (Federal Register: January 4, 2001, [Volume 66, Number 3]).

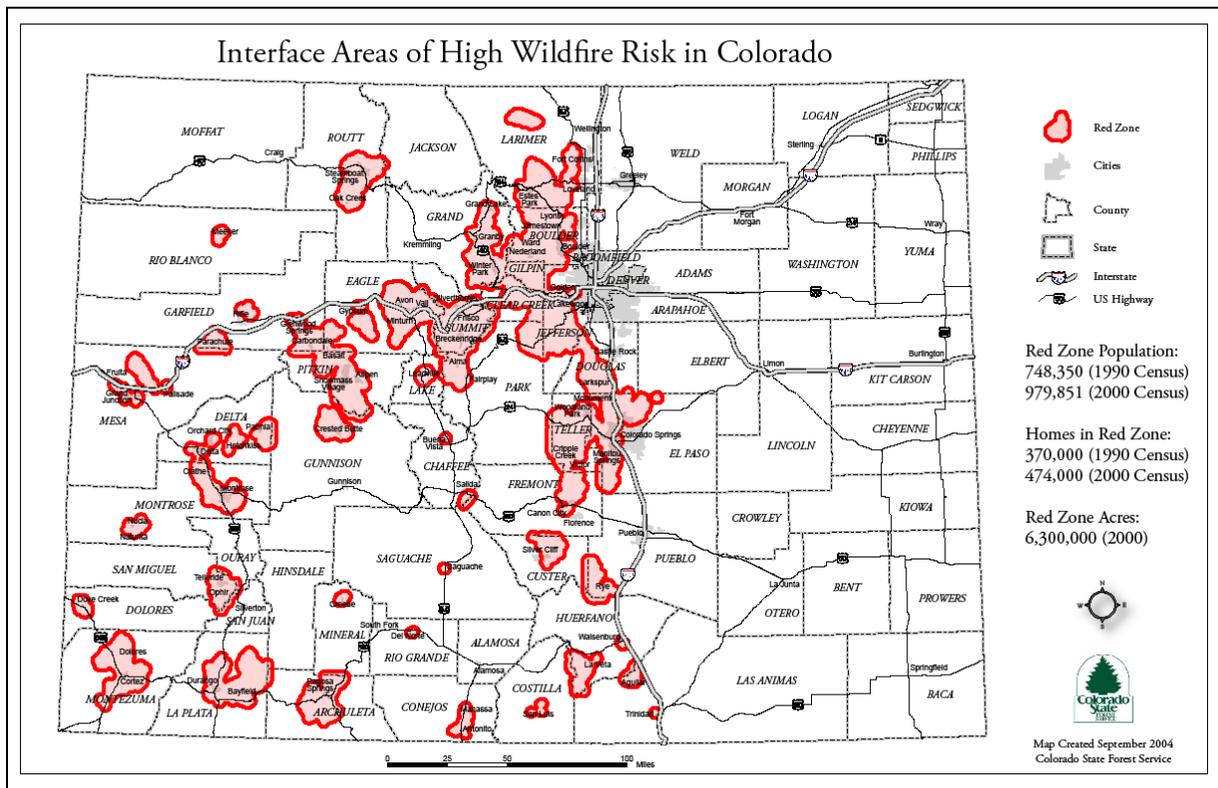


Figure 1. Colorado’s Redzone Interface

The communities, neighborhoods, and subdivisions of CCC are surrounded by public lands that are largely undeveloped and a source of vegetative fuels and wildfire risk potential. Residents of the county have demonstrated awareness of these risks, as well as the need to develop comprehensive wildfire protection plans and take action across multiple scales, from the individual home and subdivision to adjoining public lands under county, state, and federal management. The energy, input, and guidance from local residents have played an essential role in the development of this CWPP.

1.3 Project Goals and Objectives

Wildfire is a natural process within the forests, shrublands, and grasslands of CCC. While the risk of wildfire cannot be eliminated, definitive measures can be taken to mitigate the impact of *catastrophic* wildfire by reducing the fire behavior potential in areas at highest risk. The goals of this assessment are to create a collaborative environment to:

- Improve safety and welfare of residents and emergency personnel;
- Provide mitigation strategies that most effectively reduce the risk of wildfire loss to residential structures, infrastructure, and other community values at risk; and
- Recommend mitigation measures that contribute to the conservation of headwater watershed resources and other natural and economic assets.

Objectives to reach these goals include:

- Facilitate community education concerning wildfire potential, mitigation effectiveness, and community ownership of the CWPP recommendations and action plans;
- Engage affected stakeholders;
- Identify and group communities and values at risk into individual WUIs that represent common hazard factors;
- Conduct a standardized community survey for each WUI that quantifies values and hazards affecting each;
- Establish an approximate level of risk for each WUI based on community survey results;
- Conduct a scientifically based fire behavior analysis of the entire assessment area;
- Identify, prioritize, and facilitate wildfire mitigation treatments at the county level;
- Ensure that local efforts collaborate and coordinate with federal, state, and other related regional efforts; and
- Promote an improved level of emergency response.

1.4 The CWPP Process

The HFRA designed the CWPP to incorporate a flexible process that can accommodate a wide variety of community needs. This CWPP is tailored to meet specific goals identified by the Core Team, following the standardized steps for developing a CWPP as outlined in *Preparing a Community Wildfire Protection Plan: A Handbook for Wildland-Urban Interface Communities*, (Society of American Foresters 2004) and the *Colorado State Forest Service Minimum Standards for Community Wildfire Protection Plans*, (CSFS 2004). Table 1 outlines the CWPP development process.

Table 1. CWPP Development Process

Step	Task	Explanation
One	Convene Decision Makers	Form a Core Team made up of representatives from local governments, fire authorities, and the CSFS.
Two	Involve Federal Agencies	Engage local representatives of the U.S. Forest Service (USFS) and other land management agencies as appropriate.
Three	Engage Interested Parties	Contact and encourage participation from a broad range of interested organizations and stakeholders.
Four	Establish a Community Base Map	Develop a base map of the county that provides a better understanding of communities, critical infrastructure, and forest/open space at risk.
Five	Develop a Community Risk Assessment	Develop a risk assessment that considers fuel hazards, community and commercial infrastructure, resources, and preparedness capability. Rate the level of risk and incorporate into the base map as appropriate.

Step	Task	Explanation
Six	Establish Community Priorities and Recommendations	Use the risk assessment and base map to facilitate a collaborative public discussion that prioritizes fuel treatments and non-fuel mitigation practices to reduce fire risk and structural ignitability.
Seven	Develop an Action Plan and Assessment Strategy	Develop a detailed implementation strategy and a monitoring plan that will ensure long-term success.
Eight	Finalize the CWPP	Finalize the county CWPP and communicate the results to interested parties and stakeholders.

The initial step the development of the CCC CWPP is to organize an operating group that serves as the core decision-making team (Table 2). This team consists of representatives from local government, local fire authorities/districts, and the CSFS. Together, these three entities form the decision-making team responsible for the development of a CWPP as described in the HFRA. The core team members must mutually agree on the plan’s final contents. The core team should collaborate closely with relevant affected land management agencies and active community and HOA stakeholders. Collaboration between agencies and communities is an important CWPP component because it promotes sharing of perspectives, plans, priorities, and other information that are useful to the planning process. Together these entities guide the development of the CWPP as described in the HFRA.

Table 2. CCC CWPP Core Team Members

Team Member	Organization	Contact
Kathleen Gaubatz	Director, Clear Creek County Office of Emergency Management	303-679-2320
Allen Gallamore	District Ranger, Colorado State Forest Service	303-279-9757 x 302
Kelly Babeon	Chief, Clear Creek Fire Authority (CCFA)	303-674-3145

As a majority holder of managed lands within the region, activities of the USFS play a critical role in directing forest management and treatment in the county. HFRA directs the CWPP core team to consult with agency representatives throughout the planning process.

The CCC CWPP also has many critical stakeholders that are directly contributing to the development of the Plan. Details are provided in Section 4.3, Stakeholder Collaboration.

As a strategic plan, the real success of any CWPP hinges on effective and long-term implementation of the identified objectives. The CWPP planning and development process must include efforts to build a stakeholder group that serves as an implementation team and will oversee the execution of prioritized recommendations and maintain the Plan as the characteristics of the WUI change over time. Specific projects may be undertaken by individual HOAs/POAs, while larger-scale treatments may require collaboration between multiple HOAs/POAs, local government, and public land management agencies. Original CWPP Core Team representatives may, but are not required to assist in the implementation of the CWPP

action plan. Continued public meetings are recommended as a means to generate additional support and maintain momentum.

A successful CWPP utilizes relevant geographic information (e.g., GIS data) to develop a community base map. Comprehensive risk assessment is conducted at the neighborhood or community level to determine relative levels of wildfire risk to better address hazard treatment prioritization. A standardized survey methodology is utilized to create a community-based rating benchmark for comparative future assessments and project evaluations.

CWPP fuel treatment recommendations derived from this analysis were prioritized through an open and collaborative effort with the Core Team and stakeholders. Prioritized treatments target wildfire hazard reduction in the WUI communities and neighborhoods, including structural ignitability and critical supporting infrastructure. An action plan guides treatment implementation for high-priority projects over the span of several years.

The finalized CWPP represents a strategic plan with Core Team consensus that provides prioritized wildfire hazard reduction treatment projects, preferred treatment methods, a base map of the WUI, defensible space recommendations, and other information relevant to the scope of the project.

1.5 Policy Framework

This CWPP is not a legal document. There is no legal requirement to implement the recommendations herein. Actions on public lands will be subject to federal, state, and county policies and procedures such as adherence to the HFRA and National Environmental Policy Act (NEPA). Action on private land may require compliance with county land use codes, building codes, and local covenants.

There are several federal legislative acts that set policy and provide guidance to the development of the CWPP for CCC:

- HFRA (2003) – Federal legislation that promotes healthy forest and open space management, hazardous fuels reduction on federal land, community wildfire protection planning, and biomass energy production; and
- National Fire Plan and 10-Year Comprehensive Strategy (2001) – Interagency plans that focus on firefighting coordination, firefighter safety, post-fire rehabilitation, hazardous fuels reduction, community assistance, and accountability; and
- Federal Emergency Management Agency (FEMA) Disaster Mitigation Act (2000) – Provides criteria for state and local multiple-hazard and mitigation planning.

The CSFS is a valuable resource that provides education and guidance to communities and individual landowners concerned with the threat of wildfire, as well as forest resource management in the WUI. Clear Creek Fire Authority, Clear Creek Sheriff's Office Marmot Wildfire Crew and Evergreen Fire/Rescue are other excellent resources for wildfire mitigation guidance within CCC.

The CCC Annual Operating Plan (AOP) provides intergovernmental mutual aid agreements between local fire districts within the county and includes the CSFS and USFS as well as

neighboring local agencies. These plans provide emergency response infrastructure for any large incident support. (<http://www.co.clear-creek.co.us/Depts/OEM/CC%20EOP.htm>)

1.5.1 USFS Policy

The recommendations identified in the CWPP will assist the USFS in identifying and prioritizing forest treatment locations on public lands in relation to adjacent populated areas. The appropriate environmental analysis and documentation through the NEPA process for fuel treatments on USFS lands needs to be completed prior to any ground disturbing or vegetation management activities occurring. A completed CWPP does not authorize private landowners to conduct forest treatment work on USFS lands. Private land owners that own land adjacent to USFS lands may not conduct defensible space treatments on the National Forest lands without USFS permission and the NEPA process being completed. The NEPA process can take up to a year to complete once a project location has been identified.

The recreation residences on the Clear Creek Ranger District of the Arapaho-Roosevelt National Forests are scheduled to have the NEPA process completed by September 2008 for defensible space treatments within the lots of each tract. The permit holder is responsible for completing this work and protecting the recreation residence cabin from wildfire risk. No treatments should occur without USFS permission. Recreation residence home permittees are not eligible to apply for grant money to do defensible space on the lots where their cabin is located. Federal grant money cannot be used to treat fuels on federal lands. It is intended to be used on private lands (USFS, Boulder Ranger District, 2007).

1.6 County Mitigation Support, Permitting Requirements, and Resources

The single-most effective tool any community has in its arsenal to reduce the threat of wildfire is motivated homeowners who take action to reduce the ignitability of their homes and mitigate hazardous fuels to create an effective defensible space in and around where they live. There are no county regulations or state mandates that require action from current homeowners unless building an addition (400 square feet) or new outbuilding. It comes down to individual action.

In support of voluntary fuels reduction on private property, the county's Site Development Department is initiating a Volunteer Defensible Space program through the WUI Fuels Reduction Program. The program grant money, received through the CSFS, can be used to assist in reducing hazardous fuels on private property through the following:

- Monetary compensation for performing volunteer defensible space work on your property.
- Providing a free slash disposal program at the county's Transfer Station. Slash disposal will be free at the Transfer Station from May 1, 2008 through September 30, 2008.
- The county also has a 6-inch Vermeer wood chipper for participation in the Fuels Reduction Program. The wood chipper is also available for rent by citizens in CCC if they are not required to perform defensible space on their property for building purposes.

More details concerning this opportunity can be obtained through the CCC Site Development Department (303-679-2421).

Should a property change ownership, insurance companies typically require adequate mitigation prior to insuring the home. This may involve defensible space improvements and/or roofing upgrades to replace flammable shingles.

Should property or home improvements involve the county permitting process, the County's Wildfire Hazard Mitigation Plan Building Code amendment (1995) provides a framework for required improvements that directly address the importance of reducing wildfire hazards around each home.

The Defensible Space Plan will be developed by the Site Development Inspector and is explained in detail in the Department's information packet. The Site Development Inspector will also determine, at the time of the homeowner's driveway permit site visit, whether the Wildfire Hazard Point System Agreement will be required. The Building Department is then notified and the Agreement is initiated and mailed to the property owner, or to the general contractor to be completed and later submitted with the building permit documents (Clear Creek County Site Development Department).

1.7 Forest Improvement District House Bill 07-1168

The State of Colorado's Forest Improvement District law (House Bill 07-1168, which was created during the 2007 legislative session, allows for a special overlay district to be created for wildland fire mitigation. The counties of Clear Creek, Jefferson, Gilpin, and northeast Park may develop a special district to assist the counties and fire districts to meet the goals outlined within these and other CWPPs. The improvement district's objectives will be to provide a funding base for managing mitigation projects, developing grant applications for the individual communities, developing specific mitigation plans not outlined within this document, providing a contracting process for mitigation work and providing staffing/equipment for mitigation projects.

2

Clear Creek County Profile

2.1 County Overview

CCC was one of the original 17 counties created by the Colorado legislature in 1861, and is one of only two counties (along with Gilpin) to have persisted with its original boundaries unchanged. It was named after Clear Creek which runs down from the continental divide through the county. Idaho Springs was originally designated the county seat, but the county government was moved to Georgetown in 1867.

CCC lies between 6,900 and 14,240 feet elevation on the eastern flank of the Continental Divide, west of the greater Denver, Colorado metropolitan area. The county is positioned at the headwaters of Clear Creek, South Clear Creek, and Upper Bear Creek watersheds.

As of July 7, 2002, CCC's estimated permanent population was 9,528, with an annual projected growth rate of .8 percent. Of that total, 5,942 people (63 percent) lived within the unincorporated territory of the county. There are times when the temporary, ambient or visitor population exceeds the permanent population by 100,000 due to the county's frequency of use for recreational, educational and travel purposes (CCC EOP).

Five municipalities have corporate boundaries within CCC. The four municipalities of Idaho Springs, Georgetown, Empire, and Silver Plume comprise 37 percent of the county's permanent population. The fifth municipality, Central City, has extended (or "annexed") its corporate boundaries into CCC in order to surround a roadway named "Central City Parkway." However, all of Central City's residents currently live within the portion of the Central City municipal boundary that lies within Gilpin County, Clear Creek's neighboring county to the north. Each municipality, except for Silver Plume, has its own local police department. Unincorporated CCC is under the law enforcement jurisdiction of the County Sheriff (CCC EOP).

The forests, shrublands, and grasslands in CCC have adapted to a mixture of low- and high-severity fires along a broad range of historic frequencies. It is generally acknowledged that a policy of fire suppression along the Front Range has exacerbated the potential for high-intensity wildfire by increasing the density of living and dead fuels in those ecosystems.

Weather plays a critical role in determining fire frequency and behavior. A dry climate and available fuels in an area prone to strong gusty winds can turn an ignition from a discarded cigarette, vehicle parked over dry grass, or lightning into a major wildfire event in a matter of several minutes.

CCC is a desirable place to live because of diverse ecosystems, recreation, and aesthetics. However, the county is characterized by several factors that typify a hazardous WUI: aggressive development into fire-adapted ecosystems, steep topography, frequencies of natural and human-caused ignitions, hazardous fuels, prolonged drought, and dry, windy weather conditions. The diverse characteristics of each WUI neighborhood create distinct areas with unique combinations of wildfire fuels, building construction, topography, access, available resources, and opportunities for fuels mitigation.

2.2 Ownership and Demographics

Figure 2 highlights the distribution of land ownership in CCC. Of the county’s 396 square miles, only 23 percent of the land or 93.6 square miles is in private ownership. The remainder is in public ownership with the USFS as the largest public land owner with 266 square miles, or 67 percent of the total county land area.

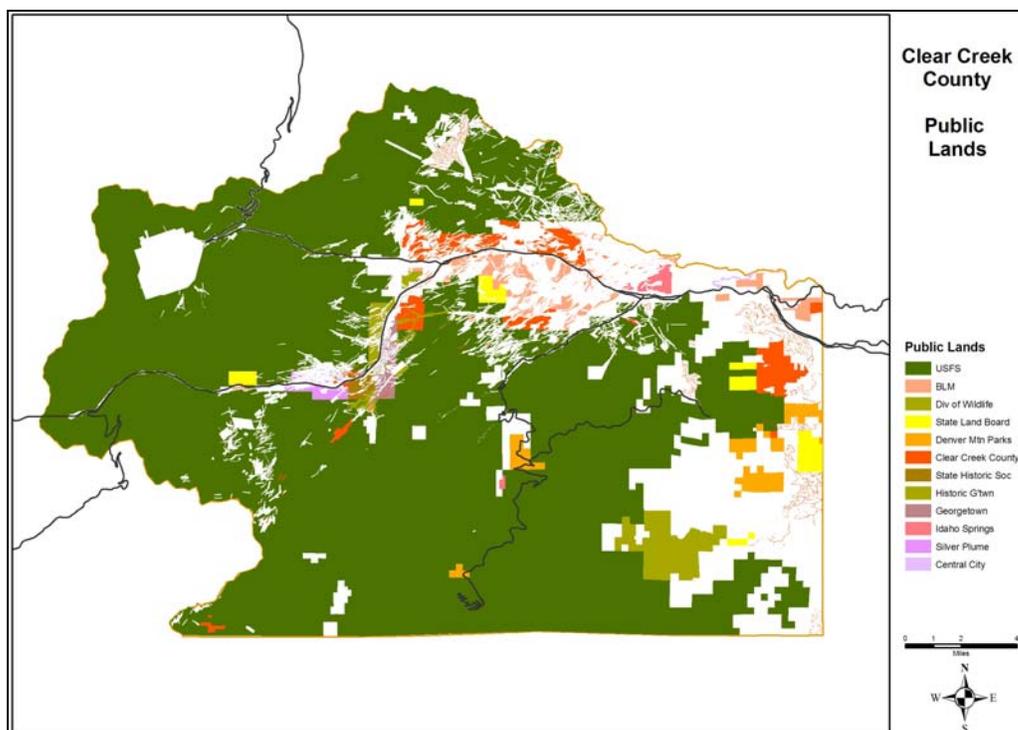


Figure 2. Clear Creek County Distribution of Land Ownership

Source: <http://www.co.clear-creek.co.us/oswebsite/LandOwnership.pdf>

2.3 Climate

With an annual average of only 16 inches of precipitation and nearly 300 days of sunshine, CCC experiences a relatively dry climate. The majority of precipitation occurs during heavy spring snows and late summer monsoon rains (Table 3). The county’s high elevation and proximity to the continental divide play major roles in moderating summertime temperatures and deepening the chill of winter. Fire weather conditions are discussed in Section 5.4.

Table 3. Average Monthly Climate Summary (1971 – 2007, Georgetown, CO)

Climate Attribute	Month												Annual
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Avg. Max. Temp. (F)	37.9	41.1	45.6	50.0	61.4	70.9	77.2	76.1	68.4	58.0	44.5	38.0	55.9
Avg. Min. Temp. (F)	15.3	17.2	20.3	25.5	33.8	41.1	46.3	47.2	39.1	29.1	19.8	13.8	29.1
Avg. Total Precip (in)	0.78	0.81	1.18	2.03	1.83	1.49	2.02	2.05	1.40	0.92	0.90	0.73	16.14

Source: High Plains Regional Climate Center (<http://hprcc.unl.edu/index.php>)

2.4 Topography

Topographic characteristics of an area include slope, aspect, and elevation. These factors play an important role in dictating dominant vegetation as well as fire behavior. In mountainous areas, such as CCC, the topography strongly influences community design, which is a major factor in a community’s wildfire hazard determination. The topographic features within the county may be best described as “significant” with glacially carved terrain and elevations that range from 6,920 on the eastern boundary with Evergreen, Colorado to 14,240 along the continental divide, which defines its rugged western and northern boundaries (Figure 3). The older historic communities within the county are generally located along broader valley floors, which provided easier access to transportation, water, and other resources. Over the years, newer subdivisions have been constructed in less convenient, harder to reach locations, with minimal water resources, complicating access for residents as well as emergency response.

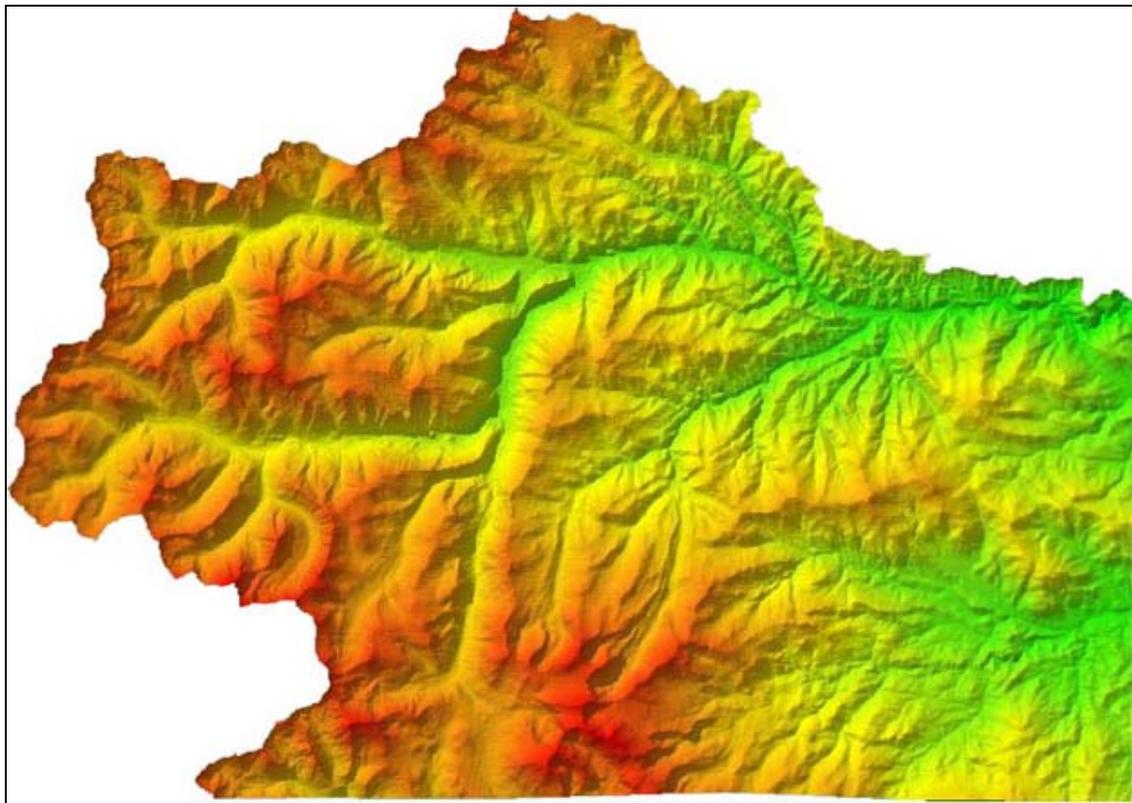


Figure 3. Clear Creek County Elevation Map

2.5 Vegetation

The CCC region encompasses three unique elevation ecosystems: the Montane, the Subalpine, and the Alpine (Figure 4). Variation in vegetation communities relates not only to elevation, but also to slope, slope aspect, drainage, available moisture, exposure to wind, amount and type of soil, occurrence of fire or other major disturbances, and other factors.

Ecosystem boundaries are typically characterized by gradual species transitions rather than clear-cut points. However each ecosystem has some plants and animals that are typically found within its limits.

Existing vegetation is the fuel source for wildland fire and has a direct effect on fire behavior. Accurately mapping vegetative ground cover is a critical component of fuel modeling and fire behavior modeling (Figure 5). Understanding the fire behavior characteristics of particular fuel types facilitates effective fuels treatment strategies on a local, as well as landscape, level. Detailed analysis of fire behavior and fuel models is detailed in Section 5.4.

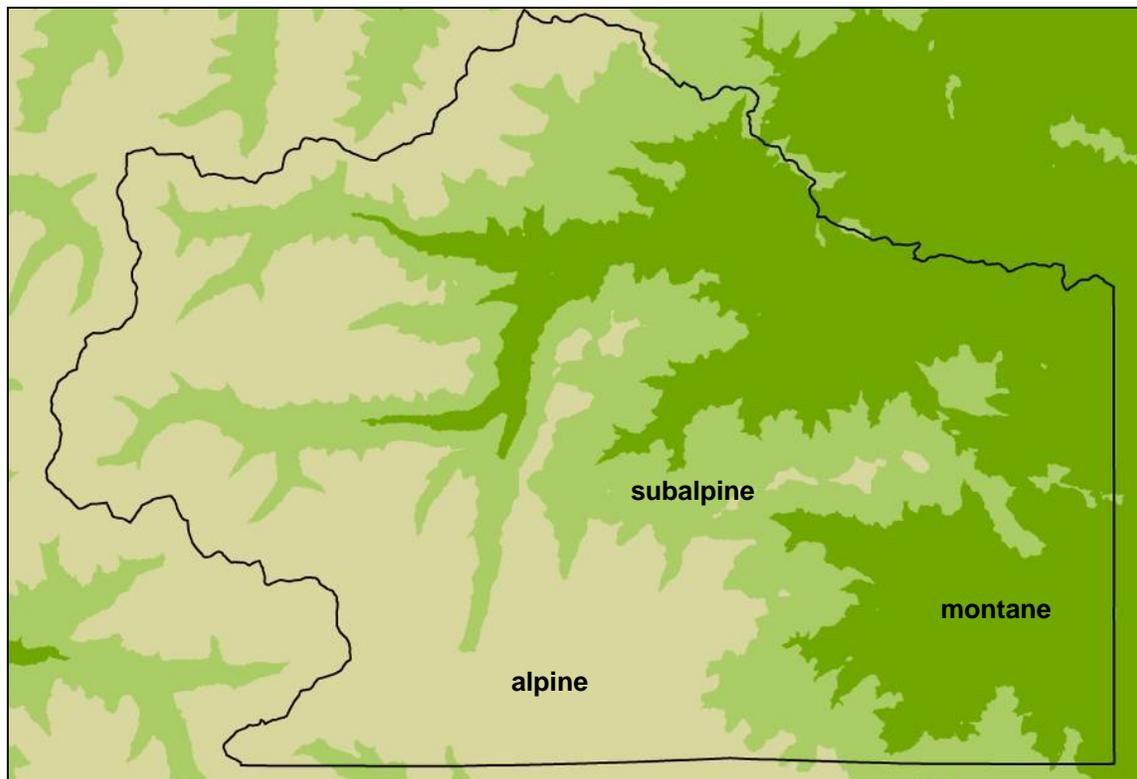


Figure 4. Distribution of Montane, Subalpine, and Alpine ecosystem zones within Clear Creek County

The **Montane Ecosystem** occurs at elevations between approximately 5,600 and 9,500 feet. Dry, south-facing slopes of the Montane often have open stands of large ponderosa pines. Spacing of ponderosa pines is somewhat related to available soil moisture. Grasses and shrubs may grow between the widely spaced trees on dry slopes.

North aspects of the Montane ecosystem retain more soil moisture and support denser stands of conifer that are less drought resistant. The trees may be a mixture of Douglas fir, Lodgepole pine, Ponderosa pine and an occasional Engelmann spruce. Shade-tolerant plants may grow on the forest floor.

Montane soils with high moisture content may support groves of quaking aspen, whose leaves turn golden-yellow in the autumn and whitish bark are easy to recognize. Along streams or the shores of lakes, other water-loving small trees may be found. These include various willows, mountain alder, and water birch with dark-colored bark. In a few places, blue spruce may grow near streams and sometimes hybridize with Engelmann spruce. Flat Montane valleys may frequently have water-logged soil and be unable to support growth of evergreen forests.

Trees common to CCC's Montane Ecosystem include Ponderosa pine, Douglas fir, Lodgepole pine, and Quaking aspen. Common shrubs include Antelope Bitterbrush, Kinnikinnick, Common Juniper, Holly Grape, Wax Currant, Big Sage, and Rocky Mountain juniper.

The **Subalpine Ecosystem** occupies elevations approximately between 9,000 and 11,000 feet. A typical subalpine forest may consist mostly of Subalpine fir and Engelmann spruce. However, previously-burned or disrupted areas may contain varying amounts, or even almost pure stands,

of Lodgepole pine. Lodgepole seedlings do well in sunlight and are often abundant after a stand replacement event such as fire or de-forestation. However once the forest is re-established, plant succession may result in increasing amounts of spruce and Subalpine fir.

Ground cover in a previously-burned forest area often includes two species of huckleberry. Limber pine may also be a part of subalpine forests. Engelmann spruce and Subalpine fir, which grow straight and tall in the lower subalpine forests, become shorter and deformed nearer treeline. At treeline, tree seedlings may germinate on the lee side of rocks and grow only as high as the rock provides wind protection. Further growth is more horizontal than vertical; and additional rooting may occur where branches contact the soil. The resulting low growth of dense trees is called krummholz. Well-established krummholz trees may be several hundred to a thousand years old.

Trees common to CCC's Subalpine Ecosystem include Subalpine fir, Engelmann spruce, Limber pine. Shrubs common the Subalpine zone include Blueberry, Cinquefoil, Wax Currant, Elder, and Wood's Rose.

The **Alpine Ecosystem**, starting at elevations of 11,000 to 11,500 feet, completes the county's suite of vegetation ecosystems. While wildfire is rare at these high elevations, mention of its associated plants types is warranted. Extreme weather conditions with strong, frequent winds and cold temperatures help limit what plants can grow there. Most alpine plants are perennial grasses and forbs but willows may be found in protected ravines and shallow drainages. Cushion plants, looking like ground-hugging clumps of moss, escape the strong winds blowing a few inches above them. Where tundra soil is well-developed, grasses and sedges are common. Non-flowering lichens cling to rocks and soil.

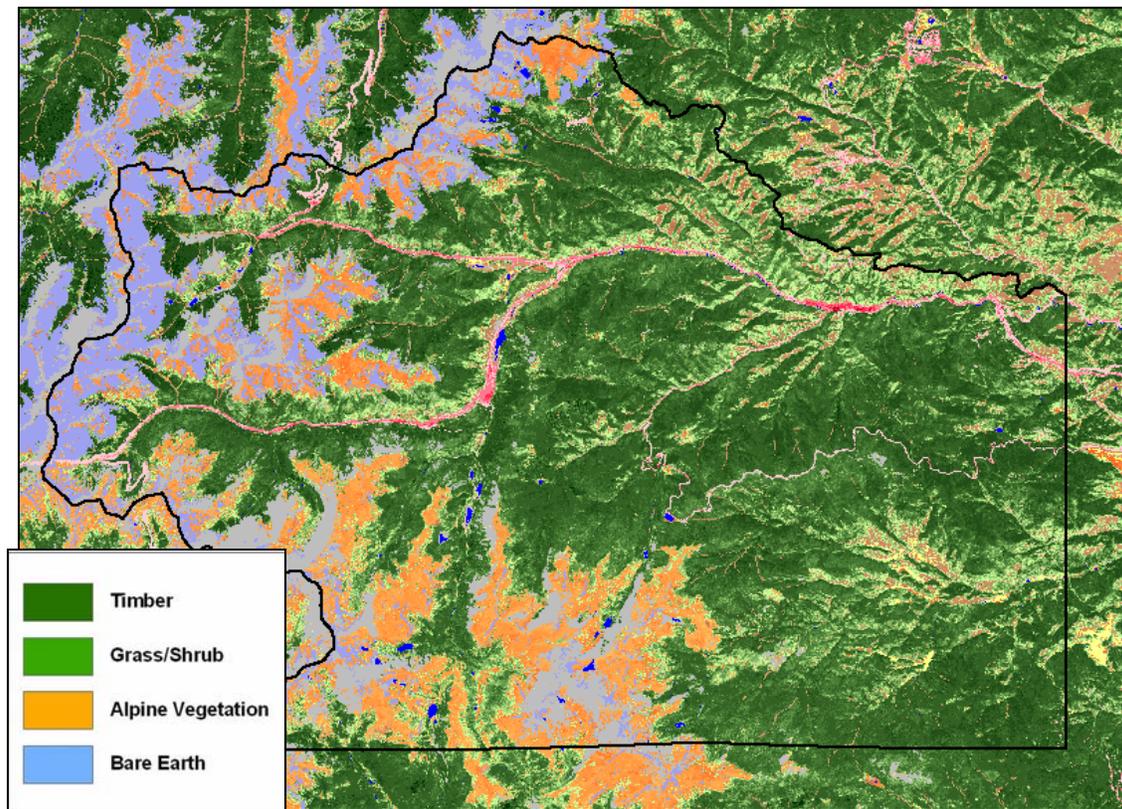


Figure 5. Vegetation Distribution Within Clear Creek County

Source: LandFire

2.6 Natural Resources

Natural resources within the county have played a pivotal role in the region's infrastructure and economic development since the first discovery of gold in the spring of 1859 near the junction of Chicago and Clear Creeks. Towns soon took shape in support of 17 original mining districts with Georgetown-Silver Plume, Empire, Lawson-Downieville-Dumont, and Idaho Springs remaining today.

Today the dramatic backdrop of the Rocky Mountain Continental Divide and the proximity of Interstate Highway 70 (I-70) provide easy access to year-round outdoor recreation opportunities. Mining, while greatly diminished from the gold rush era of the 1800s, continues to be a significant force within the county. In operation since 1976, the Henderson Mine is now the largest primary producer of molybdenum in the world.

With numerous downstream municipalities, towns, cities, and commercial enterprises depending on a continuous source for potable water, the county's most critical natural resource may be its unique geographical position as the source headwaters for the greater Clear Creek watershed area (Figure 6).

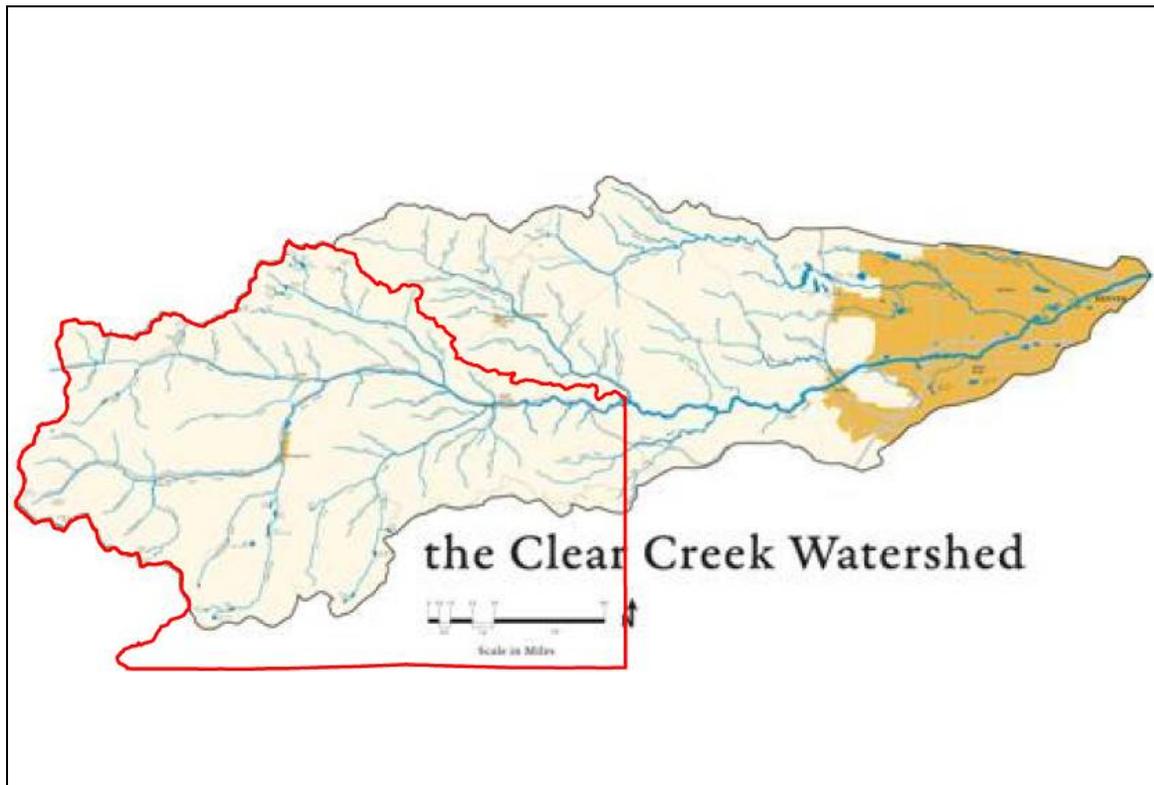


Figure 6. Proximity of Clear Creek County and the headwaters of the Clear Creek Watershed

2.7 Transportation

With an average daily traffic count (ADTC) of over 32,000 vehicles, the I-70 corridor that traverses the county is one of the two most significant interstate traffic corridors in Colorado (<http://www.dot.state.co.us/Eisenhower/trafficcounts.asp#2007>). This high traffic count continues to climb every year despite the extreme elevation of over 11,000 feet at the east portal of the Eisenhower/Johnson Memorial Tunnel. It is estimated that I-70 is responsible for facilitating the generation of over \$830 million in state revenue. In addition, 23 percent of Colorado's tourism tax revenue, the state's second largest economic driver, is generated in the nine counties directly on or impacted by I-70, including CCC (Vail Daily 9/11/2007).

US Highway 40 provides additional routing through the county and traverses Berthoud Pass at an elevation of 11,300 feet before descending into the Frasier Valley and Grand Lake area. ADTC volume (CDOT 2006) over the pass is nearly 7,000 vehicles.

Prior to the construction of the Eisenhower/Johnson Memorial Tunnel in the 1970s, traffic on I-70 had to navigate Loveland Pass (elevation 11,990) to gain access to the western slope of the state. Today, US Route 6 provides a scenic alternative and a required route for oversized and hazardous loads that are restricted from the tunnel. ADTC on the east side of the pass is over 1,300 vehicles.

Major highway systems provide rapid transit through the county but rural access outside of these primary and secondary corridors is typically hampered by extreme topography (Figure 7). Road networks often provide anchor points or pre-existing control lines for fire suppression activities.

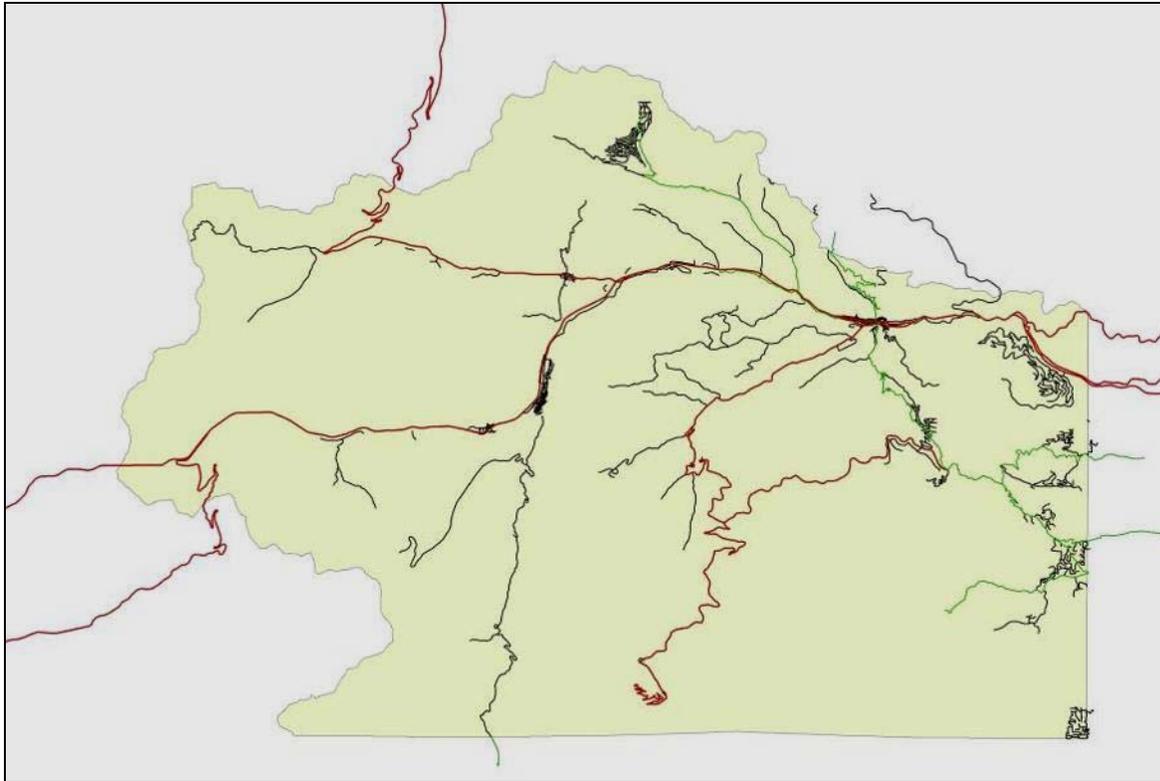


Figure 7. CDOT County Transportation Infrastructure Map With Local, County, State, and Federal Road Networks Within Clear Creek County

2.8 Tourism

Tourism provides one of the most critical financial components to the county’s economy. With its early mining heritage dating long before Colorado obtained statehood, the county hosts and maintains a colorful history that includes the old mining towns of Silver Plume, Georgetown, Empire, and Idaho Springs. Year-round outdoor recreation abounds with 14,000 peaks and vast tracks of National Forest hosting skiing, rafting, camping hiking, hunting, fishing, and biking opportunities, to name a few (Figure 8).

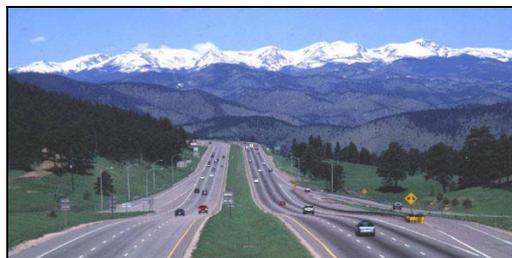


Figure 8. Year-round Tourism is an Important Component of the Clear Creek County Economy

Photo by Ron Ruhoff www.clearcreekcounty.org

Forest health directly contributes to this important bottom line. Any negative visual impacts from infestation or large-scale wildfire would have an immediate detrimental economic effect.

2.9 Insurance Service Office Fire Hazard Ratings

The Insurance Service Office (ISO) provides fire and wildfire hazard assessment services for residential and commercial property insurers to help establish a standardized basis for appropriate fire insurance premiums. Over 44,000 fire-response jurisdictions are regularly assessed for up-to-date information concerning a community's fire protection services. The Fire Suppression Rating Schedule provides a standardized methodology for reviewing the fire fighting capabilities of individual communities. The schedule measures major elements of a community's fire-suppression capacity and develops a numerical grading known as a Public Protection Classification. Ratings range from 1 (best) to 10 (worst). These ratings are established based on the following factors and are developed independent of any findings developed in the CWPP process:

- **Fire alarms**
Ten percent of the overall grading is based on how well the fire department receives fire alarms and dispatches its fire-fighting resources.
- **Engine companies**
Fifty percent of the overall grading is based on the number of "engine companies" and the amount of water a community needs to fight a fire. This includes suppression resource distribution, equipment maintenance, available personnel, and training.
- **Water supply**
Forty percent of the grading is based on the community's water supply. In urban interface settings where a municipal water supply is available, the water supply is assessed for fire suppression capacity beyond daily maximum consumption, as well as the distribution of fire hydrants. In rural areas, documenting the ability to provide a continuous water supply to fire fighting apparatus through a water tender relay may suffice.

The current ISO ratings for various areas within the Clear Creek Fire Authority range from 6, in areas serviced by a municipal water supply to 10, in isolated subdivisions with no available emergency water resources.

Source: www.clearcreekfire.com

3

Wildland Fire Management Primer

3.1 Introduction

Wildland fire is defined as any fire burning in wildland fuels and includes prescribed fire, Wildland Fire Use (WFU), and wildfire. Prescribed fires are planned controlled fires ignited by land managers to accomplish specific natural resource improvement objectives. Fires that occur from natural causes, such as lightning, that are then used to achieve management purposes under carefully controlled conditions with minimal suppression costs are known as WFU. Wildfires are unwanted and unplanned fires that result from natural ignition, unauthorized human-caused fire, escaped WFU, or escaped prescribed fire.

Wildland fires may be further classified as ground, surface, or crown fires. Ground fire refers to burning/smoldering materials beneath the surface including duff, tree or shrub roots, punchy wood, peat, and sawdust that normally support a glowing combustion without flame. Surface fire refers to loose fuels burning on the surface of the ground such as leaves, needles, and small branches, as well as grasses, forbs, low and medium shrubs, tree seedlings, fallen branches, downed timber, and slash. Crown fire is a wildland fire that moves rapidly through the crowns of trees or shrubs.

When assessing wildfire hazard and risk, wildfire hazard refers to vegetation or wildland fuel in terms of its contribution to problem fire behavior and its resistance to control. Risk is the probability of an actual ignition of wildland fuels. Values at risk include human welfare, infrastructure, structures, and natural resources that are likely to suffer long-term damage from the direct impacts of a wildfire.

3.2 Wildland Fire Behavior

Fire behavior is the manner in which a fire reacts to the influences of fuel, weather, and topography. Fire behavior is typically modeled at the flaming front of the fire and described most simply in terms of fireline intensity (flame length) and in rate of forward spread. The implications of observed or expected fire behavior are important components of suppression strategies and tactics, particularly in terms of the difficulty of control and effectiveness of various suppression resources. The Hauling Chart (Table 4) is an excellent tool for measuring the safety and potential effectiveness of various fireline resources given a visual assessment of active flame length. It was so named because it infers the relative intensity of the fire behavior to trigger points where hauling various resources to or away from an incident should be considered.

Table 4. Hauling Chart Interpretations

Flame Length (Feet)	Fireline Intensity (BTU/Ft/Sec)	Interpretation
0-4	0-100	Persons using handtools can generally attack fires at the head or flanks. Handline should hold the fire.
4-8	100-500	Fires are too intense for direct attack on the head by persons using handtools. Handline can not be relied on to hold fire. Equipment such as dozers, engines, and retardant aircraft can be effective.
8-11	500-1,000	Fires may present serious control problems such as torching, crowning, and spotting. Control efforts at the head of the fire will probably be ineffective.
11+	1,000+	Crowning, spotting, and major runs are common, control efforts at the head of the fire are ineffective.

Source: *Fireline Handbook Appendix B*

Fire risk is the probability that wildfire will start from natural or human-caused ignitions. Fire hazard is the presence of ignitable fuel coupled with the influences of topography and weather, and is directly related to fire behavior. Fire severity, on the other hand, refers to the immediate effect a fire has on vegetation and soils.

The characteristics of fuels, topography, and weather conditions combine to dictate fire behavior, rate of spread, and intensity. Wildland fuel attributes refer to both dead and live vegetation and include such factors as density, bed depth, continuity, density, vertical arrangement, and moisture content. Structures with flammable materials are also considered a fuel source.

Fuels are often characterized in terms of fire behavior fuel models, which are discussed in Sections 3.4 and 3.5. Fuels may also be described in terms of size. The terms one-hour, ten-hour, one-hundred-hour, and one-thousand-hour timelag fuels refer to the amount of time required for the water content of the fuel particle to reach equilibrium with the ambient environment. This timelag corresponds to the diameter of the fuel particle. Each size class is individually described in the List of Fire Behavior Terms in Appendix A.

When fire burns in the forest understory or through grass, it is generally a surface fire. When fire burns through the canopy of vegetation, or overstory, it is considered a crown fire. The vegetation that spans the gap between the forest floor and tree crowns can allow a surface fire to become a crown fire and is referred to as ladder fuel.

3. *Wildland Fire Management Primer*

For fire to spread, materials such as trees, shrubs, or structures in the flame front must meet the conditions of ignitability. The conditions needed are the presence of oxygen, flammable fuel, and heat. Oxygen and heat are implicitly available in a wildland fire. However, if the potential fuel does not meet the conditions of combustion, it will not ignite. This explains why some trees, vegetation patches, or structures may survive a wildland fire and others in the near vicinity are completely burned.

Potential surface fire behavior may be estimated by classifying vegetation in terms of fire behavior fuel models (FBFMs) and using established mathematical models to predict potential fire behavior under specific climatic conditions. In this analysis, FBFMs were derived from the federal LANDFIRE project which is developing consistent and comprehensive maps and data describing vegetation, wildland fuels, and fire regimes across the United States.

Climatic conditions were derived from local weather station records. Weather conditions such as high ambient temperatures, low relative humidity, and windy conditions favor fire ignition and high-intensity fire behavior. Under no-wind conditions, fire burns more rapidly and intensely upslope than on level terrain. The affects of terrain can be particularly pronounced in steep narrow canyons often referred to as “chimneys” due to their convective characteristics. Wind tends to be the driving force in fire behavior in the most destructive WUI fires. The “chinook” winds common along the Front Range can rapidly drive wildfire downslope.

3.3 History of Wildfire

Lightning-induced fire is a historic component of CCC ecosystems, and its occurrence is important to maintaining the health of forest and open space ecosystems. Native Americans used fire as a tool for hunting, improving wildlife habitat, and land clearing. As such, many of the plant species and communities have adapted to recurring fire through phenological, physiological, or anatomical attributes. Some plants, such as Lodgepole pine and western wheatgrass, require reoccurring fire to exist.

European settlers, land use policy, and changing ecosystems have altered fire behavior and fuels accumulation from their historic setting. Euro-American settlers in CCC changed the historic fire regime in several interrelated ways. The nature of vegetation (fuel) changed because of land use practices such as homesteading, livestock grazing, agriculture, water development, mining, and road construction. Livestock grazing reduced the amount of fine fuels such as grasses and forbs, which carried low-intensity fire across the landscape. Mining activities lead to large scale deforestation and removal of individual stands that formed the historical forest mosaic. Homogeneous stands of same-aged lodgepole replaced these diverse stands and then fell under decades of fire exclusion management policies. Today these aging contiguous stands lack species diversity and are very susceptible to widespread infestation. The removal of the natural vegetation also facilitates the invasion of nonindigenous grasses and forbs, some of which create more flammable fuel beds than their native predecessors.

In addition, more than a century of fire-suppression policy has resulted in large accumulations of surface and canopy fuels in western forests and brushlands. Fuel loads also increased as forests and brushlands encroached into grasslands as a result of fire exclusion. This increase in fuel loading and continuity has created hazardous situations for public safety and fire management,

3. Wildland Fire Management Primer

especially when found in proximity to communities. These hazardous conditions will require an array of mitigative tools, including prescribed fire and thinning treatments.

3.4 Prescribed Fire

Prescribed fire may be used as a resource management tool under carefully controlled conditions. This includes pre-treatment of the fuel load and close monitoring of weather and other factors. Prescribed fire ultimately improves wildlife habitat, helps abate invasive vegetation, reduces excess fuel loads, and lowers the risk of future wildfires in the treatment area. These and other fuel management techniques are employed to protect human life, economic values, and ecological values. The use of prescribed fire in the WUI is carefully planned and enacted only under favorable weather conditions, and must meet air quality requirements of the Colorado Department of Public Health and Environment (CDPHE) Air Pollution Control Division (CAPCD). Open burning permits are obtained from the CCFA.

Prescribed fire may be conducted either in a defined area, as a broadcast burn, or in localized burn piles. Broadcast burns are used to mimic naturally occurring wildfire but only under specific weather conditions, fuel loads, and expert supervision. Burn piles are utilized to dispose of excess woody material after thinning if other means of disposal are not available or are cost-prohibitive.

3.5 Hazardous Fuels Mitigation

Wildfire behavior and severity are dictated by fuel characteristics, weather conditions, and topography. Because fuel is the only variable of these three that can be practically managed, it is the focus of many mitigation efforts. The objectives of fuels management may include reducing surface fire intensity, reducing the likelihood of crown fire initiation, reducing the likelihood of crown fire propagation, and improving forest health. These objectives may be accomplished by reducing surface fuels, limbing branches to raise canopy base height, thinning trees to decrease crown density, and/or retaining larger fire-resistant trees.

By breaking up vertical and horizontal fuel continuity in a strategic manner, fire suppression resources are afforded better opportunities to control fire rate of spread and contain wildfires before they become catastrophic. In addition to the creation of defensible space, fuel breaks may be utilized to this end. These are strategically located areas where fuels have been reduced in a prescribed manner, often along evacuation routes and access community access roads. Fuelbreaks may be strategically placed with other fuel breaks or with larger-area treatments. When defensible space, fuel breaks, and area treatments are coordinated, a community and the adjacent natural resources are afforded an enhanced level of protection from wildfire.

Improperly implemented fuel treatments can have negative impacts in terms of forest health and fire behavior. Aggressively thinning forest stands in wind-prone areas may result in subsequent wind damage to the remaining trees. Thinning can also increase the amount of surface fuels and sun and wind exposure on the forest floor. This may increase surface fire intensity if post-treatment debris disposal and monitoring are not properly conducted. The overall benefits of properly constructed fuel breaks are, however, well documented.

The WUI is the zone where communities and wildland fuel interface, and is the central focus of this CWPP. Every fire season catastrophic losses from wildfire plague the WUI. Homes are lost,

3. Wildland Fire Management Primer

businesses are destroyed, community infrastructure is damaged, and, most tragically, lives are lost. Precautionary action taken before a wildfire strikes often makes the difference between saving or losing a home. Creating a defensible space around a home is an important component in wildfire hazard reduction. Providing an effective defensible space can be as basic as pruning trees, applying low-flammability landscaping, and cleaning up surface fuels and other fire hazards near a home. These efforts are typically concentrated within 75 feet of a home but may significantly vary based on percent of slope adjacent to the structure. Recommended guidelines for creating effective defensible space are outlined in CSFS bulletin 6.302. Defensible space is defined as an area around a structure where fuels have been treated; thinned; or removed in order to reduce wildfire intensity as it moves towards a structure, reduce the chances of a structure fire moving to the surrounding wildlands, and to provide room for firefighters to do their jobs (see Section 7.2).

While reducing hazardous fuels around a structure, it is very important to prevent fire loss. Recent studies indicate that, to a great extent, the attributes of the structure itself determine ignitability. Experiments suggest that even the intense radiant heat of a crown fire is unlikely to ignite a structure that is more than 30 feet away as long as there is no direct flame impingement (Cohen and Saveland 1997). Studies of home survivability indicate that homes with noncombustible roofs and a minimum of 30 feet of defensible space had an 85-percent survival rate. Conversely, homes with wood shake roofs and less than 30 feet of defensible space had a 15-percent survival rate (Foote 1996).

4.2 Community Outreach

The success of any CWPP is dependent upon community involvement for both strategic input and long-term ownership and implementation. A plan that accurately reflects the community's interests, concerns, and priorities will have greater legitimacy and long-term success. The outreach strategy this CWPP employed was a multi-tiered approach to engage interested parties, raise public awareness, and generate public input for mitigation recommendations and action plan through:

- CCC landowner questionnaire;
- Community-based meetings; and
- County web site posts.

Goal

The goal of the community involvement activities for the CCC CWPP was two-fold, 1) to inform the community of the project, and 2) to stress the value of their input during the information-gathering phase and during the comment phase of the draft Plan. Since this is a community-based plan, it was essential to obtain as much information as possible about the perceptions, concerns, and issues of residents and landowners in the WUI areas, as well as other watershed stakeholders. The primary means of collecting community input was through a distributed questionnaire and through a series of public meetings.

4.2.1 Questionnaire Strategy

The purpose of the landowner survey was to gain information about how landowners in the county perceive the potential risk of wildfire and their attitudes towards risk reduction and preparedness strategies. The survey results may be used to focus public outreach activities aimed at wildfire risk reduction and loss prevention. Additional benefits of the survey include educating and informing the public, incorporating public values into decision-making, improving the quality of decisions, and building trust in this planning process.

- Tri-fold project flyer and questionnaire – 4,000 bulk mailed to homeowners and property owners in the WUI areas of the Clear Creek Fire Authority (mailed 10/19/07)
 - Brief project overview and community involvement overview
 - Meeting announcements
 - Project contact information
 - Questionnaire
 - Listing ways to submit questionnaire and/or get more information
- Newspaper insert – 2,000 copies of same flyer/questionnaire inserted in October 24, 2007 *Clear Creek Courant*
- Mailed to HOAs/POAs (25)
- Ad in October 24, 2007 and October 31, 2007 *Clear Creek Courant*
- Calendar listings in October 24, 2007 and October 31, 2007 *Clear Creek Courant*
- *Other Voices* article in October 24, 2007 *Clear Creek Courant*
- Emails to HOAs and other stakeholders (approximately 300)
- Meeting notices posted in local shops, businesses, restaurants, etc. in Silver Plume, Georgetown, Empire, Dumont, Idaho Springs (approximately 50)

4. Community Outreach and Collaboration

- Project page on CCC website
- Questionnaire drop-box at Safeway (October 19 through November 30)

Results from over 225 responses are tabulated and summarized in Appendix E.

4.2.2 Community Meetings

Two sets of public meetings were organized, four meetings total. The first set was held early on in the project to obtain preliminary community/stakeholder input (via presentations, questions/answers, interactive mapping, and questionnaires); the second set held after the release of the draft Plan in order to collect final comments. For each set of meetings, one meeting was scheduled for the eastern end of the county and one at the western end, both following the same format and agenda. The meetings were held at locations and times considered convenient for the working public and pizza and beverages were provided. Overall, the meetings were successful with positive information exchange and impressive attendance – approximately 50 participants at each meeting (Figure 10).

A series of community meetings are incorporated into the county's CWPP development process. Locations were chosen to accommodate residents living in both the eastern and western regions of the county. Two sets of meetings were held. The first addressed the initial wave of public interest generated by the survey questionnaire. The meetings provided a forum through which to involve residents in discussing the CWPP process, the effectiveness of fuel reduction, available resources, public perception of values, hazards and risks, and other questions or concerns they had related to emergency services and fire agency response. The second set of meetings was designed to accommodate discussion of the draft report that was posted for public review.



Figure 10. Clear Creek County Residents And Landowners Review Project Base Maps

4.3 Stakeholder Collaboration

Integral in the planning and development process of the CCC CWPP has been the active involvement of a core stakeholder group (Table 5). This group worked closely with the Core Team and provided strategic and tactical guidance and support relating to all facets of the

4. Community Outreach and Collaboration

development process. This is the intention of the CWPP process that this group be extended over time to include other land management agencies.

Table 5. Core Stakeholder Team

Team Member	Organization	Contact
Rick Albers	CCC SO	303-679-2380
John Chapman	Southern Rockies Conservation Alliance	
Donna Kline	CCC OEM	3003-679-2364
Chris Crouse	Clear Creek Watershed Foundation	303-567-2699
Einar Jenson	Evergreen FPD	
Ed Rapp	Clear Creek Watershed Foundation	
Matt Taylor	CCC GIS	
Lisa Vogel	CCC Lands	
Tim Vogel	CCC Site Development	

Because of the county’s unique location at the apex of the state’s central access through the Continental Divide, the values-at-risk component of this CWPP takes on a greater sense of urgency and importance than what other fire-prone areas contend with. These values include economic impacts to commerce and other resources that would be negatively impacted in the event of interruption due to a large scale wildfire. Downstream watershed impacts to major municipal water supplies, disruption of major electrical high transmission supply lines, and major commerce impacts on a national scale if transportation flow is interrupted on I-70, all have to be considered in a comprehensive county assessment (Table 6).

Table 6. Municipal, Commercial, and Downstream Stakeholders

Organization/Agency	Primary Contact	Contact
Standley Lake Cities	Shelley Stanley	303-679-2377
City of Golden	Anne Beierle	303-384-8153
City of Arvada	Jim McCarthy	720-898-7765
City of Northglenn	Shelley Stanley	303-679-2377
City of Westminster	Mary Sabiezius	303-430-2400 x2137
Lookout Mountain Sanitation		
CDOT	Saeed Sohbi	
XCEL Energy	Steve Smith	
Climax - Henderson Mine	Bryce Romig	(303) 569-3221 x 1204
Loveland Ski Area	Ken Abrahamson	
Denver Water Board		
Front Range Watershed Working Group	Mary Sabiezius	303-430-2400 x2137

4. Community Outreach and Collaboration

The county is also home to 266 square miles of National Forest that is managed by the USFS. These lands have always been a valued resource to the county with local timber enabling the early and rapid development of the region’s mines and towns. Today these forested lands attract throngs of recreational enthusiasts who help drive the county’s tourist industry. However, just within the last few years, this critical resource has come under serious threat of attack from the mountain pine beetle. Closer collaboration with USFS foresters, planners, and fire managers is necessary to better coordinate treatment strategies and facilitate an accurate and informative flow of information to residents and the general public (Table 7).

Table 7. Local USFS Consultative Contacts

Team Member	USFS Department	Contact
Mark Martin	Planner, South Zone	303-254-6409
Dave Niemi	Fire Management Officer	303-541-2520
Dave Buchanan	Asst Fire Manager Officer	303-541-2518
Dan Lavato	District Ranger, Clear Creek Ranger District	303-567-3000

5

Community Assessment

5.1 Methodology

A comprehensive community wildfire assessment takes into account a wide variety of factors in order to fully identify and assess wildfire risks and hazards its residents face. These include the proximity of hazardous fuels, predicted fire behavior, fire occurrence, as well as the predominant characteristics of neighborhood that would influence fire behavior, effectiveness of emergency response, evacuation, and the potential for structural ignition. By carefully analyzing all elements, including input from residents, a very accurate hazard model can be developed that provides valuable guidance for developing effective mitigation recommendations and logical treatment prioritization.

The assessment area for this CWPP is defined by the boundary of CCC, Colorado. The CWPP Task Force and county residents identified 43 communities, neighborhoods, and subdivisions within the assessment area through collaborative strategic planning and community meetings. These include eight communities located in CCC that were assessed as a part of the Evergreen FPD CWPP project. The interface zones vary greatly in size, density, and geography but standardized assessments were conducted for each that are consistent with the assessments conducted for the communities within the Evergreen FPD.

According to the Federal Register: January 4, 2001 (Volume 66, Number 3, Page 753), the WUI community exists where humans and their development meet or intermix with wildland fuel. There are three categories of communities that meet this description.

5. Community Assessment

Category 1. Interface Community: The Interface Community exists where structures directly abut wildland fuels. There is a clear line of demarcation between residential, business, and public structures and wildland fuels. Wildland fuels do not generally continue into the developed area. The development density for an interface community is usually three or more structures per acre, with shared municipal utilities. Fire protection is generally provided by a local government fire department with the responsibility to protect the structure from both an interior fire and an advancing wildland fire. An alternative definition of the interface community emphasizes a population density of 250 or more people per square mile.

Category 2. Intermix Community: The Intermix Community exists where structures are scattered throughout a wildland area. There is no clear line of demarcation; wildland fuels are continuous outside of and within the developed area. The development density in the intermix ranges from structures very close together to one structure per 40 acres. Fire protection districts funded by various taxing authorities normally provide life and property fire protection and may also have wildland fire protection responsibilities. An alternative definition of intermix community emphasizes a population density of between 28 to 250 people per square mile.

Category 3. Occluded Community: The Occluded Community generally exists in a situation, often within a city, where structures abut an island of wildland fuels (e.g., park or open space). There is a clear line of demarcation between structures and wildland fuels. The development density for an occluded community is usually similar to those found in the interface community, but the occluded area is usually less than 1,000 acres in size. Fire protection is normally provided by local government fire departments.

Generally, the federal agencies will focus on communities that are described under categories 1 and 2. For purposes of applying these categories and the subsequent criteria for evaluating risk to individual communities, a structure is understood to be either a residence or business facility, including mining structures and government facilities.

With low structure density and no clear forest demarcation, most communities within the CCC assessment area may be defined as Category 2, Intermix Communities.

5.2 Community Hazard Assessments

WUIs were identified and delineated during the initial strategic planning meeting and reviewed during the initial community meetings. These areas are delineated according to a set of homogeneous hazard factors such as access, wildland fuels, emergency resources, common structural characteristics, or emergency resources. A single WUI may span multiple subdivisions or HOAs/POAs, or a single subdivision or HOA/POA may be subdivided in multiple WUIs. The remainder of the county may be characterized as either urban/commercial with no direct wildland interface, or rural. In these areas isolated homes and ranches are best served through individual home and property hazard and risk assessments and are outside the scope of this project.

Field surveys were conducted during the fall of 2007. A standardized survey process defined by the National Fire Protection Association (NFPA) was utilized to assess the relative level of wildfire risk and hazard for each WUI. Appendix D contains a sample NFPA Form 1144, *Standard for Protection of Life and Property from Wildfire*. Surveys assess predominant characteristics within a WUI as they relate to structural ignitability, fuels, topography, expected

5. Community Assessment

fire behavior, emergency response, and ultimately human safety and welfare. Scores are assigned to each element and then totaled to determine the relative level of risk for each individual assessment. Low, moderate, high, and extreme hazard ratings may be assigned based on the total community score (Table 8). The spatial proximity of these WUIs is highlighted in Figure 11.

Table 8. Community Assessment Survey Summary

CLEAR CREEK COUNTY WUI	Means of Access					Vegetation		Topography		Other Factors			Construction		Fire Protection			Score	Survey Hazard Rating		
	Ingress/Egress (7)	Road Width (4)	Road Condition (7)	Fire Service Access (5)	Street Signs/Address (5)	Vegetation/Fuels (25)	Defensible Space (25)	Slope w/in 300 ft of structure (10)	Topography affecting fire behavior (5)	Ignition Potential (5)	Fire Weather Potential (5)	Density of Structures (5)	Utilities (5)	Roofing (25)	Construction (15)	Set-back from slope >30% (5)	Water Availability (10)			Emergency Resources (3)	Fixed Fire Protection (5)
Alvarado	2	2	0	2	1	7	7	4	2	3	2	1	5	3	15	1	5	1	4	67	MODERATE
Bakerville	0	2	2	5	3	9	22	1	3	4	2	2	5	3	15	1	5	1	5	90	HIGH
Bard Creek	7	2	2	3	0	10	10	2	4	5	2	3	5	3	15	1	5	3	5	87	HIGH
Beaver Brook	7	3	6	5	5	10	21	7	5	4	3	0	5	3	15	4	5	3	5	116	EXTREME
Bendemeer Valley, etc. EFPD	0	3	4	4	0	8	21	3	4	4	2	5	3	14	2	5	3	5	94	HIGH	
Berthoud Falls	1	3	2	4	5	10	15	4	3	5	2	4	1	2	15	1	5	3	5	90	HIGH
Black Eagle	3	4	6	5	4	5	7	7	4	5	3	1	5	5	15	4	5	3	5	96	HIGH
Blue Valley	2	3	5	3	3	15	18	8	5	3	3	3	5	3	15	5	5	3	5	112	EXTREME
Brook Forest EFPD	7	4	5	5	2	18	20	5	5	4	3	3	5	3	15	4	5	1	5	119	EXTREME
Chicago Creek	7	3	2	5	0	8	20	7	5	3	2	4	5	3	15	3	5	3	5	105	HIGH
Echo Hills EFPD	7	3	4	5	3	18	21	7	5	4	3	3	5	4	15	4	5	3	5	124	EXTREME
Empire	1	1	1	1	1	5	1	5	2	4	2	5	3	3	15	1	0	3	4	58	MODERATE
Evergreen West EFPD	3	2	2	3	0	13	20	7	5	4	4	2	5	10	13	4	3	3	5	108	HIGH
Fall River	7	2	2	5	0	10	10	8	5	4	2	4	5	3	15	5	5	3	5	100	HIGH
Floyd Hill EFPD	7	3	4	5	3	12	21	7	5	3	3	4	5	3	13	5	5	3	4	115	EXTREME
Floyd/Sadlback	7	1	5	4	3	12	20	7	5	3	3	5	3	15	5	5	3	4	115	EXTREME	
French Springs EFPD	7	2	2	4	0	10	21	3	3	4	4	2	5	2	14	2	5	3	5	98	HIGH
Georgetown	3	2	1	1	1	7	1	3	2	4	2	5	3	3	15	1	0	1	4	59	MODERATE
Hefferman Gulch	7	4	5	5	4	10	25	7	5	3	2	4	5	3	15	4	5	3	5	121	EXTREME
Henderson Mine	7	0	2	0	0	18	1	8	5	2	2	0	0	0	1	1	1	1	1	49	MODERATE
Herman Gulch	7	3	4	5	3	10	25	7	4	5	2	3	5	3	15	5	5	3	5	119	EXTREME
Hidden Valley	7	2	5	2	2	8	18	3	4	5	3	4	3	3	15	2	5	1	5	97	HIGH
Idaho Springs	1	1	2	1	1	5	1	2	2	4	3	5	3	3	15	1	0	1	4	55	MODERATE
Little Bear	5	3	5	4	4	10	10	8	5	3	3	1	5	3	15	5	5	3	5	102	HIGH
Lower 103	1	0	2	0	2	7	12	4	3	4	3	5	5	7	15	5	5	1	4	85	HIGH
Lower Fall River	1	3	2	4	3	7	12	4	4	5	3	5	5	2	15	4	5	1	5	90	HIGH
Lower Mill Creek	7	2	2	5	3	8	12	8	4	5	3	4	5	2	13	4	5	1	5	98	HIGH
Lower Soda Creek	1	0	2	2	2	6	6	7	2	3	3	4	3	3	13	2	5	1	5	70	MODERATE
Middle 103	1	0	0	0	2	6	15	8	4	3	3	5	5	3	15	5	5	2	5	87	HIGH
Montane Park	7	4	2	5	3	9	20	7	5	5	3	4	1	3	13	4	1	1	5	102	HIGH
Morrison Lane	7	2	2	5	5	10	25	2	5	2	1	3	1	15	3	5	3	5	103	HIGH	
Peaceful Valley	7	3	5	3	5	7	18	1	3	4	2	1	5	3	15	1	5	3	5	96	HIGH
Pine Slope	1	3	4	3	3	6	12	4	2	4	3	4	3	3	15	2	5	1	5	83	HIGH
Pine Valley Estates EFPD	0	3	4	4	4	9	15	3	2	4	4	3	5	3	15	2	5	3	5	93	HIGH
Silver Lakes	0	2	2	3	2	6	8	2	2	3	3	5	3	3	12	2	1	1	4	64	MODERATE
Silver Plume	1	3	2	2	1	5	3	3	2	5	2	5	3	3	15	1	0	1	4	61	MODERATE
Silver Valley	0	2	2	2	1	10	20	4	2	5	2	5	1	2	15	2	5	1	5	86	HIGH
Soda Creek	7	3	5	5	3	10	9	5	3	3	3	1	5	5	14	4	5	2	5	97	HIGH
South Spring	5	3	5	5	3	12	14	7	5	5	3	1	5	10	15	4	5	2	5	114	EXTREME
Squaw Mountain	7	2	5	4	4	14	18	8	5	3	3	1	5	3	14	5	5	3	5	114	EXTREME
Stevens Gulch	7	4	7	5	4	18	15	8	5	2	2	0	5	3	15	2	5	3	5	115	EXTREME
St Marys/Alice	7	3	5	5	5	17	15	8	5	2	2	4	5	3	15	5	10	3	4	123	EXTREME
Trail Creek	7	3	5	5	3	12	20	7	5	5	3	1	5	2	15	4	5	3	5	115	EXTREME
Upper Fall River	7	2	2	2	3	8	12	3	4	3	2	2	5	3	15	2	5	3	5	88	HIGH
Upper Mill Creek	7	3	5	3	1	10	20	5	5	3	2	5	5	3	15	3	5	3	5	108	HIGH
Ute Creek	7	3	5	5	2	10	18	6	5	4	3	1	5	2	15	5	5	3	5	109	HIGH
Virginia Canyon	1	2	2	1	2	6	10	8	5	5	3	3	5	3	12	5	5	1	5	84	HIGH
York Gulch	3	3	5	5	3	8	12	5	5	4	3	1	5	3	10	4	5	3	5	92	HIGH

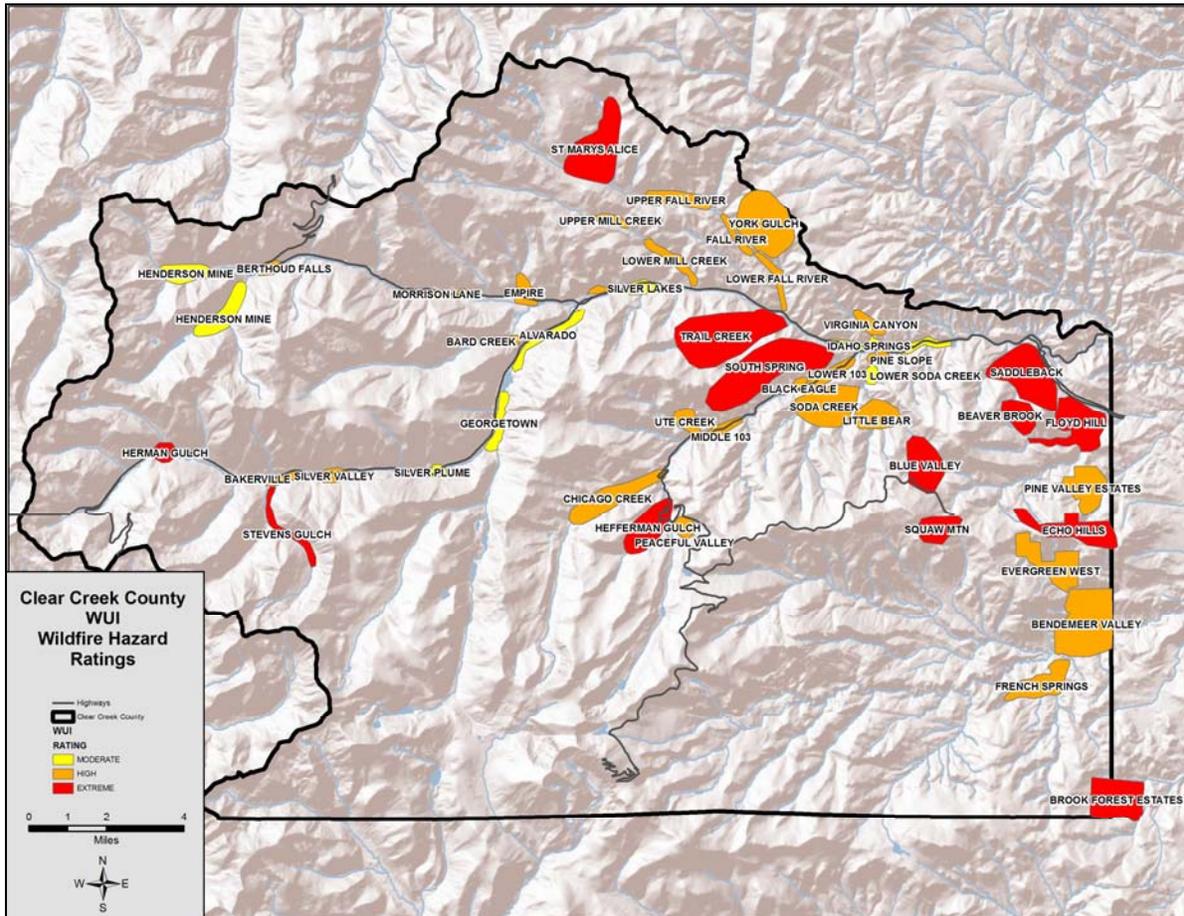


Figure 11. WUI Distribution and Hazard Ranking

These comprehensive community assessments provide the basis for effective identification, prioritization, and implementation of specific mitigation and hazard reduction recommendations. Individual WUI survey details, mitigation recommendations, and community treatment maps, are found in Appendix D.

5.3 Fire Regime Condition Class

A natural fire regime is a general classification of the role fire would play across a landscape in the absence of modern human mechanical intervention, but including the influence of aboriginal burning. A Fire Regime Condition Class (FRCC) is a conceptual tool that is used to measure the amount of departure from an expected natural condition that would exist in the absence of aggressive fire exclusion management policies (Figure 12). FRCC may be utilized, in combination with other factors, to help guide management objectives and set priorities for treatments. This methodology is of great value in the absence of critical infrastructure and communities that would otherwise be the focus of wildfire hazard reduction. FRCC classes include:

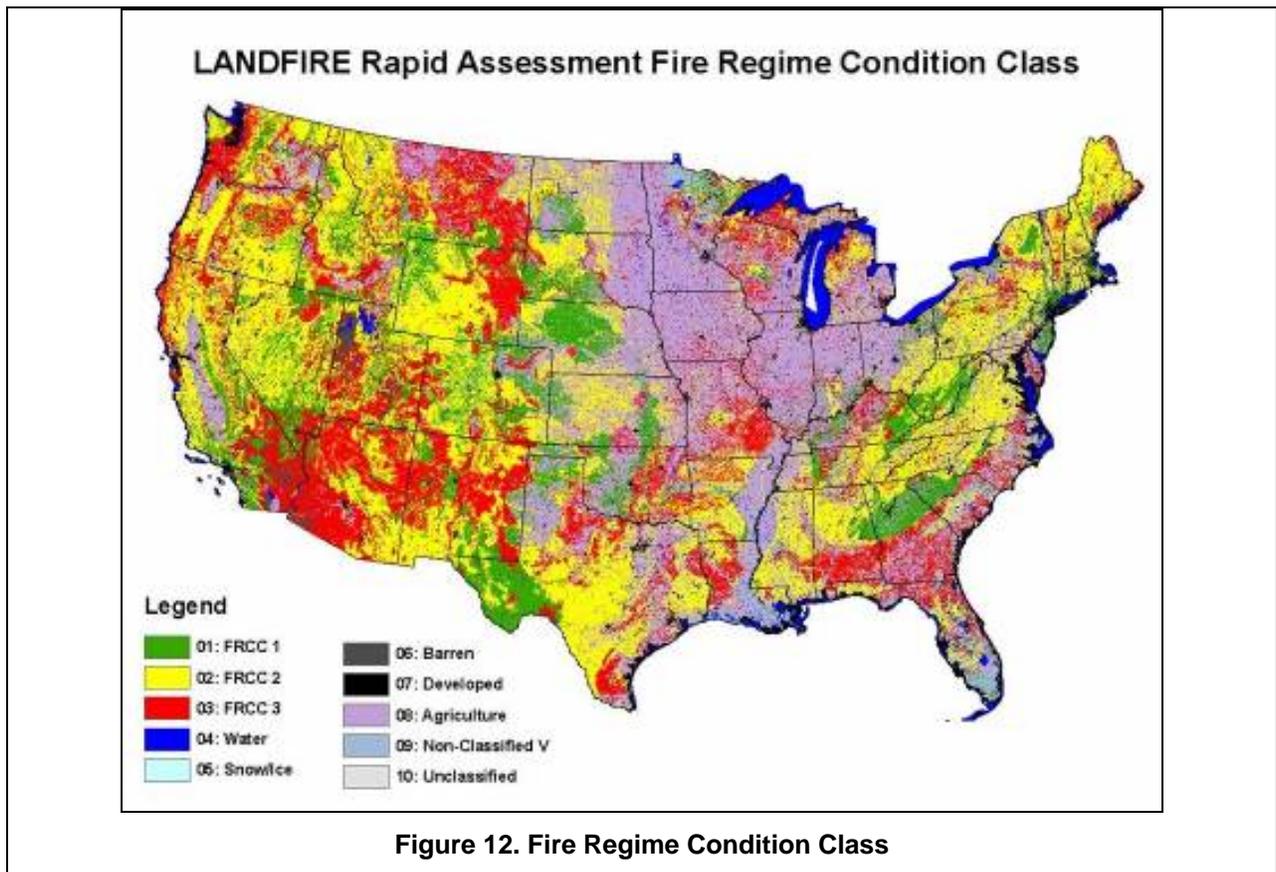
5. Community Assessment

Condition Class 1 – Within the historical fire regime range; fire behavior, effects, and other associated disturbances are similar to those that occurred before fire exclusion.

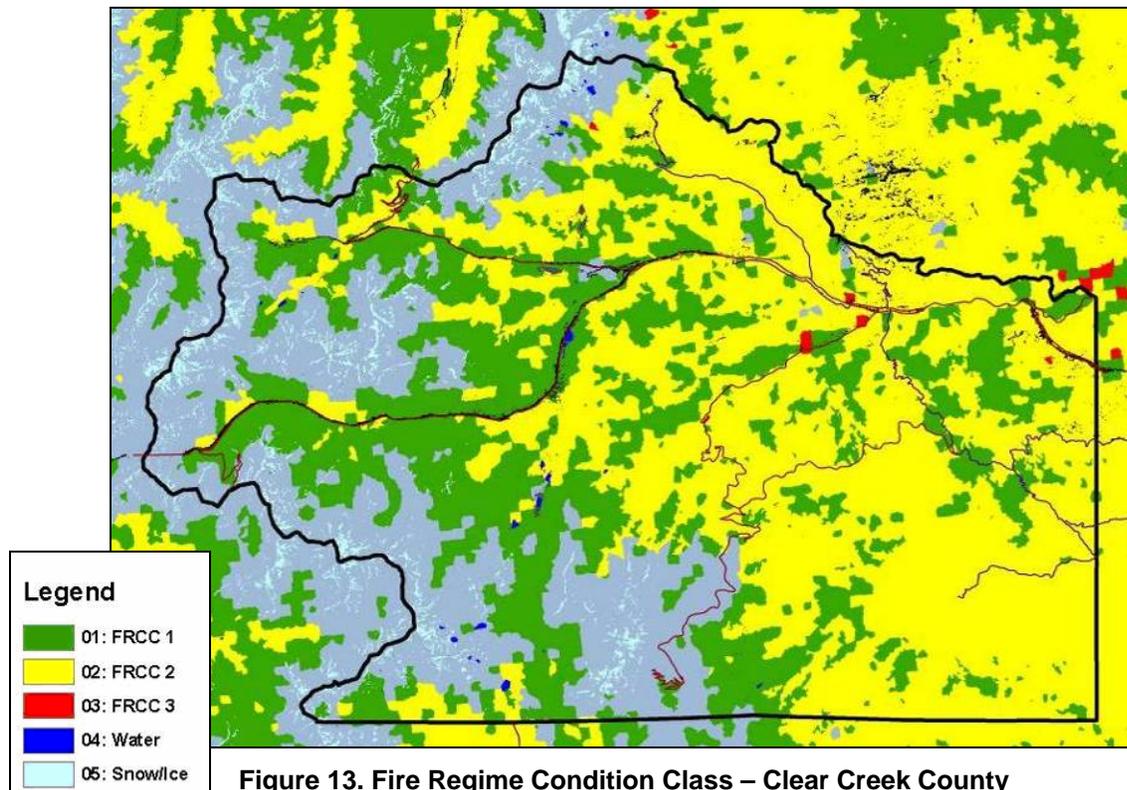
Condition Class 2 – Moderate departure from historical fire regime; fire behavior, effects, and other disturbances are more or less severe than those that occurred before fire exclusion.

Condition Class 3 – High departure from historical fire regime; conditions of the area are highly uncharacteristic; composition and structure of vegetation and fuel are highly altered.

The risk of losing key ecosystem components (e.g., native species, large trees, soil) is low (green) for Class 1, moderate (yellow) for Class 2, and high (red) for Class 3.



A majority of the lands in the CCC are in condition Class 2, putting them at moderate risk for catastrophic wildfire (Figure 13).



5.4 Fire Behavior Analysis

Fire behavior is defined as the manner in which a fire reacts to the influences of fuel, weather, and topography. For the purposes of this plan fire behavior analysis is a relative measure of potential fire behavior for a spatially defined gridded location within the assessment area. Each 10 meter cell is queried for fuel model and topographic characteristics. Once weather variables are added, the computer model will estimate Rate of Spread (ROS), Flame Length (FL), as well as potential Crown Fire Activity for each grid cell. These individual values are computed and combined into a fire behavior map for the entire assessment area. Analyzing the spatial proximity of areas with high wildfire risk to WUI communities and their relative hazard levels helps to provide a level of confidence and certainty when developing effective mitigation and hazard reduction recommendations and prioritizing treatments.

5.4.1 Input – Wildland Fire Behavior Fuel Models

Unless structural density is high, existing vegetation is the primary fuel source for wildland fire and has a direct effect on fire behavior. Understanding the fire behavior characteristics of particular vegetation types is paramount in predictive fire behavior modeling. There are several systems for classifying fuel models. This analysis utilizes the most commonly used fuel modeling methodology as developed by Hal E. Anderson (1982). Thirteen FBFMs are presented in four fuel groups: grasslands, shrublands, timber litter and understory, and logging slash. Each group comprises three or more fuel models. Eight FBFMs are represented in CCC (Table 9).

Table 9 Fire Behavior Fuel Model Descriptions Found in CCC

FBFM	Description
<p>1 Short Grass</p>	<p>Grass Group – Fire spread is determined by the fine, very porous, and continuous herbaceous fuels that have or are nearly cured. These are surface fires move rapidly through the cured grass and associated material. Very little shrub or timber is present, generally less than one-third cover of the area. Annual and perennial grasses occur in this model. Fire ROS can exceed 300 chains per hour with flame lengths over 8 feet.</p>
<p>2 Grass with Timber/Shrub Overstory</p>	<p>Grass Group – Fire spread occurs through curing of dead herbaceous fuels. These are surface fires where downed woody debris from the shrub and tree component adds to fire intensity. Open shrublands, pine stands, or oakbrush stands that cover from one- to two-thirds of the area generally fit this model.</p>
<p>4 Mature Brush</p>	<p>Shrub Group – High intensity and fast spreading fires involve the foliage and live and dead fine woody material in the crowns of a nearly continuous secondary overstory.</p>
<p>5 Young Brush</p>	<p>Shrub Group – Fire is generally carried in the surface fuels that are made up of litter cast by the shrubs and grasses or forbs in the understory. The live vegetation produces poor burning qualities.</p>
<p>6 Intermediate or Dormant Brush</p>	<p>Shrub Group – Fire spreads though the shrub layer with flammable foliage but requires moderate winds to maintain the foliage fire. Fire will drop to the ground in low wind situations. Shrubs are mature with heights less than 6 feet. These stands include oakbrush and mountain mahogany less than 6 feet tall. Fire rate of spread can be rapid with flame lengths of 6 to 10 feet.</p>
<p>8 Closed or Short-Needle Timber Litter–Light Fuel Load</p>	<p>Timber Group – These fuels produce slow-burning ground fires with low flame lengths. Occasional “jackpots” in heavy fuel concentrations may occur. These fuels pose a fire hazard only under severe weather conditions with high temperatures, low humidity, and high winds. These are mixed conifer stands with little undergrowth. Fire rate of spread is up to 106 feet per hour with flame lengths of 1 foot.</p>
<p>9 Hardwood or Long-Needle or Timber Litter–Moderate Ground Fuel</p>	<p>Timber Group – Fires run through the surface litter faster than in FBFM 8 and have longer flame lengths. These are semiclosed to closed canopy stands of long-needle conifers, such as ponderosa pine. The compact litter layer is mainly needles and occasional twigs. Concentrations of dead-down woody material contribute to tree torching, spotting, and crowning. Fire rate of spread is up to 27 chains per hour with flame lengths of 5 feet.</p>
<p>10 Mature/Overmature Timber and Understory</p>	<p>Timber Group – Surface fires burn with greater intensity than the other timber litter models. Dead and down are heavier than other timber models and the stands are more prone to hard-to-control fire behavior such as torching, spotting, and crown runs.</p>

Source: Anderson (1982)

5.4.1.1 Grasslands, FBFMs 1 and 2

Grass fuels are most common on south-facing slopes and valley meadows. On many forested slopes with a south-facing aspect, grasses may mix with open ponderosa pine and shrub to form a vegetative understory. The short- and mid-grass species common to this area include blue grama, western wheatgrass, needle-and-thread, and prairie Junegrass. These western annual grasses are adapted to the relatively frequent disturbance of fire and benefit from fast moving, “cool” fire because it removes excess dried biomass and adds nutrients to the soil. In the absence of these periodic fires, the accumulation of thatch and woody material and the encroachment of

brush increases surface fuel loads, increasing the probability of high-intensity surface fires and compromises grassland health.

Historic fire return intervals for these grasslands range from approximately 10 to 35 years, allowing for a rapid departure from the historic fire regime conditions when fire is excluded. Fire exclusion also encourages shrub and noxious grass and weed encroachment. Cheatgrass, also known as downy brome, is an aggressive invasive grass species that is now common throughout the state and region. It exhibits higher fire intensity than other native grasses. Despite its early growth and rich color, cheatgrass provides poor nutrition for livestock, deer, and elk.

Although brush and timber fires are known for intense fire behavior, the potential impact of grass fires should not be underestimated. These light, flashy fuels can be resistant to suppression, producing incredibly rapid rates of spread, and flame lengths in excess of 10 feet. They can pose a very real risk to firefighter safety and a serious threat to untreated homes.

Open prairie, grassy slopes, and irrigated meadow and lawns are characterized as FBFM 1. Grassy understory of ponderosa pine mixed with other herbaceous fuels that would carry a surface fire is defined as FBFM 2.

Fire Behavior is generally lower intensity but fast moving.

5.4.1.2 Shrublands, FBFMs 4, 5, and 6

Shrub stands are most common on south slope aspects and meadow margins throughout the District. Mountain mahogany is the dominant shrub species in the northern two-thirds and oakbrush is dominant in the southern one-third of the District. Areas where conifer is aggressively regenerating are also classified as shrublands based primarily on density and height of the growth. Deciduous riparian zones along creek beds and slope drainages are common throughout the area and also support shrub growth. Cottonwood, scrub willow, chokecherry, and alder are common in these zones.

Shrub stands in the region are classified as FBFM 4 (mature brush, greater than 6 feet tall, dense woody surface fuel), FBFM 5 (young brush, less than 6 feet tall, clean litter), and FBFM 6 (intermediate brush, older than FBFM 5, less dense than FBFM 4).

It should be noted that shrub vegetation typically constitutes higher-moisture woody plants associated with low to moderate fire behavior. However, prolonged drought, experienced in recent years, lowers the live fuel moisture content in plant stems, producing extreme fire behavior under favorable weather conditions.

5.4.1.3 Timber Litter and Understory, FBFMs 8, 9, and 10

Forest composition in the county is strongly influenced by elevation and slope aspect, which are directly related to the available soil moisture. Ponderosa pine favor drier south-facing aspects while Douglas fir, Lodgepole pine, and spruce favor moister and cooler north-facing aspects. Lodgepole pine is more common in higher elevations above 8,000 feet but species will commonly mix on transitional slope aspects. In some areas, fire exclusion has allowed Douglas fir to become disproportionately dominant. Continuous forest canopy, most common at higher elevations and north-facing aspects, often prohibits live surface fuels from taking hold. In some mature and over mature closed canopy conifer stands, the understory is devoid of live surface fuel but thick with woody timber litter from downed trees and ladder fuels.

FBFMs in timber are classified according to the surface fuels that accumulate in the absence of a dominant live understory. FBFM 8 is associated with all short-needle conifer species including Douglas fir, Lodgepole pine, and a variety of spruce; FBFM 9 is characterized by the long needles of ponderosa pine; and FBFM 10 is associated with forest floors that are thick with naturally occurring downed timber in a mature or overmature stand.

In normal weather conditions, fire behavior in these timber fuel models at higher elevations is generally characterized by understory surface fires fueled by timber litter. Occasional isolated torching or crown runs may occur but fire behavior is generally contained to the ground. Under extreme weather conditions these same fuel models have the capacity to “go nuclear.” Crown runs through dense unbroken canopy may extend for miles.

5.4.2 Input – Topography

The topographic characteristics of CCC were highlighted in the County Profile section and are important components in predictive fire behavior modeling. Topography are the three dimensional characteristics of earth’s surface. These characteristics can be analyzed according to elevation, slope, and aspect. Elevation is usually measured in terms of vertical distance from sea level and strongly influences temperature which in turn can influence moisture content of available fuels and soils.

Slope is typically measured in degrees and relates to the relative steepness of a hillside. The influence of slope to wildland fire behavior is substantial. The steeper the slope the faster a fire can move uphill, given available fuel. Flames are closer to the fuel source, radiant heat preheats and dehydrates fuels, which results in a much faster rate of spread.

Aspect refers to the direction a slope faces. Aspect strongly influences vegetation and fuels as solar heating regulates available moisture. In the Northern Hemisphere south facing slopes receive much more solar heating which results in lower humidity; rapid moisture loss; and lighter drought tolerant fuels such as grasses, juniper, and ponderosa.

5.4.3 Input – Weather

Average, severe, and extreme case weather and fuel moisture conditions were determined using records from local remote access weather stations (RAWS) during the summer wildfire season of June through September. The Corral Creek RAWS is the only station within CCC that collects all of the data required for fire behavior modeling. Corral Creek has data from 1968 through 1985 and 2001 through 2007. These data sets are from two different stations in slightly different locations on the same site.

Several RAWS stations in surrounding counties were compared to the Corral Creek data (Table 10). Differences in fuel moistures and the resultant predicted fire behavior were negligible in most cases. Composite data sets representing 50th, 90th, and 97th percentile fuel moisture conditions were developed for the fire behavior modeling inputs, representing average, severe, and extreme conditions respectively (Appendix B).

Table 10. Remote Access Weather Stations In and Near Clear Creek County

RAWS	Years of Data	Elevation	Location
Corral Creek	1968-1985, 2001-2007	8081	Eastern Clear Creek County
Pickle Gulch	1995-2007	9380	Gilpin County, 7.6 mi N of CCC
Bailey	1970-1992, 2000-2007	7982	Jefferson County, 14 mi SE of CCC
Cheesman	1987-2007	7473	SW Douglas County, 27 mi SE of CCC

Additional important fire- and weather-related resources include:

- Fort Collins Interagency Wildfire Dispatch Center Web index for Fire Intelligence, Fire Weather, Fire Danger/Severity, RAWS – <http://www.fs.fed.us/r2/arnf/fire/fire.html>
- RAWS index for the Rocky Mountain Geographic Coordinating Area – http://raws.wrh.noaa.gov/cgi-bin/roman/raws_ca_monitor.cgi?state=RMCC&rawsflag=2
- National Fire Weather Page – <http://fire.boi.noaa.gov/>

5.4.4 Modeling Potential Fire Behavior

Computer modeling of potential fire behavior was accomplished using FlamMap V.3, developed by the Fire Sciences Laboratory (USDA Forest Service, Missoula, MT). Analysis was conducted by an National Wildfire Coordinating Group (NWCG) qualified Fire Behavior Analyst (FBAN) employing the same techniques utilized on large-scale federal fires for tactical predictive fire behavior support.

FlamMap is a fire behavior mapping and analysis program that computes potential fire behavior characteristics over an entire landscape for given weather and fuel moisture conditions. The software uses GIS-based inputs for terrain and fuel characteristics, computes fire behavior outputs for a given landscape using standard fire behavior prediction models, and generates maps of potential fire behavior characteristics for spread rate, flame length, crown fire activity, over an entire landscape.

For tactical incident support, the fire behavior information generated by FlamMap, facilitates informed overhead team decisions that help guide suppression operations, resource management, and fire management strategies. For community hazard and risk assessment, the information provides valuable guidance for identifying and prioritizing those areas that pose the highest risk of wildfire to WUI communities.

Fire behavior modeling for CCC incorporated the following methodology in the analysis process (Figure 14). A detailed description of this process is provided in Appendix B.

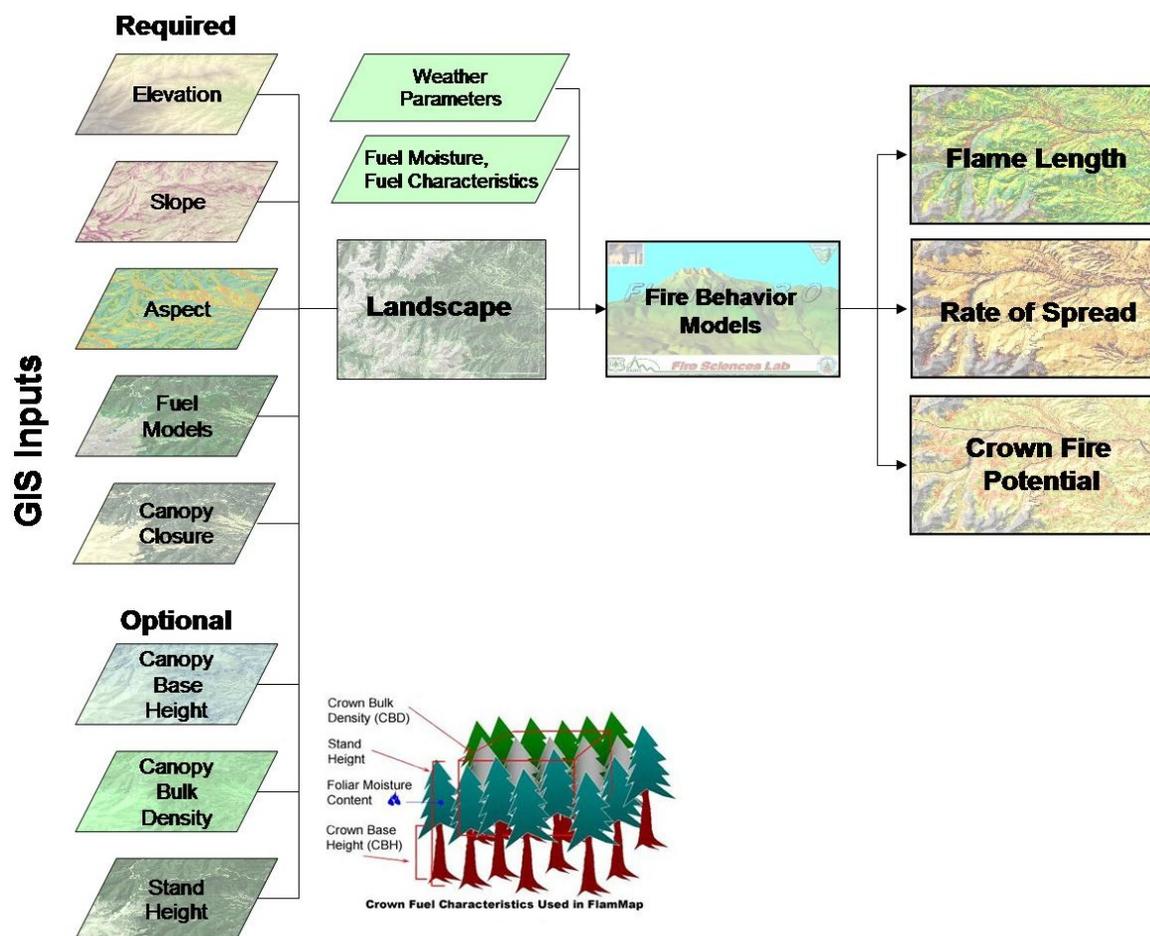


Figure 14. Fire Behavior Modeling Methodology for Clear Creek County

Weather observations from four RAWS were examined for use in fire behavior modeling. These stations included Corral Creek, Bailey, Cheesman, and Pickle Gulch as previously described. From this data, three sets of weather parameters were chosen for use in modeling, based on depth of data and how representative each site was. These three sets of weather inputs represent “Average” conditions for June through September (50th Percentile), “Severe” conditions (90th Percentile), and “Extreme” conditions (97th Percentile). 50th and 90th percentile weather are the most useful for planning purposes; the 97th percentile represents a worst-case scenario.

Wind is an important weather element in fire behavior, as even small changes in wind speed can have significant impacts on fire intensity, spread rate, and potential for crown fire development. Two wind scenarios were used for modeling fire behavior for CCC. One was based on typical summer conditions where surface wind direction is diurnal in nature, flowing upslope and up-canyon during the day. The other wind scenario assumed a strong downslope wind that overpowered the weaker diurnal winds, such as what happens when a Chinook wind situation develops in the Front Range of Colorado. Three predictive fire behavior output models are generated from the analysis:

- Flame Length (FL)
- Rate of Spread (ROS)
- Crown Fire (CF)

5. Community Assessment

Flame length (FL) is the distance from the base of the flame (the fuel bed) to the tip of the flame in a fire burning in surface fuels (surface fire) (Figures 15, 16, 17).

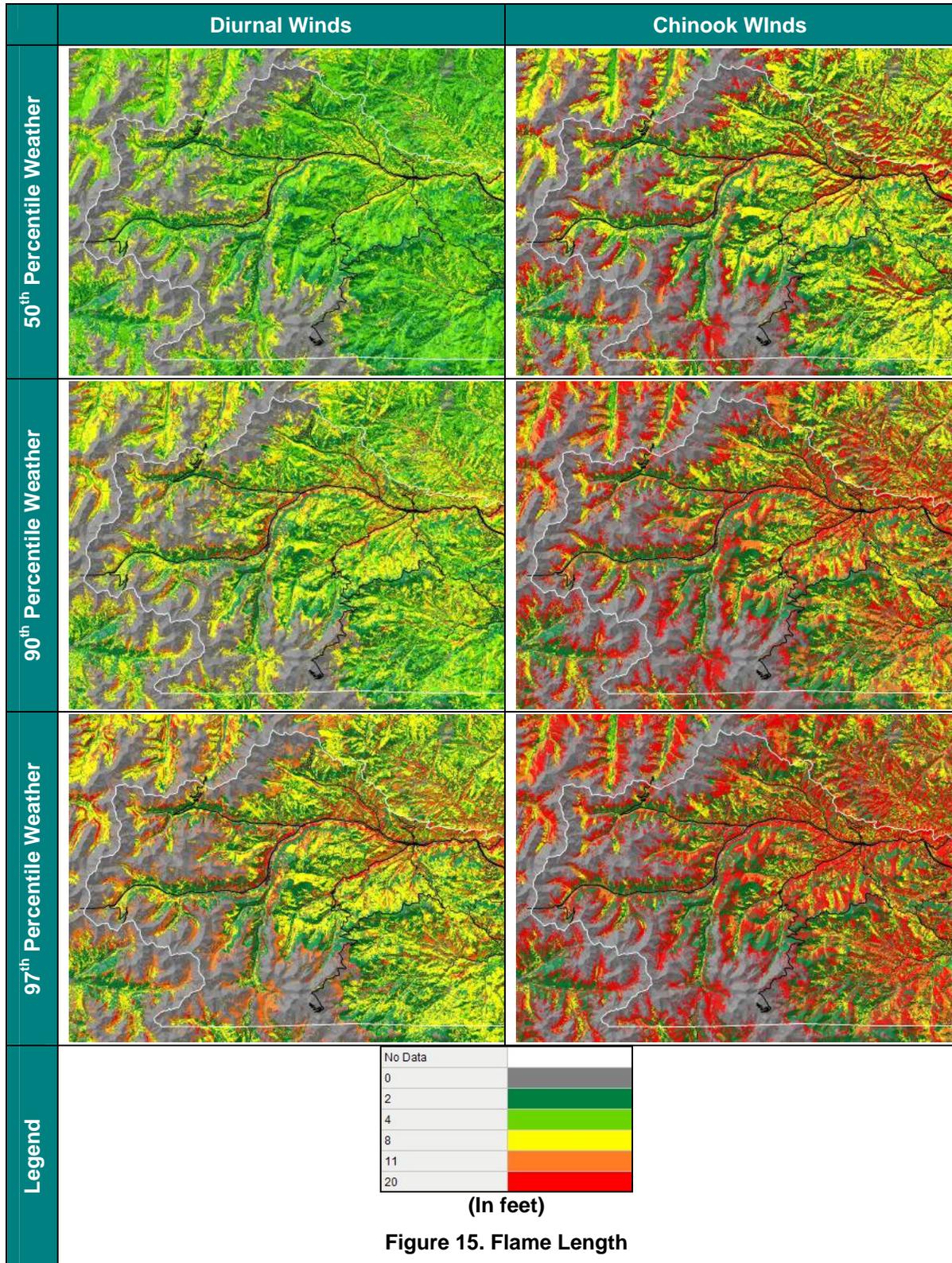


Figure 15. Flame Length

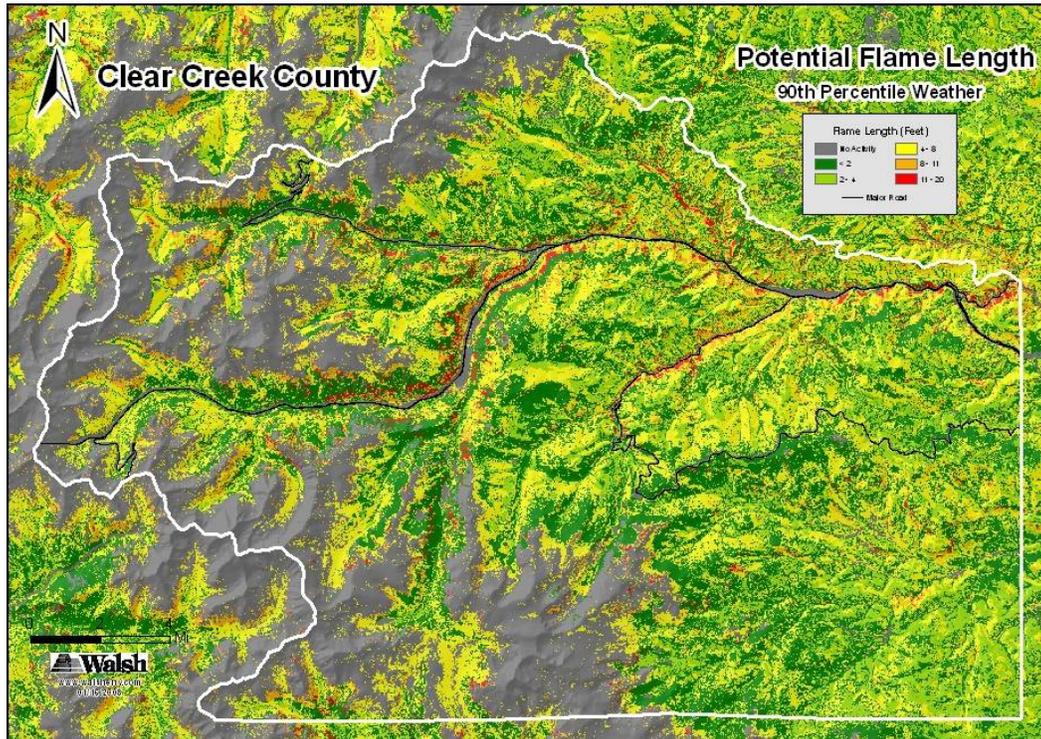


Figure 16. Potential Flame Length, 90th Percentile Weather, Diurnal Winds

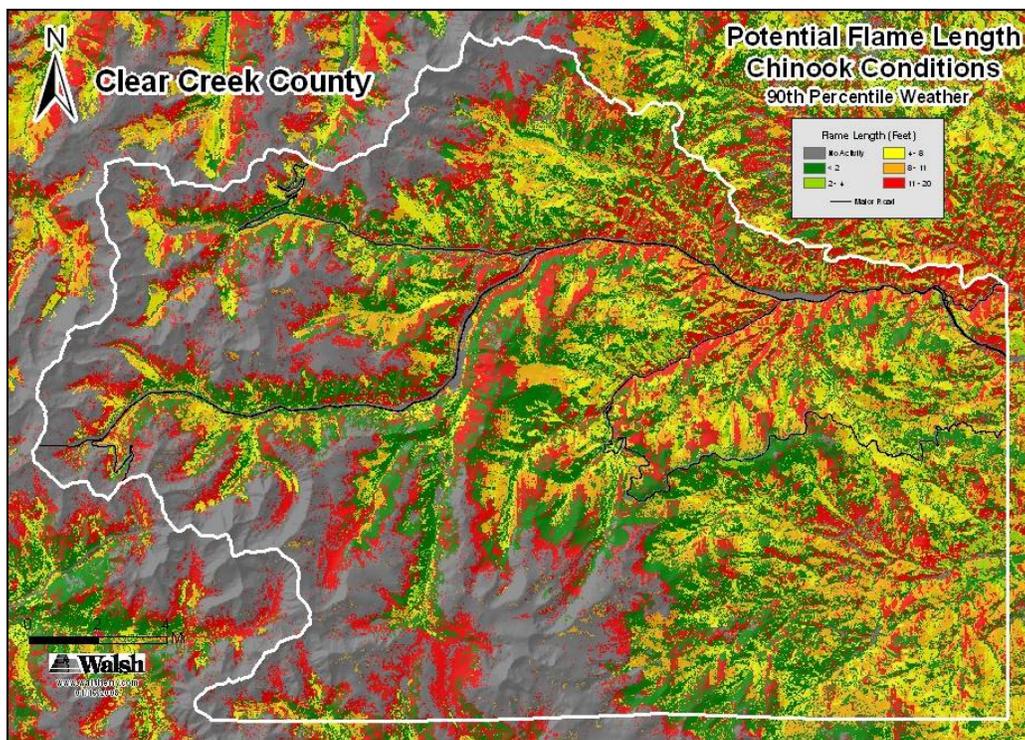
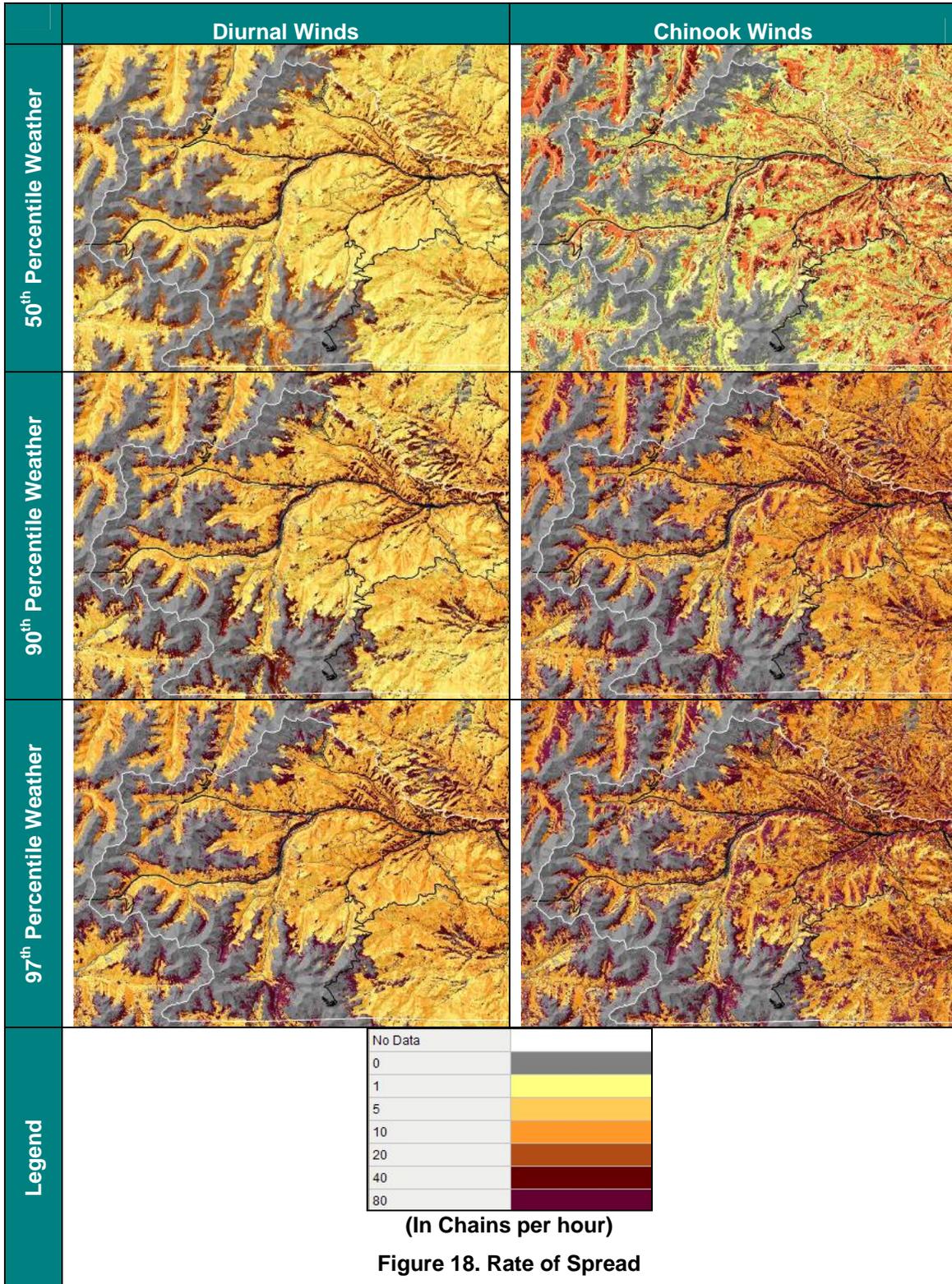


Figure 17. Potential Flame Length, 90th Percentile Weather, Chinook Winds

5. Community Assessment

The **rate of spread** (ROS) is the forward rate of movement at the active front (head) of a surface fire (Figures 18, 19, 20).



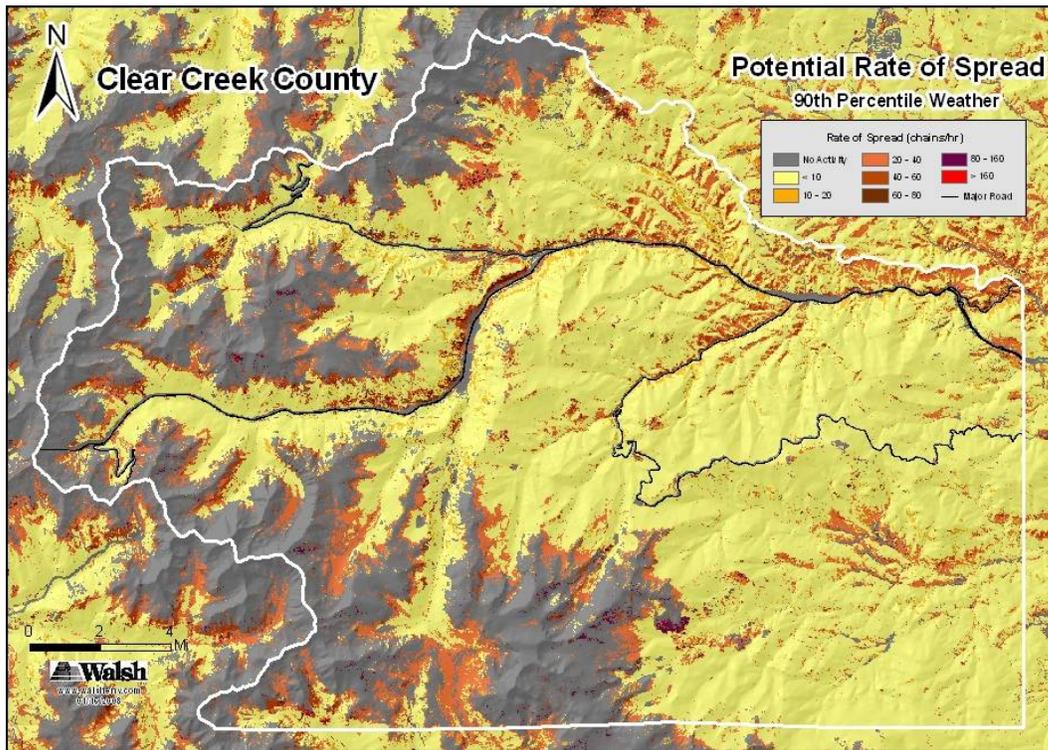


Figure 19. Rate of Spread, 90th Percentile Weather, Diurnal Winds

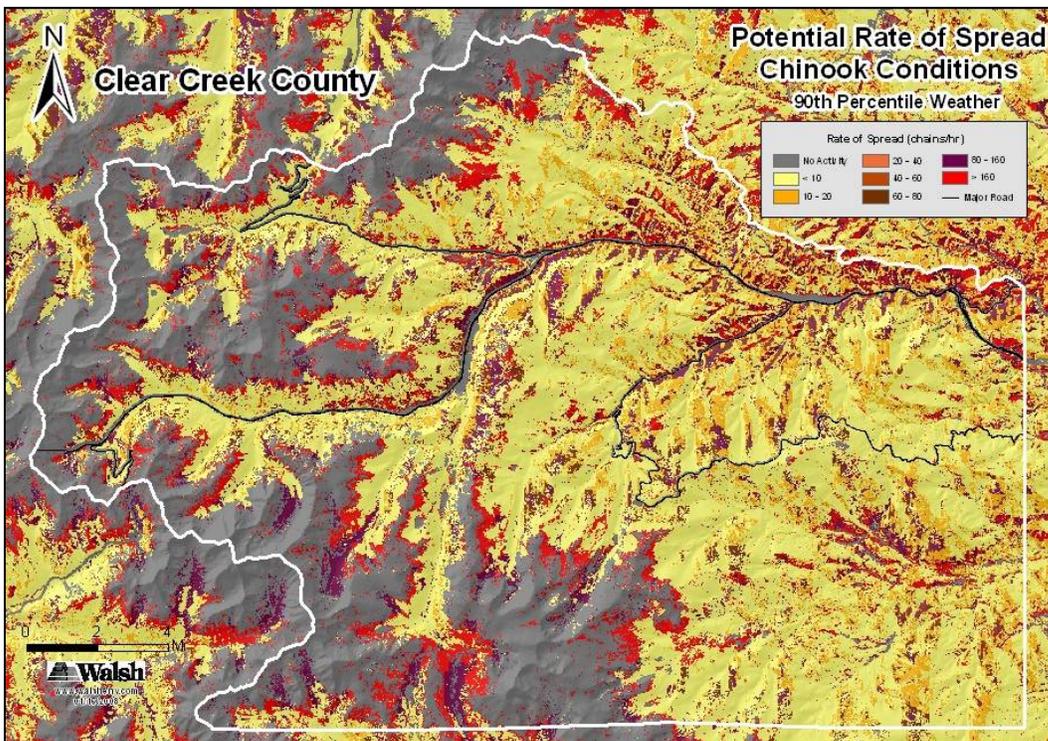
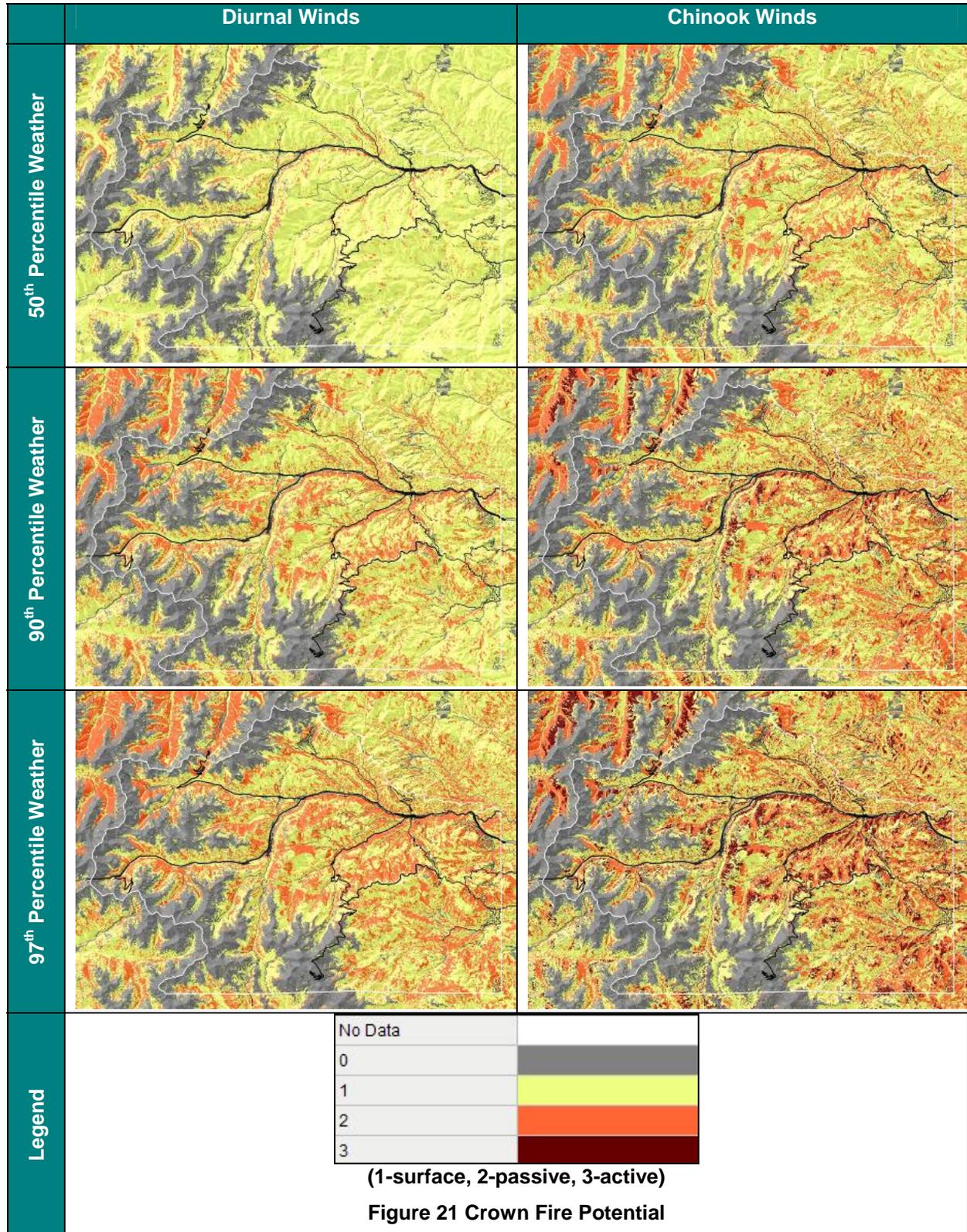


Figure 20. Rate of Spread, 90th Percentile Weather, Chinook Winds

5. Community Assessment

Crown fire (CF) potential is the movement of fire into and through the tree canopy. Crown fires typically move rapidly, and are very intense, with flaming fronts up to 100-200 feet in height (Figures 21, 22, 23).



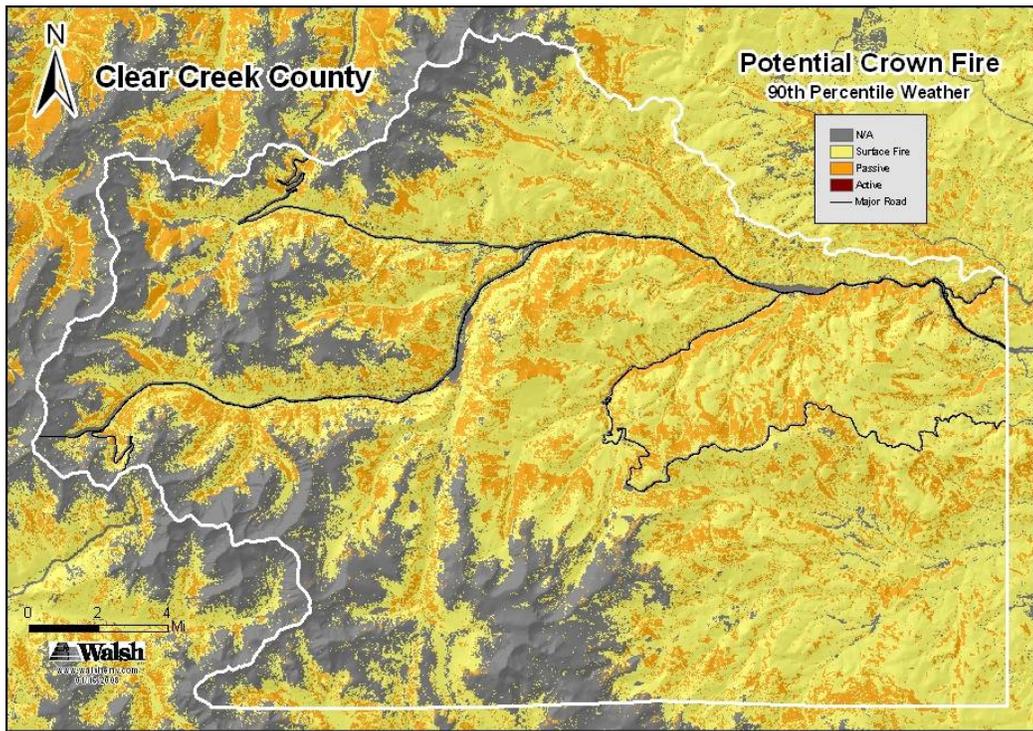


Figure 22. Potential Crown Fire, 90th Percentile Weather, Diurnal Winds

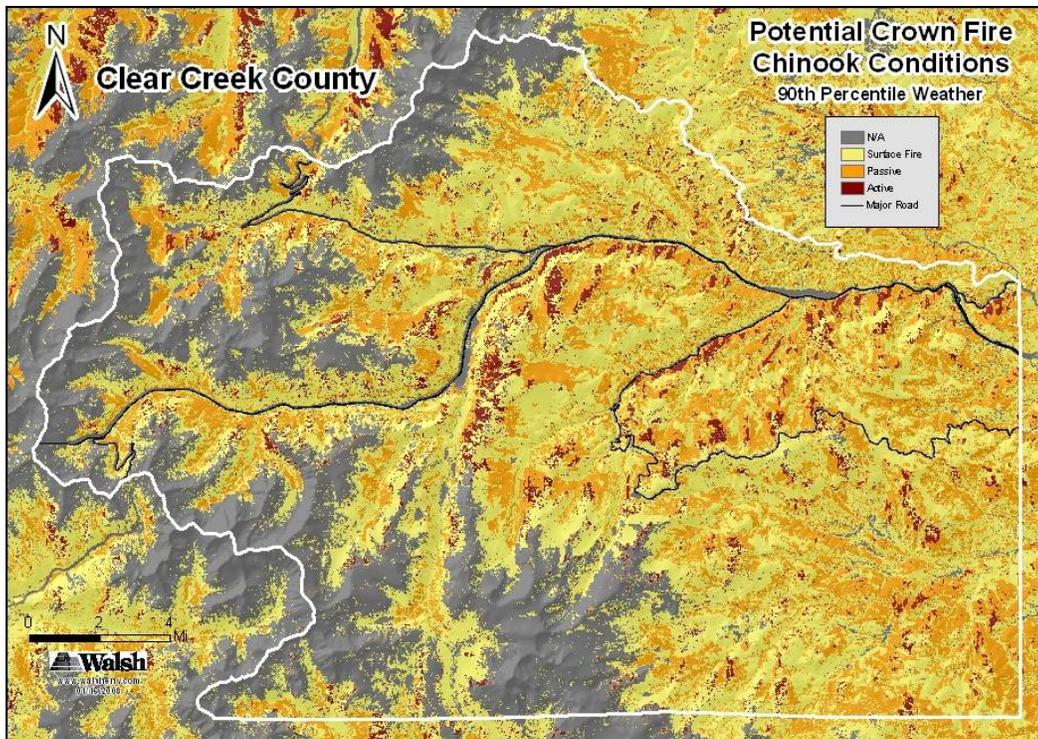


Figure 23 Potential Crown Fire, 90th Percentile Weather, Chinook Winds

5.5 Wildfire Occurrence

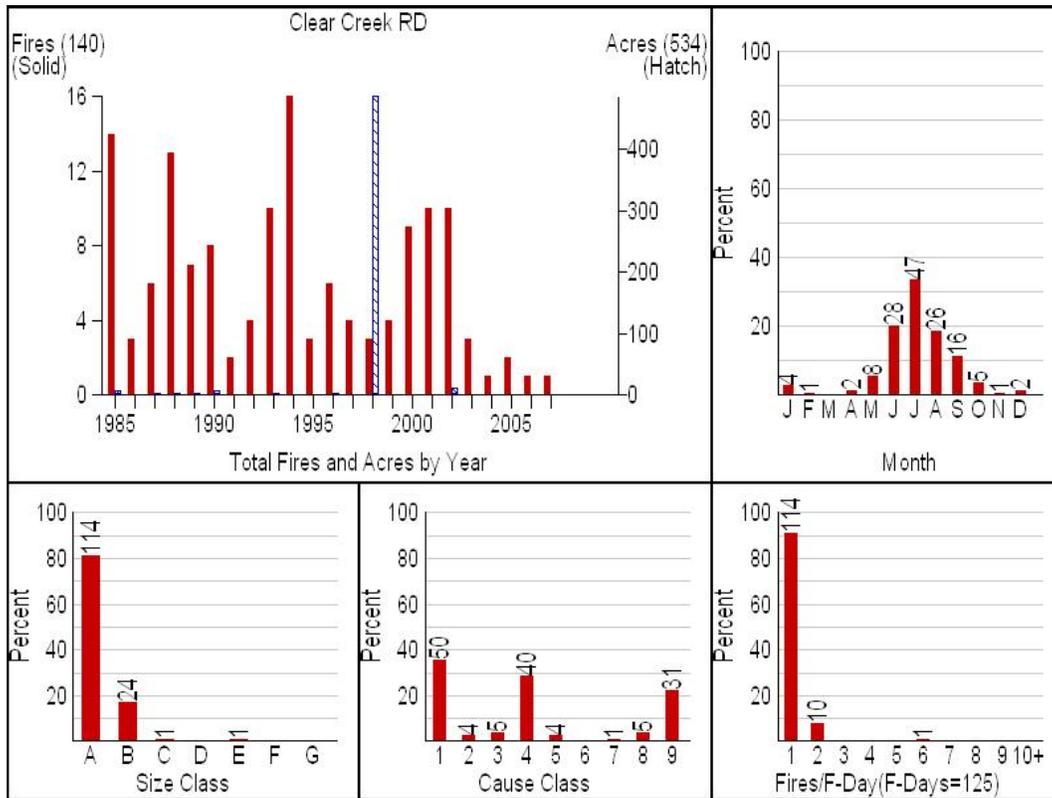
Fire data for 1985 through 2007 were obtained and analyzed for the Clear Creek Ranger District of the Arapaho National Forest. While this district actually extends into four counties and does not include all of CCC, it covers the majority of CCC which in turn comprises a majority of this ranger district. Approximately 72 percent of CCC’s 396 square miles are public lands, predominantly USFS.

With lightning accounting for only 36 percent of the district’s fires, human ignitions (and prevention/education) should be a serious concern. Most fires remained quite small with 81 percent under ¼ acres and 99 percent under 10 acres (Figure 24). Only two fires from the USFS data set exceeded 10 acres, the Bear Tracks Fire of 1998 (485 acres) and the North Springs Fire of 2002 (11 acres). June through September were identified as the typical fire season with 84 percent of the fires occurring during these months (Table 10).



Figure 24. The Fountain Gulch Fire, Clear Creek County, 2002

Table 10. Federal Fire Records for USFS Clear Creek Ranger District



Fire suppression services for non-federal lands with the county are provided by CCFA, Evergreen Fire/Rescue (EFR), and incident support from the Clear Creek Sheriff’s Office (CCSO) (Table 11).

Table 11. Clear Creek County OEM Fire Records

Fire	Month/Year	Acres Burned	Comments
North Spring Fire	06/06/02	9	
Fox Gulch Fire	05/22/04	1.5	
Benchmark 263 Fire	06/06/04	5	USFS Lands
Closet Fire	08/01/04	<1	
Hidden Valley Fire	08/02/04	<1	
Naylor Lake Fire	07/12/05	1	
Three Valley Tree Fire	08/25/05	<1	
Dumont East Fire	09/26/05	<1	
Devil's Gate Fire	06/09/06	<1	
Hwy 103 MM 12 Fire	06/19/06	<1	
York Gulch Road Fire	06/21/06	<1	

5. Community Assessment

Fire	Month/Year	Acres Burned	Comments
Devil's Tongue Fire	07/19/06	<1	
Standley 236 Fire	09/27/07	<1	
Alvarado Fire	11/07/07	25	

EFPD call records indicate an average of five wildfires per year. Though these statistics may seem to portray wildfires as a limited hazard within the region, a study of past wildfires in the area illustrates the potential for large fires and the threat to communities (Table 12). See Appendix G for a comprehensive wildfire history of the CSFS, Golden District, which includes EFPD and CCC.

Table 12. Significant Named Wildfires in the Local Region

Fire	Month/Year	Acres Burned	Fire Protection District
O'Fallon	Mar 1991	52	Evergreen
Elk Creek	May 1991	102	Golden Gate
Buffalo Creek	May 1996	10,400	USFS/North Fork
Bear Tracks	Jun 1998	485	USFS/Evergreen
Linger Mountain	Feb 1999	35	Genesee/Foothills
Hi Meadow	Jun 2000	10,800	Platte Cyn/Elk Cr/North Fork
Black Mountain	May 2002	300	USFS/Elk Cr/Evergreen
Fountain Gulch	Jun 2002	200	Clear Creek
Centennial Cone	Jul 2006	22	Jefferson County Open Space
Upper Bear Creek	Jan 2006	35	Evergreen

6

Emergency Operations

Clear Creek Fire Authority and Evergreen Fire Protection District (EFPD) serve the structural fire protection and rescue needs of CCC residents and business owners within their respective jurisdictions in CCC. In addition to fire suppression, Clear Creek Fire Authority and EFPD offer emergency first response medical services, initial attack WUI fire response, hazardous materials response, and fire prevention advice for fire safety within their jurisdictions in CCC.

Wildland fire management services are provided by the CCC Sheriff's Office wildland "Marmots Wildland Fire Crew" on all unincorporated lands in the county, and as requested by the CCFA on all private lands within Clear Creek County.

Wildland fire management is provided by USFS and CSFS on the Arapaho/Roosevelt National Forest lands. The USFS is typically not equipped to provide structural protection.

6.1 Clear Creek County Emergency Operations Plan

Originally adopted in 2004, the CCC Emergency Operations Plan (CCC EOP) describes the mechanism and structure by which the county will mobilize resources and conduct activities and defines policies, assumptions, operations, actions, and responsibilities county agencies will follow in the event of a disaster, emergency, or incident. The CCC EOP was amended in 2006 to accommodate the following Wildland Firefighting EOP. This section describes the county's operational plan specifically in the event of a wildfire.

6.1.1 Wildland Firefighting EOP Introduction

Purpose and Scope

The purpose and scope is to provide courses of action; resource mobilization guidelines; and prescribe the responsibilities of local, state, and federal governments in providing for the detection and suppression of wildland fires that occur within CCC.

Planning Assumptions

Wildland firefighting will involve mobilizing; providing; managing; and coordinating personnel, equipment, and supplies in the detection and suppression of wildland fires. Successful suppression and extinguishment of wildland fires will require organized interagency cooperation at all levels.

Land ownership in the forested areas of CCC includes: county, private, municipal, United States government (USFS), Denver Mountain parks, state agency-owned lands including: Colorado Division of Wildlife, State Land Board, State School Lands, and State Historical Society.

The authority for suppression activities comes from municipal ordinances, such as state statutes governing: Fire Protection Districts, Fire Authorities, Colorado State Forest Service, and the Sheriff; and federal laws governing the USFS.

Agreements

- “Wildland Fire Protection Agreement” between the County of Clear Creek Colorado, the CCC Sheriff (CCSO) and the CCFA.
- The AOP is a working document compiled each year by the wildfire agencies participating in the Plan, and shall be attached to and part of the Interagency Cooperative Fire Protection Agreement – Clause # 12. The AOP agreement is between the Wildfire Protection Agencies within CCC, Colorado, including: CSFS, CCSO, CCC Board of County Commissioners, United States Department of Agriculture (USDA).

Policies

- Wildland firefighting operations on all private lands in CCC will be the responsibility of the Clear Creek Fire Authority, excluding lands that are in the EFPD. The CCFA shall be responsible to commence initial attack on any wildland fire within its response jurisdiction. The CCFA will be responsible for all wildland fires (command, operations, logistics, planning, finance/administration, etc.) that are expected to be contained within the first 12 hours following initial attack unless/until a delegation of authority is made. Fires that are not transferred to the Sheriff, the state or any federal agency shall remain the responsibility of the CCFA through containment, control, and mop-up.
- Wildland firefighting operations on public lands, and private lands outside of the Clear Creek Fire Authority jurisdictions in CCC, will be the responsibility of the CCC Sheriff.
- The Sheriff shall have the responsibility for any and all wildland fire response and suppression obligations that are delegated to the Sheriff.
- The Clear Creek Fire Authority and the CCC Sheriff shall have the responsibility for wildland fire response and suppression as outlined in the AOP except as otherwise provided in the “Wildland Fire Protection Agreement.”
- The Incident Commander on scene will be the most qualified person by NWCG Standards.
- Mutual Aid from outside agencies may be activated by the Incident Commander in consultation with respective agency representatives.
- Out-of-county resources will be activated by the Incident Commander. The County Commissioners may declare a disaster and request State assistance.
- Local and State Civilian Fire Fighting Forces may be augmented by federal Agencies.

6. Emergency Operations

- All operations will be conducted under the Incident Command System (ICS) and the National Incident Management System (NIMS).
- Support/Mutual Aid Agencies are responsible for the following:
 - Notifying, activating, and mobilizing all personnel and equipment to perform or support assigned functions as designated within the Basic Plan of this document.
 - Coordination of all actions of the support agency with the primary agency in performing assigned missions.
 - Identifying all personnel and resource requirements to perform assigned missions that are within the support agencies' capabilities.

6.1.2 Concept of Operations

General

Wildland firefighting personnel will be needed when a wildland fire has been reported in CCC or a valid request has been received from the Incident Commander at the scene of a wildland fire.

- Standard NWCG Incident Command System (ICS) will be utilized.
- All emergency operations will be directed by the Incident Commander.
- Operations will be handled by standard procedures set forth by the NWCG. In the event that an incident is too great in magnitude or duration for the responsible jurisdiction to adequately handle, outside resources will be requested as needed in accordance with the AOP.
- State and federal agencies will assume primary responsibility on state and federal owned lands, respectively. These agencies will also provide support and/or leadership in the case of an extended incident within CCC.

Activation Procedures

After the CCC Dispatch Center is notified of a wildland fire the appropriate agencies will be contacted per the CCC Dispatch Center Standard Operating Procedures (SOPs).

Mutual Aid Period

CCC has executed agreements that establish a non-reimbursable initial attack first operational period of time when assistance is provided; between CCC, Clear Creek Fire Authority, EFPD, USFS, and CSFS, stated in the AOP.

When agencies assist each other, they have agreed to be responsible for costs for their own personnel and equipment for the initial attack operational period from the time the equipment is dispatched.

Staging Areas

The Incident Commander shall designate a staging area as soon as possible. The Incident Commander will identify to dispatch the location of the staging area, assign a Staging Area Manager, and notify dispatch that all resources not given a direct line assignment should report to the staging area.

Resource Order Process

Fire suppression resources from local and mutual aid response agencies include: Clear Creek, Gilpin, Grand, Jefferson, Park, and Summit counties, and will be requested through CCC

6. Emergency Operations

Dispatch Center (CCCDC) by the Incident Commander. Resources from outside the mutual aid agencies will be requested through Fort Collins Interagency Dispatch Center by the Incident Commander either directly or through the CCCDC.

Requests for state and federal fire resources will be made only by those authorized to do so (see list below) either through the CCCDC or directly to the Fort Collins Interagency Dispatch Center.

Out of county local government resources from counties other than Clear Creek, Gilpin, Grand, Jefferson, Park, and Summit counties will be coordinated, ordered and placed by either the Colorado State Forest Service Fire Duty Officer (FDO) and/or the CCSO. Both CCC and the CSFS will work together to coordinate requests from non-adjacent counties. The CSFS FDO will be notified of all state and federal resource orders.

Authorized Personnel to Order State and Federal Resources

This is the list of persons authorized to order state and federal fire management resources in CCC. This includes but is not limited to: fixed wing aircraft, rotary wing aircraft, hand crews, strike teams, incident management teams, heavy equipment, engines, and personnel.

- CCC Sheriff
- CCC Undersheriff
- CCC Sheriff-Major of Special Services
- CCC Commissioners
- Clear Creek Fire Authority Chief
- CSFS appointed Fire Duty Officer on an active fire being considered for Emergency Fire Fund (EFF) activation.
- USDA Forest Service appointed Incident Commander (only for USDA supervised fires)

Aircraft Request Considerations

The Wildfire Emergency Response Fund (C.R.S. 23-30-310) will reimburse the county for the first load of retardant dropped and the first hour of operation by any aircraft (fixed wing or rotary wing) on private and public land wildland fires.

However, other costs associated with air support will be the responsibility of CCC. These costs may include:

- Cost of a lead plane;
- Cost of air attack aircraft (in-flight supervisor);
- Travel time to Colorado;
- Cost of ground support personnel, vehicles and fuel;
- Cost of lodging, food and miscellaneous expenses for the pilot and crew; and
- Cost for additional loads of retardant.

It is important to remember that under most circumstances wildland fires that require one drop will require several more.

Special Management Considerations

Mechanized equipment such as bulldozers, graders, etc., are not permitted on federal lands without the expressed approval of the headquarters agency or district office.

6. Emergency Operations

The use of aerial retardants is restricted within 100 feet of lakes, rivers and live streams on federal lands.

Multi-Agency Coordinating System (MACS)

Because of the high degree of interspersed jurisdictional boundaries within CCC, the MACS may be implemented in a single large fire incident or multiple fire incidents where multiple agencies and jurisdictions may be impacted either financially or through resource allocation. The MACS is an information and resource support group intended to facilitate integrated action on wildland fires.

In general the MACS Group provides the means for making decisions affecting dispersal and usage of resources during an emergency diffused across political boundaries or any emergency involving multiple jurisdictions.

The MACS Group may coordinate for an Incident Command (IC) on Mode 4 fires, or may coordinate for the delegation of authority to an outside Overhead Team to provide management for suppression activities. The MACS Group may direct the Incident Commander as to fiscal or political restraints in managing wildfire incidents

References

- Clear Creek County Annual Operating Plan
- Clear Creek County Emergency Operations Plan
- Colorado State Statute C.R.S. 30-10-513.5
- Colorado State Statute C.R.S. 30-10-513
- Colorado State Statute C.R.S. 23-30-203

6.2 Emergency Resources

The CCFA is comprised of 60 volunteer firefighters, one full-time paid chief and three part-time paid staff. There are currently two lieutenants, two captains and one assistant chief under the command of the CCFA chief. CCFA maintains seven stations and is constructing an eighth. It has 21 apparatus units.

EFPD is comprised of 33 full-time paid staff, and 12 part-time paid staff. There are currently eight lieutenants, six captains, two assistant chiefs, and one operations chief under the command of the Chief of EFPD. EFPD maintains eight fully equipped stations and 29 apparatus pieces.

Clear Creek EMS (CCEMS) has six full time staff/Paramedics and one full time office administrator, 24 part time Paramedics and five Emergency Medical Technician (EMT) Basics. CCEMS operates five ALS ambulances, one rescue vehicle and one MCI/Special Events trailer. CCEMS maintains two stations (Station 1 and Station 2a) and utilizes one CCFA fire station (Station 4). Two ambulances are housed at Station 2a, two ambulances, the rescue vehicle and the MCI special events trailer are housed at Station 1, and one ambulance is housed at Station 4. On average week days, CCEMS staffs 1 ALS ambulance (24 hours), and one a rescue vehicle (week days) and on-call staffing (week nights). On average weekends, CCEMS staffs two ALS ambulances (24 hours).

6. Emergency Operations

The CCSO has developed the Marmot Wildfire Crew to augment the existing wildfire (and other emergency) response capabilities of CCC. The crew consists of 7 full-time members and 18 volunteer members, and they have three apparatus units.

The number and availability of firefighters make CCC stand out among volunteer-dependent communities. With four agencies combining a solid volunteer core with paid staff available 24 hours a day, CCC has a comparably strong response capability. The county needs an increase in the number of overhead positions to support advanced wildland fire operations, especially in the engine boss/crew boss/task force/strike team level of management. Participation in the Jefferson County Incident Management Team (IMT) and on mutual aid incidents will strengthen the department capabilities and provide risk incident management experience.

6.2.1 Training and National Wildfire Coordinating Group Positions

Each of the emergency response agencies has members certified at National Wildfire Coordinating Group levels.

Currently EFPD has one Incident Commander Type 3 (ICT3), two Crew Bosses (CRWB), two Engine Bosses (ENGB), and two Taskforce Leaders (TFLD). Target levels in the plan for NWCG positions are five TFLDs, 20 ENGBs, five CRWBs, five CRWB trainees, and all firefighters trained to the advanced level of firefighter 1 (FFT1).

Training and maintaining this level of fireline leadership will require an ambitious commitment from the various departments and their firefighters. These standards can be met through a local certification program. There is latitude within the state and federal certification process for the departments to set their own local certification programs as long as personnel only deploy within their respective districts and normal mutual aid areas. It is recommended each agency develop standards that mirror the NWCG certification process by using NWCG courses and locally developed Position Task Books (PTB). PTBs should be developed for Squad Boss (FFT1), Crew Boss/Engine Boss (Single Resource), and Task Force/Strike Team Leader (TFLD). Incident Commander Type 5 (ICT5) PTB should not be modified and officers should be able to complete it without going on a wildland fire assignment.

Each agency also should provide a process for individuals who want to deploy on national incidents. This process could be developed similar to the program Fairmount Fire Department is using to provide positions at the national level. Completion of the required PTB for these positions can be facilitated by participation on prescribed fires but is still subject to the availability of wildfire assignments.

Each agency should sponsor the required courses using its training facilities and hiring instructors. The costs of these courses can be born by outside participants and/or shared by the four local emergency response agencies serving CCC. This process will allow each department to set times and locations that are convenient to their personnel.

Each agency should develop the following interim position/training targets:

- Year 1: Officers/Officer Candidates/Interested Firefighters initiate FFT1/ICT5 PTB; classes: S-131 Firefighter Type 1, S-133 Look Up, Look Down, Look Around; officers complete I-300 Intermediate ICS.

6. Emergency Operations

- Year 2: Officers/Officer Candidates/Interested Firefighters complete FFT1/ICT5 PTB; classes: S-290 Intermediate Wildland Fire Behavior, S-230/231 Crew Boss/Engine Boss (Single Resource) (for ENGB); officers complete I-400 Advanced ICS.
- Year 3: Officers/Officer Candidates/Interested Firefighters initiate ENGB PTB; classes: S-215 Fire Operations in the WUI.
- Year 4: Officers/Officer Candidates/Interested Firefighters complete ENGB PTB and work towards Engine Strike Team Leader (STEN) and ICT4 as able; classes: S-330 Task Force/Strike Team Leader.

6.2.2 Performance Standards

Target standards for wildland fire response that are outlined in the existing draft of the Evergreen Fire/Rescue Wildland Fire Plan are applicable to all agencies serving CCC. The standards are divided into two categories: wildland fire and WUI fires. These target performance standards are based on daytime turnout response and the threat to values at risk. These benchmarks should be monitored against actual response time over the next few years to determine if they require adjustment or if operational modifications are required in order to meet these objectives.

Wildland Fire

- Size-up and scouting completed within 30 minutes of smoke report;
- Handcrew stage within 30 minutes of a confirmed fire;
- Handcrew on the fire within 1 hour of a confirmed fire;
- Fire behavior forecast transmission within 30 minutes of smoke report;
- Maintain type 4 incident management to termination or relief by a type 3 incident management team;
- Maintain a 20-person handcrew for the duration of an in-county incident; and
- Ability to activate air support within 30 minutes if determined to be necessary

Wildland-Urban Interface Fire

- Size-up and scouting completed within 10 minutes of smoke report;
- Task force stage within 20 minutes of a confirmed fire;
- Fire behavior forecast transmission within 10 minutes of a confirmed fire;
- Maintain type 4 incident management to termination or relief by a county type 3 incident management team;
- Maintain a 20-person task force for the duration of an in-district incident; and
- Ability to request air support within 10 minutes of a confirmed fire if determined to be necessary.

Suppression Requirements

For illustration purposes, Table 13 compares initial attack capabilities for an average engine crew as determined from the “Line Production Rates for Initial Action by Engine Crews” charts (NWCG 2004) with predicted fire spread under 50th percentile climatic conditions as determined from the Corral Creek RAWS data. These are generalized figures provided to illustrate the potential gap between potential fire behavior and available suppression resources and do not account for response time.

Table 13. Wildland Fire Production Rates vs. Fire Spread

Initial Attack Fire Line Production Rates Using 3-Person Engine Crew			
FBFM	Predicted Fireline Production Rates (chains/hr)	Fire Acreage and Perimeter (chains) After First Hour	Predicted Fire Spread (chains/hr) Under Average Conditions
1 – Short grass	24	222 acres/183 chains	72
2 – Grass with Timber/Shrub Overstory	15	47 acres/84 chains	33
4 – Mature Brush	8	16 acres/157 chains	61
5 – Young Brush	12	15 acres/47 chains	19
6 – Intermediate or Dormant Brush	12	39 acres/77 chains	30
8 – Closed or Short-Needle Timber Litter – Light Fuel Load	15	0.1 acres/5 chains	2
9 – Hardwood or Long-Needle or Timber Litter – Moderate Ground Fuel	12	2 acres/18 chains	7
10 – Mature/Overstory Timber and Understory	12	2 acres/18 chains	7

1 chain = 66 feet

Source for production rates: Fireline Handbook, NWCG, 2004.

Source for fire size and rate of spread: BehavePlus Fire Behavior Modeling System

A single-engine company can make good progress in containing a surface fire in timber fuels under average climatic conditions. Three or four engine companies should be able to catch a fire in light brush. Heavy brush and grass fuels that can't be quickly accessed by firefighters during severe climatic conditions will pose a challenge to containment, highlighting the importance of mutual aid and aerial support.

Table 14 is based on the time a crew can prepare a structure for a wildland fire using a Type-1 engine. The accepted standard is 20 minutes for a four-firefighter crew and 30 minutes for a three-firefighter crew.

Table 14. Structure Protection/Triage Rates

Structural Protection Rates Per Hour Using Type-1 Engine		
Firefighters	Rates	Total Structures per Hour
3	30 minutes/structure	2
4	20 minutes/structure	3

The aforementioned performance standards included in the plan are designed to address these suppression needs. As with the response targets, these production standards should be trained to and monitored for attainability.

6.3 Emergency Procedures and Evacuation Procedures

In the event that the CCC Sheriff orders a community to evacuate because of threatening wildfire, residents should leave in an orderly manner. The Sheriff would proclaim the preferred evacuation routes and safe sites. However, the need for evacuation can occur without notice when conditions for wildfire are favorable. Homeowners should be prepared to evacuate without formal notice. Human safety is the number one concern in an evacuation.

Residents of the WUI should have a predetermined action plan for the eventuality of a wildfire. This plan should include closing windows and doors while leaving a backdoor unlocked and placing a ladder to the roof for firefighter access, as well as leaving porch lights on so that the home can be seen at night. Families should have meeting locations in place and phone numbers to call in case family members are separated. A plan to leave quickly with essential items should be included. Some refer to these items as the “Four Ps:” Pets, Papers, Pills (medications), and Photos.

Evacuation procedures vary according to subdivision. CCC and its emergency response agencies should ensure that every resident has the opportunity to become familiar with these procedures. Evacuation plans should outline available evacuation centers and procedures to activate the centers. Large-animal evacuation centers and assistance teams, including the CCSO Animal Control Division, also need to be identified. These procedures should be addressed in public or HOA meetings with information eventually being distributed door-to-door.

Upon returning to a home after a fire, residents should be told to monitor the exterior of the house for smoke for several days. Embers may lodge in small cracks and crevices and smolder for several hours or days before flaming.

6.4 Water Resources

Emergency water availability varies greatly throughout the county and is a critical resource in the event of any wildfire. Georgetown and Idaho Springs are serviced through a municipal water supply with hydrants installed throughout the incorporated districts.

Community surveys assessed each subdivision for availability of an emergency water source. In most rural areas, emergency water is supplied by mobile water tenders and re-supplied by drafting from local streams and ponds, if available. Improving and stabilizing access to these resources is a recommended action and one that will facilitate more efficient water supply for initial as well as extended attack. Permanent plumbing may be installed for emergency access to static water sources such as ponds, lakes and pools. These “dry hydrants” provide easier access and facilitate drafting operations (Figure 25). Regular inspection and maintenance is required.

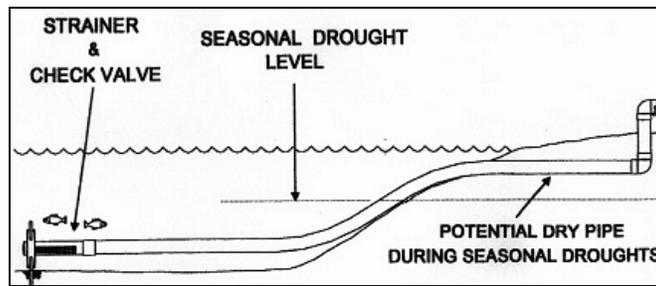


Figure 25. Dry Hydrant Installation

Areas are also identified that lack a natural water source. Cistern installation is recommended in these areas to supplement the lack of an accessible re-supply source (Figure 26). Site selection should have easy and safe access, adequate defensible space, ability to accommodate gravity feed to apparatus, easy re-supply, and strategic placement at the entrance to a subdivision.



Figure 26. A 10,000-Gallon Cistern Awaiting Installation In Jefferson County

Potential helicopter dip sites have been located and mapped with corresponding GIS coordinate information. These sites should be carefully surveyed by NWCG qualified personnel for potential obstructions and other hazards. Access to most water resource sites involves negotiations with landowners and/or water rights holders. Detailed water resource information may be found in Appendix D.

Fixed wing air support is often utilized when fires are difficult to access, ground resources are inadequate, or fir behavior prevents direct attack. Fixed wing airtankers typically refuel and re-supply in Broomfield, Colorado at the Rocky Mountain Metropolitan Airport.

7

Wildfire Mitigation

7.1 The Principals of Mitigation

Mitigation objectives ultimately support the overarching goal of enhancing the safety and welfare of the county’s residents and emergency responders. This is achieved by reducing the threat of catastrophic wildfire through strategic fuels reduction, reducing structural ignitability, and making infrastructure improvements that facilitate access and enhance suppression capabilities. Sustaining community outreach through education and public relations efforts are equally important factors. Effective mitigation needs the support of the residents.

Mitigation recommendations directly address those factors identified through the community hazard and risk assessments that may comprise human safety and welfare (Figure 27). Specific community recommendations are detailed in Appendix D. Several assumptions that drive these recommendations are highlighted below.



Figure 27. The Fire Triangle

7.1.1 Ignitions and Surface Fire vs. Catastrophic Fire

Wildfire ignitions are inevitable. No measure of preparedness can prevent an ignition from occurring. We can, however, greatly influence what happens to that ignition with effective suppression response and modifying the one element of the fire triangle we have any control over – fuel.

Catastrophic wildfire is the result of having the right mix of fuels during extreme fire weather conditions. Low fuel moisture and low relative humidity on a hot day sets the stage. Dense timber, grass, and shrubs or low hanging limbs provide the ladder fuels needed to carry a surface fire into the tree canopy. With continuous fuels and severe weather, these crown fires cannot be affected from direct suppression attempts on the ground (Figure 28).



Figure 28. Bigfish Crown Fire, Colorado, 2002

Surface fires, on the other hand, burn along the ground without sustaining flame runs into the forest canopy (Figure 29). Weather may also be a factor but fuel loads are lighter, trees more dispersed, and ladder fuels are generally absent. These conditions may occur naturally in certain ecosystems, or artificially through planned forest treatment. Depending on access and other safety factors, surface fire can be directly suppressed through normal firefighting ground operations.



Figure 29. Surface Fire, Whitetail incident, North Dakota, 2004

7.1.2 Fuels Mitigation

Mitigation works (Figure 30). It is entirely possible to create a cleaner, healthier, natural environment where forest fuels cannot support a crown fire. Reducing surface fuels and limbing low tree branches inhibits the initiation of crown fire. Forest thinning reduces crown fire propagation by breaking canopy continuity and forcing the flaming front to the ground. This reduces fireline intensity, significantly lowers the risk of structure loss, and creates a safer situation in which to deploy suppression resources.



Figure 30. Defensible Space Downhill From Home, Overland Fire, Colorado, 2003

Fuel reduction around homes, structures, and valued resources is known as defensible space. Effective implementation can greatly reduce or even eliminate the need for structure triage or suppression resource assignment in the event of a wildfire incident. Defensible space around a home or adjacent homes on private property is the easiest and most effective fuels treatment to implement on a local scale. Larger treatments that involve multiple property owners or public lands become more complex to implement, although results may have a broader positive effect for the entire community.

7.2 Mitigation Strategies

7.2.1 Maintain Momentum Through Outreach and Public Education

The most effective means to initiate local action is through community education and public outreach. An annual community meeting in the spring can spur action on the part of neighborhoods and individuals. This can be a forum for presentations by experts in the field and allow for coordination of “cleanup” efforts within the community. Firewise materials and postings should be made available to the public at each fire station, post office, HOA, and elementary school on a regular basis. A disposal method for yard waste should be coordinated

every spring. This may be coordinated with HOA spring cleanup activities and may include the coordination of a central disposal site, mobile chipping services, or a hauling service. See Section 7.4 for potential funding opportunities.

An example would be the scheduling of an annual “Slash Day,” taking place every first Saturday of October for instance. A community, HOA, or neighborhood would hire a contractor by the hour to chip the slash stacked along the main road by homeowners in front of each residence. Each landowner would pay for the time it took to chip his/her slash, but the equipment and scheduling costs would be carried/distributed among all participating landowners.

Community and stakeholder involvement is a critical component of developing a successful CWPP, but the same is true implementing, sustaining, and monitoring the plan over time. It is important to maintain momentum within the community after the CWPP is completed. Ongoing supporting actions also include grant application efforts, county statutes review, CCC EOP review and updates, pre-suppression planning, resource mapping updates, and ongoing collaboration and planning with neighboring agencies and jurisdictions.

7.2.2 Defensible Space and Structural Ignitability

As described in Section 1.6, defensible space improvement on private lots is a county regulated activity only through the building permitting process for new home construction and modifications to existing homes. With the possible exception of existing HOA/POA covenants, all other defensible space improvement activities are voluntary. The County Wildfire Mitigation Plan, which was implemented in 1996, establishes criteria for effective wildfire hazard reduction and provides a basis for home and property inspection. County criteria are consistent with CSFS guidelines as set forth in *Creating Wildfire Defensible Zones*, Bulletin No. 6.302 (Dennis 2003). For current homeowners, the County the Wildfire Mitigation Plan outlines common sense practices for creating defensible space on a voluntary basis.

The County Wildfire Mitigation Plan; was developed to in order to address the increasing hazards associated with the spread of development into the less accessible and more heavily forested areas of the county. The Plan provides a four-fold approach to reduce hazards in those areas:

1. Require all new development and re-roofing to use a “Class A” rated roof. Because wood shakes and wood shingles are not “Class A” rated materials, special rated assemblies are required for wood roofs.
2. Require all new development and additions greater than 400 square foot to develop a Defensible Space around the existing and/or proposed structure(s).
3. For properties where either the access road, the proposed or existing driveway does not nor can not meet the minimum standards, additional mitigation must be done in order to reduce the hazards from either a structure fire or wildfire. These measures are to protect both the property residents and the firefighters responding to the fire call. The Point System Agreement was developed to help the property owner achieve additional mitigation.
4. All structures 4,400 square foot or more must be equipped with an approved monitored automatic suppression system.

Establishing the Fire Safety Zones

To develop the most effective Defensible Space Plan possible, the property is evaluated and divided into 3 Zones (Figure 31). The following are explanations and illustrations of the Zones and their role in the Defensible Space Plan:

Zone 1 is the defensible space area immediately adjacent to the structure and the driveway. This area is where the greatest modification of thinning and cleanup will occur. The size of Zone 1 is 15 feet, measured from the edges of the structure. Within this zone, several specific treatments are recommended. Plant nothing within 3 to 5 feet of the structure, particularly if the building is sided with wood, logs or other flammable materials. Decorative rock, for example, creates an attractive, easily maintained, nonflammable ground cover.

If the house has noncombustible siding, widely spaced foundation plantings of low growing shrubs or other “fire wise” plants are acceptable. Do not plant directly beneath windows or next to foundation vents. Be sure there are no areas of continuous grass adjacent to plantings in this area.

Frequently prune and maintain plants in this zone to ensure vigorous growth and a low growth habit. Remove dead branches, stems and leaves.

Do not store firewood or other combustible materials in this area. Enclose or screen decks with metal screening. Extend the gravel coverage under the decks. Do not use areas under decks for storage.

Zone 2 is an area of fuel reduction. It is a transitional area between Zones 1 and 3. The size of Zone 2 depends on the slope of the ground where the structure is built. Typically, the Defensible Space should extend at least 75 to 125 feet from the structure. Trees and large shrubs should be thinned so there is at least 10 feet between crowns. Crown separation is measured from the furthest branch of one tree to the nearest branch on the next tree (Figure 31). On steep slopes, allow more space between tree crowns. Remove all ladder fuels from under the remaining trees. Carefully prune trees to a height of 10 feet.

Limit the number of dead trees (snags) retained in this zone. Wildlife needs only one or two snags per acre. Be sure any snags left for wildlife cannot fall onto the house or block access to roads or driveways.

Locate propane tanks at least 30 feet from any structures, preferably on the same elevation as the house. Flammable vegetation should be cleared within 10 feet of these tanks. Under no circumstances should propane tanks be screened with shrubs or vegetation.

Dispose of slash (limbs, branches, and other woody debris) removed from trees and shrubs through chipping or by piling and burning. Contact the CCC Sheriff’s office for information about burning slash piles. Only if neither of these alternatives are possible, lop and scatter slash by cutting it into very small pieces and distributing over the ground. Avoid heavy accumulations of slash; lie close to the ground to speed decomposition. If desired, no more than two or three small, widely spaced brush piles may be left for wildlife purposes. Locate these uphill towards the outer portions of the defensible space.

Zone 3 is the area of existing forest from the edge of Zone 2 out to the property boundaries. Traditional forest management in this area will target dead, diseased and damaged trees allowing continued health of the surrounding forest and the property's aesthetics.

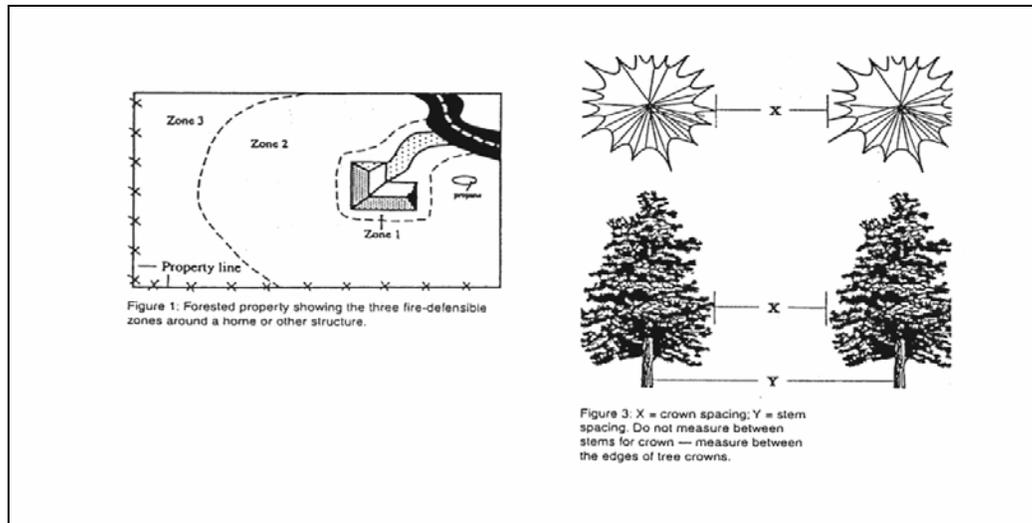


Figure 31. CSFS Defensible Space Guidelines and Standards (Dennis 2006)

Source: CCC Site Development Dept.

Commonly Asked Questions about Defensible Space

“What is a defensible space and why do I need this?” According to the NWCG, it is defined as “a fuel break adjacent to improvements, in which you can safely defend the improvements.” In order for a structure to survive a wildfire, radiated heat and fire intensity must be kept to a minimum. This is accomplished by a combination of clearing and thinning trees and other vegetation around the proposed or existing structures, and along the driveway. Defensible space requirements are designed to minimize the impact to the property while still providing safety for the structures, the inhabitants, and the firefighters.

“How are the trees selected?” The trees are selected by considering the crown spacing, the types of trees and topographical characteristics of the property. As a fire grows in intensity, it can move into the crowns of trees, and by a heat transfer mechanism known as convection, rapidly move up slope and down wind. A crown fire can outrun the surface fire and cause ground fires to start as it passes. The crown spacing must then be wider closer to the home and can be narrower as the distance from the home increases. Smaller trees and diseased trees will be selected first. The homeowners' selection of “special” trees, for screening and aesthetics, will be considered and worked around whenever possible.

“Do I have to clear cut everything from around my home?” This is a common misconception of the defensible space program. The area immediately adjacent to the home is for defensible space is 3 to 5 feet wide. If the home is sided with flammable material, it is advised not to plant any trees, shrubs, or flammable ground cover in this area. If non-combustible siding is used, widely spaced shrubs are acceptable but should not be planted under windows or next to vents. From this zone, extending out away from the home, crown spacing decreases gradually and additional lower branches are allowed to remain.

“What else can I do to help protect my home?” Improving the fire-resistant characteristics of a structure goes hand-in-hand with the development of defensible space. Extensive recommendations can be found in CSFS publications available at <http://csfs.colostate.edu/library.htm>. The most significant improvement that can be made to many of the homes in the assessment areas is the replacement of wood shake roofing with noncombustible roofing material, as is required for all new and replaced roofs in both Jefferson and Boulder Counties. All homeowners should keep roofs and gutters clear of leaves and pine needles. Screening of gutters and roof vents is recommended. Embers from a wildfire can become windborne and travel long distances before settling.

Some of the more important but often overlooked items include:

- Posting signs for quick address identification, designated emergency vehicle parking areas, and bridge load limits;
- Routine maintenance of the Defensible Space;
- Clearing debris from roof and gutters;
- Removal of branches overhanging the chimney;
- Outdoor water supply availability complete with hose and nozzle;
- Fire extinguishers are checked and in working condition;
- Storing tools, such as rakes, hoes, axes, and shovels in an easily accessible area for use in case of a fire;
- Practicing family fire drills and fire evacuation plan. Escape areas should be open with good visibility all around. Meadows, rock outcrops, and wide roads are good examples;
- Proper screening of attic, roof and eave openings, and proper skirting, screening or enclosing the sides of stilt type foundations; and
- If time allows, as the wildfire approaches, covering window shutters or heavy draping and moving furniture to the center of rooms.

Additional information and recommendations can be found in CSFS publications available at <http://csfs.colostate.edu/library.htm>.

7.2.3 Community Access and Evacuation

Access is an important component of any community’s wildfire hazard and risk profile. Community access characteristics dictate the efficiency of emergency evacuation as well as the effectiveness of emergency response. Preferably community road design provides for multiple points of ingress/egress, supports two-way traffic flow, and offers adequate emergency apparatus turnaround radius on dead end roads and cul de sacs.

Each neighborhood or community within the fire district has unique access characteristics. The individual neighborhood assessments provided in Appendix D provide analyses of these characteristics and specific recommendations on ways to improve current conditions.

Road improvements to primary or secondary evacuation routes may be as straight forward as seasonal grading, constructing or improving turnarounds at dead ends, widening a particularly tight switchback, or improving a section of road that would not support fire access.

7.2.4 Shaded Fuel Breaks

All forested access roads should be maintained as shaded fuel break zones, where possible. Reducing the forest canopy along access roads, particularly designated evacuation routes, enhances the effectiveness of the physical canopy break the road provides, as well as critical safety factors along likely evacuation and incident access routes (Figure 32). This creates a safer emergency ingress/egress scenario while greatly aiding potential tactical suppression efforts. Fuels treatment along roadways reduces removal costs as well as project complexity. Visit <http://csfs.colostate.edu/library> for fuel break guidelines.

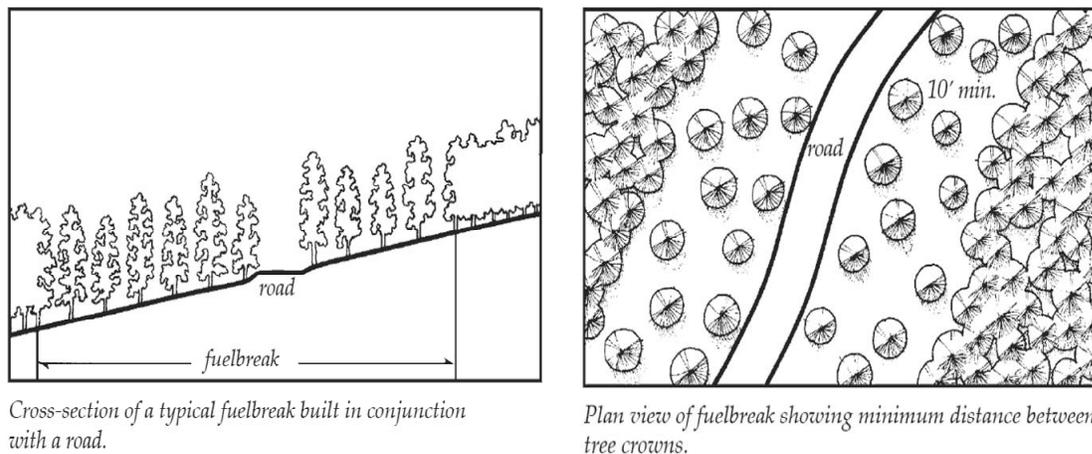


Figure 32. Principals of a Shaded Fuel Break

7.2.5 Emergency Preparedness

Strategic emergency water access, especially in rural mountainous areas, is an important factor in wildland firefighting, particularly in the early stages of an incident. Community surveys in this CWPP include water resource assessment and provide recommendations to improve access where appropriate. Enhancements to local emergency response capacity may also include apparatus and equipment upgrades, mapping and GIS, staff recruitment, communications, training and certification, and pre-suppression planning.

7.2.6 Strategic Forest Thinning

Thinning recommendations may also target larger timber stands posing a specific wildfire threat to neighborhoods. Strategic fuelbreaks may be designed with shaded fuelbreak characteristics or as a fuel-free buffer zone for more aggressive fuel reduction. Strategic fuelbreaks along neighborhood margins should mutually support adjacent defensible space efforts. Treatment locations are strategically positioned in forest stands that pose a significant threat to populated areas and are based on ignition potential, expected fire behavior, fuel type and density, and topography. As with shaded fuelbreaks these treatment areas are designed to slow an advancing wildfire by reducing the available fuel load and breaking forest canopy continuity. Stands are thinned, ladder fuels are pruned, and excess surface fuels are removed. Because of the inherent

access issues associated with these strategic locations, pile burning is often the only feasible option for the removal of timber and slash.

Because treatment areas often span multiple ownership boundaries, planning and coordination with landowners and public agencies is critical. In CCC, these areas are typically located on federal land and would require full review by USFS fire and project planners as well as NEPA assessment. Forest treatment recommendations on federal land are an important component of any CWPP as the process was designed to help influence where and how federal agencies implement fuel reduction projects on federal lands and how additional federal fund may be distributed for projects on non-federal lands.

7.2.7 Watershed Resource Protection

In the early strategic planning phases of the project, the county’s watershed resources were identified as critical value at risk. One of the primary goals established for the project was shaped by this common concern. Section 1.3, Goals and Objectives, states “recommend mitigation measures that contribute to the conservation of headwater watershed resources, and other natural and economic assets.”

A county’s “Watershed Interface” was defined and delineated in the initial strategic planning meeting. This was identified as a separate area of concern from the actual WUI management zones that were also identified during the planning meeting. The primary risk to watersheds from wildfire is the post-fire erosion that occurs after stabilizing ground cover has been removed. These erosional events take place during heavy rain or spring run-off until ground cover has been re-established, a process that can take years (Figure 33). Sediment clogs streams and reservoirs, and fouls water treatment facilities.



Figure 33. Watershed Damage From Post-Fire Debris Flow

Effectively mitigating an entire watershed with the goal of preventing potential debris flow is likely an impossible goal to achieve. Landscape-scale treatments in rugged and inaccessible terrain are logistically and financially impractical. Treatment recommendations may, however, take into account watershed resources where they intersect with designated WUI treatment zones. With a 1-mile buffer placed around each WUI, the majority of the “watershed interface” is covered (Figure 34).

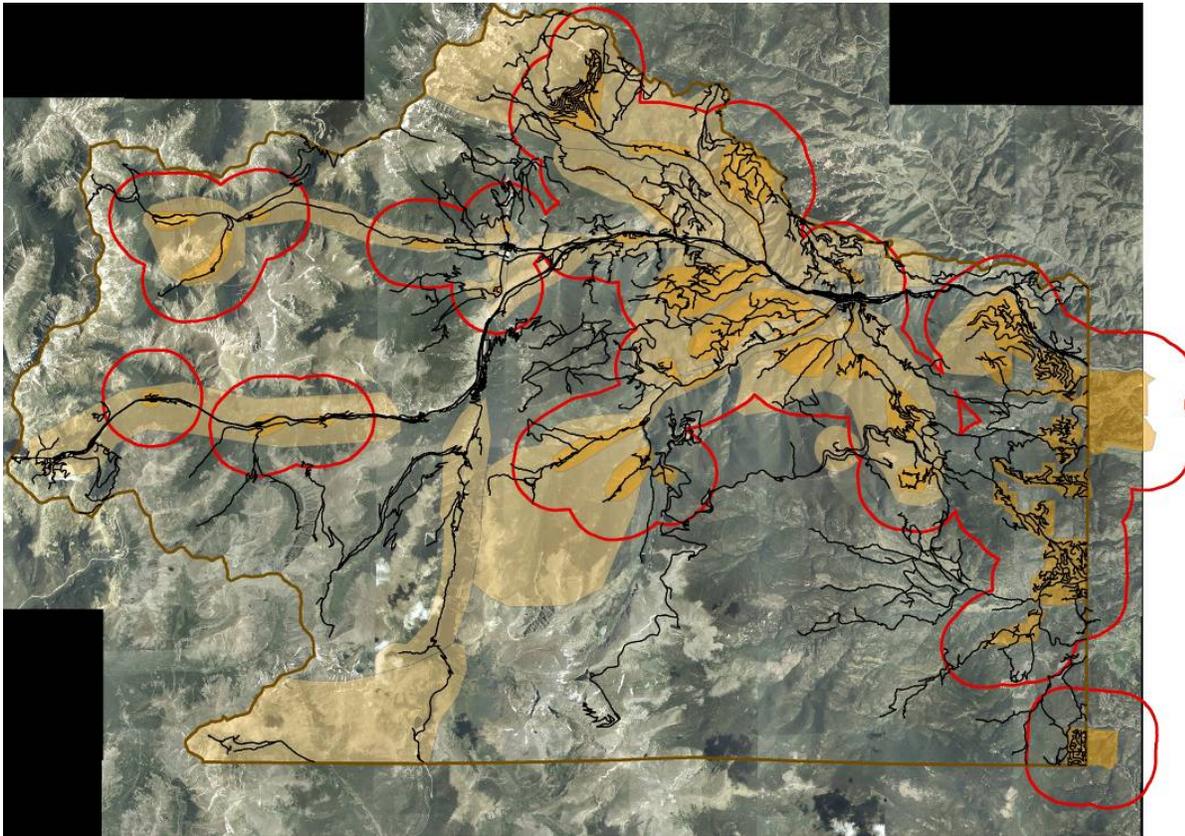


Figure 34. Proximity of Clear Creek Watershed Interface (light tan) to CCC WUIs (dark tan) With One-Mile Buffer (red)

In the event of a post-fire debris flow into Clear Creek, notification may be issued to downstream water authorities that is similar to the call-down procedure that is activated in response to a toxic waterway spill. An automatic detection system is already active that provides instant notification to the communication center if toxic materials are detected. This system should have existing capacity to detect turbidity and could be activated and utilized during a debris flow event.

7.3 Treatment Options

Fuels treatment recommendations focus on the creation of defensible space around structures; shaded fuel breaks along forested primary and secondary roads; and forest treatments that may involve thinning or path cuts in strategic locations to buffer communities, potential safety zones, or emergency access. Each of the recommended fuel mitigation projects can be achieved by a variety of methods. Selecting the most appropriate, cost-effective option is an important planning step. This brief synopsis of treatment options and cost estimates is provided to assist in this process. Cost estimates for treatments should be considered as very general guidelines (Table 15). Timber treatment costs can vary tremendously based on project complexity, but generally run \$300 to \$1,200 per acre depending upon:

- Type of fuel;
- Diameter of materials;

- Acreage of project;
- Steepness of slope;
- Density of fuels;
- Proximity to structures;
- Access; and
- Transportation costs.

It is imperative that implementers plan for the long-term monitoring and maintenance of all treatments. Post-treatment rehabilitation including seeding with native plants and erosion control may be necessary.

Table 15. Treatment Alternatives and Costs

Treatment	Estimated Cost	Comments
Machine Mowing	\$90 - \$200 per acre	<ul style="list-style-type: none"> • Appropriate for large, flat grassy areas on relatively flat topography.
Prescribed Fire	\$75 - \$300 per acre	<ul style="list-style-type: none"> • Can be very cost effective. • Ecologically beneficial. • Can be used as training opportunity for firefighters. • Cost varies with complexity. • Carries risk of escape, which may be unacceptable in some WUI areas. • Unreliable scheduling due to weather and smoke management constraints.
Brush Mastication	\$300 - \$500 per acre	<ul style="list-style-type: none"> • Brush species (Gamble oak in particular) tend to resprout vigorously after mechanical treatment. • Follow-up treatments with herbicides, fire, grazing, or further mechanical treatments are typically necessary. • Mastication tends to be less expensive than manual treatment and eliminates disposal issues.
Timber Mastication	\$300 - \$1,200 per acre	<ul style="list-style-type: none"> • Materials up to 10 inches in diameter and slopes up to 30 percent can be treated. • Eliminates disposal issues. • Environmental impacts of residue being left onsite are still under study.
Manual Treatment with Chipping or Pile Burning	\$300 - \$1,200 per acre	<ul style="list-style-type: none"> • Allows for removal of merchantable materials or firewood in timber. • Requires chipping, hauling, and pile burning of slash.
Feller Buncher	\$750 and up per acre	<ul style="list-style-type: none"> • Mechanical treatment on slopes over 30 percent of materials over 10 inches in diameter may require a feller buncher rather than a masticator. • Costs tend to be considerably higher than mastication. • May allow for removal of merchantable material.

7.4 Project Support

This section provides information that may be helpful in planning and preparing for fuels mitigation projects.

Funding and Grants: Grant funding support is often a necessary component of a fuels treatment project and can facilitate fuel reduction on both private and public lands. In addition to opportunities that are available through the CCC Office of Emergency Management and the CCC Site Development Department, CSFS (Gallamore, 2008) has summarized the following available resources:

CSFS Eligible Landowner Assistance Programs and contingencies (5/23/07):

- Landowners apply through CSFS District Offices unless noted below;
- Applications approved when funds are available throughout the year;
- Matching expenses or in-kind activities by landowner are generally required; and
- Grant availability is subject to continued funding from federal and state government.
 1. **WUI Incentives** – Wildland Urban Interface for fuels reduction.
 2. **FLEP** – Forest Land Enhancement Program for multiple conservation practices (*applications are usually handled through local Soil & Water Conservation District*).
 3. **I & D Prevention and Suppression** – Bark Beetle – Forest Health.
 4. **FRFTP** – Front Range Fuels Treatment Partnership for fuels reduction.
 5. **STEVENS'** – Stevens' or "Companion" funds for fuels reduction projects on non-federal lands that may be threatened by burning on US Forest Service lands (*these funds may be "no match" in some cases*).

CSFS Assistance Programs – Communities and Agencies and (3/20/08):

- Cooperators, communities, organizations, agencies – apply through CSFS District Offices;
- Applications received and approved during the identified funding windows;
- Matching expenses or in-kind activities by applicants are generally required
- Grant availability is subject to continued funding from federal and state government; and
- Applications for activities listed in current CWPPs are normally ranked highest for funding.
 1. **WUI Incentives** – Wildland Urban Interface for fuels reduction – Application period is August, for grants awarded the following May; grants are usually for a one-year period ending September 30th of year following award.
 2. **CWPP Implementation** (CSFS/SFA) - Application period is January or May, for grants awarded that year; grants usually must be completed by September 30th of the awarded year.
 3. **Colorado Community Forest Restoration** (HB 07-1130) - Application period is July-August, for grants awarded that year; grants are usually for a two-year period ending June 30th of 2nd year following award; subject to continued funding through Colorado Legislature.
 4. **FRFTP** – Front Range Fuels Treatment Partnership for fuels reduction - Application period is January or May, for grants awarded that year; grants usually must be completed within one to two years of the award date.

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5. **STEVENS'** – Stevens' or "Companion" funds for fuels reduction projects on non-federal lands that may be threatened by burning on USFS lands (these funds may be "no match" in some cases). Application period is January or May, for grants awarded that year; grants usually must be completed within one to two years of the award date.
6. **I & D Prevention and Suppression** – Bark Beetle – Forest Health - Application period is January or May, for grants awarded that year; grants usually must be completed within one to two years of the award date.

For additional grants and grant application assistance visit: Rocky Mountain Wildland Fire Information - Grant Database: <http://www.rockymountainwildlandfire.info/grants.htm>

Grant Writing Handbook: <http://www.theideabank.com/freeguide.html>

Public Land Planning: Public lands within CCC include those managed by:

- CCC;
- Denver Mountain Parks;
- Colorado Division of Wildlife;
- City of Golden;
- Town of Georgetown;
- Historic Georgetown;
- City of Idaho Springs;
- Jefferson County Schools;
- Colorado State Historical Society;
- Colorado State Land Board;
- Town of Silver Plume; and
- USFS.

The CWPP development process is designed to facilitate dialog with these agencies and coordinate public and private wildfire and forest management strategies where appropriate. As the CWPP strategic plan is implemented, dialogue and collaboration should be maintained with these agencies to coordinate strategies and treatments, and make adjustments if necessary.

Regulatory Support: One of the major issues confronting defensible space and hazardous fuels mitigation is the need for ongoing maintenance. Treatment projects in timber or brush fuels have an effective life span of approximately 10 to 15 years before vegetation regeneration once again creates hazardous fuel loads. In addition, defensible buffers and fuel breaks mowed in grasslands are beneficial only through that particular growing season. Regulatory assistance is provided upon the sale or upgrade of a home. Additional regulatory impetus may be needed to help motivate existing landowners to improve conditions on their property in the absence of a sale or building permit.

Section 50: W-H Wildfire Overlay District (orig. 1-27-76; am. 7-11-06) provides basic landuse and mitigation guidelines; ***Subsection G. Maintenance Of Defensible Space and Associated Fuel Break Thinning;*** *Defensible space and fuel break thinning work must be completed and maintained to the standards described in the Colorado State University's Cooperative Extension Fact Sheet 6.302. The responsibility for maintaining defensible space and associated fuel break*

7. Wildfire Mitigation

thinning lies with the landowner. Noncompliance with defensible space maintenance standards will be enforced as a Zoning Violation, as specified in the Enforcement and Administrative Exceptions Section of this Zoning Resolution. (orig. 6-18-02; am. 7-11-06)

8

Public Lands Management within Clear Creek County

8.1 Land Ownership Profile

Like much of the mountainous regions of Colorado, the ownership profile of Clear Creek County is dominated by a variety of public land management agencies. With responsibility for managing nearly 67 percent of the county's lands, the largest stakeholder is the USFS. Over 260 square miles of the Arapaho and Roosevelt National Forests lie within county boundaries and includes a large portion of the Mount Evans Wilderness Area. The CSFS actively manages holdings of the Colorado Division of Wildlife and State Land Board. Clear Creek County oversees management activities on county open space, while Denver Mountain Parks oversees the management of several other land assets within the county.

Although ownership is somewhat fragmented, similar forest management challenges face all agencies and include overcrowded even-aged timber stands, hazardous fuel loading, drought stress, insect infestation, as well as the expansion of the WUI to the margins of public lands.

Active forest management can protect water quality, increase habitat diversity for wildlife, and increase the health of remaining timber. In addition, properly managed forests can provide income, reduce the risk of wildland fire, help protect trees against insects and diseases, and even increase the value of privately held forest lands.

Unfortunately actual application of these beneficial management projects is severely limited because of budget constraints from the national to the local county level. With limited resources, supported projects tend to be well defined and address multiple goals and objectives (Figure 35).

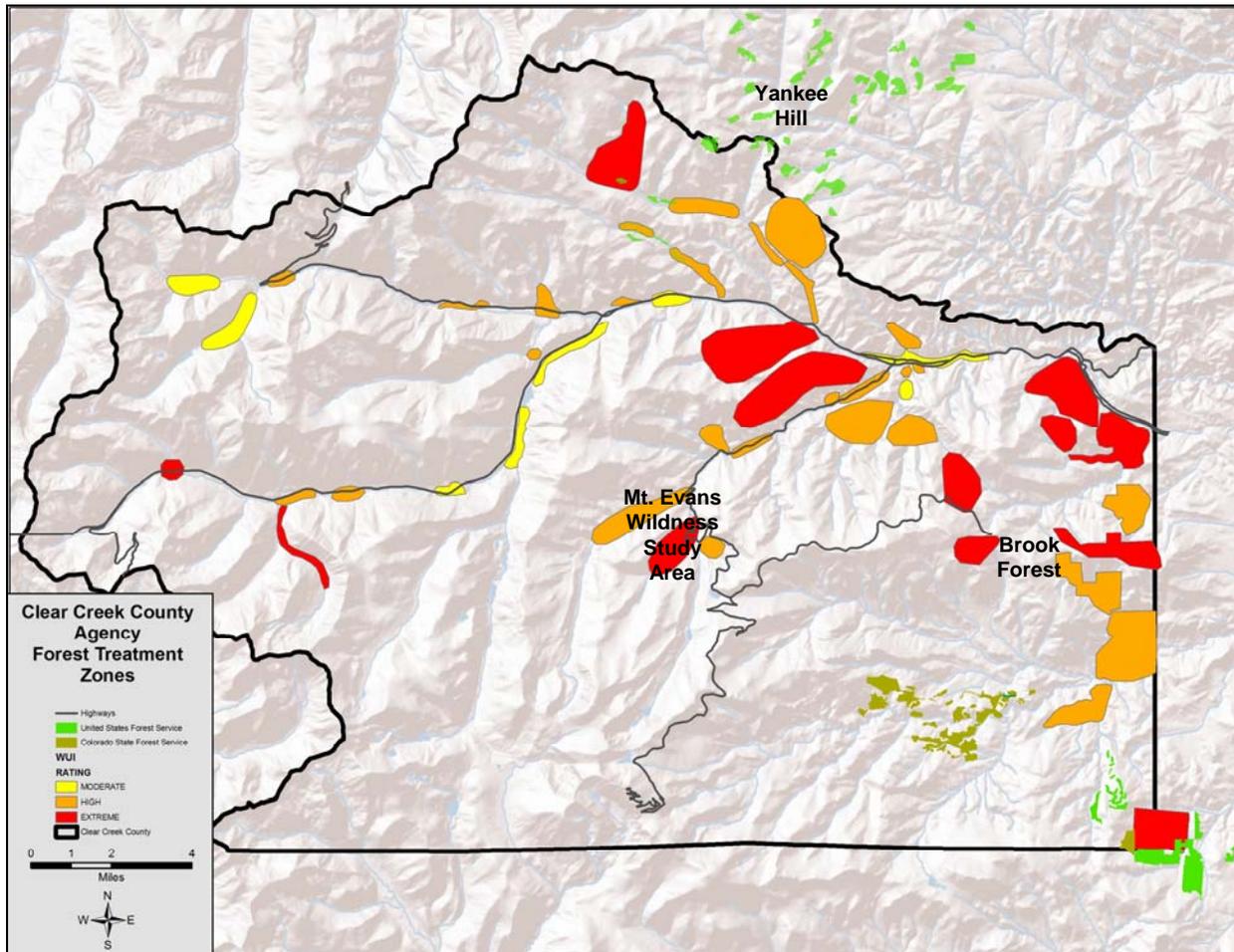


Figure 35. USFS and CSFS Forest Treatment Zones Within The CCC Assessment Area

8.2 Yankee Hill Pilot Project – Arapaho and Roosevelt National Forests, Clear Creek Ranger District

The USFS Yankee Hill pilot project is a component of an interdisciplinary federal fuels reduction project that is being implemented in a number of diverse regions across the United States. A primary objective is to develop a standardized and repeatable methodology to integrate multiple land and resource management objectives when evaluating fuel risks. Landscape scale treatment patterns were developed based on an iterative and collaborative approach. Predictive fire behavior computer modeling was used to evaluate the effectiveness of the proposed treatments.

8.3 Mount Evans Wilderness Study Area

With no WUI near the Mount Evans Wilderness Area, forest management objectives focus on forest and habitat health to support species diversification and healthy ecosystem

restoration. Reduction in the likelihood of catastrophic wildfire in treated areas results from most active forest management activities.

8.4 Brook Forest Fuels Management

Both the USFS and the CSFS have identified treatment zones in the Brook Forest WUI area. Patch cutting and thinning in areas surrounding the subdivision benefit forest and ecosystem health as well as provide a fuels buffer. Dense forest maintained on privately held lands within the WUI remain a serious Wildfire threat to residents.

8.5 Mountain Pine Beetle

The following mountain pine beetle information was presented to the Front Range Fuels Treatment Partnership Roundtable, Golden, CO, January 23, 2008.

More than a dozen leading research experts from the western US and Canada met over a three-day period last week, to assess the status of our scientific knowledge of Lodgepole pine ecology and fire behavior in relation to the mountain pine beetle epidemic. Their focus was on Colorado and southern Wyoming, but they also examined knowledge from many other Lodgepole pine areas where mountain pine beetle epidemics are occurring.

The science team, led by Dr. Merrill R. Kaufmann (emeritus scientist, Rocky Mountain Research Station) and Mike Babler (fire initiative program manager, The Nature Conservancy), reached consensus on a series of points:

- Not all Lodgepole pine forests are the same. Some forests are pure Lodgepole pine established after large fires decades or centuries ago. Others are mixtures with subalpine species such as Engelmann spruce, subalpine fir, and aspen at higher elevations, or with mixed conifer species such as Ponderosa pine, Douglas-fir, and aspen at lower elevations. Each type of forest has unique features of ecology and fire behavior. And Lodgepole pine trees in all three types are vulnerable to attack by mountain pine beetles.
- Forests are living systems subject to constant change. It is normal and expected that many natural agents change our forests over time, including mountain pine beetles, fire, and wind. While forests losing many trees to insect attack will never look the same in our lifetime, healthy and vigorous forests will undoubtedly return in most locations.
- Lodgepole pine will not disappear from the southern Rocky Mountains. The make-up of our forests will change where mountain pine beetle causes high mortality. But we will continue to have forests dominated by or including Lodgepole pine, and these forests will provide valuable ecological services and aesthetic and recreational benefits.
- Active vegetation management is unlikely to stop the spread of the current mountain pine beetle outbreak, because the beetles are so numerous and spreading so rapidly that they may simply overwhelm any of our efforts. However, judicious vegetation

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management between outbreak cycles may help mitigate future bark-beetle caused tree mortality in local areas.

- Though they are infrequent, large intense fires with extreme fire behavior are characteristic of Lodgepole pine forests, especially during very dry and windy conditions. Such fires are a natural way for Lodgepole pine to be renewed and are largely responsible for extensive pure Lodgepole pine forests.
- In forests killed by mountain pine beetles, future fires could be more likely than fires before the outbreak. Large intense fires with extreme fire behavior are again possible. While more research is needed to learn in what ways and how long the fuels and fire environment are altered by the beetles, protection of communities and other values at risk continues to be imperative.
- Mountain pine beetle outbreaks are not likely to cause increased erosion, because they do not disturb the soils or reduce protective ground cover. In areas of high tree mortality, streamflow may increase and the timing of water delivery may be changed for decades, because of reduced canopy interception of precipitation and reduced water uptake by the trees.
- Climate changes will most likely contribute to substantial forest changes in the decades ahead. Given the climate changes in the last 20 years and projected changes for the next several decades, large fires and other natural disturbances are anticipated in many forests of Colorado and southern Wyoming. These large disturbances and other changes in growing conditions will likely contribute to restructuring many forest lands

9

Monitoring and Evaluation

9.1 CWPP Adoption

The CCC CWPP is a strategic planning document that is developed and approved by the Core Team. An important component of the development process includes building a stakeholder group that will move the plan forward, implement prioritized recommendations, and maintain the CWPP as the characteristics of the WUI change over time. Organizing and maintaining this “CWPP Task Force” team are often the most challenging components of the CWPP process. They are, however, essential in the process of converting the CWPP from a strategic plan into action.

This team will oversee the implementation and maintenance of the CWPP by working with fire authorities, community organizations, private landowners, and public agencies to coordinate and implement hazardous fuels treatment projects management and other mitigation projects. Building partnerships among neighborhood-based organizations, fire protection authorities, local governments, public land management agencies, and private landowners is necessary in identifying and prioritizing measures to reduce wildfire risk. Maintaining this cooperation is a long-term effort that requires the commitment of all partners involved. The CWPP encourages citizens to take an active role in identifying needs, developing strategies, and implementing solutions to address wildfire risk by assisting with the development of local community wildfire plans and participating in county-wide fire prevention activities.

The CCC CWPP is a valuable resource that provides the foundation for understanding wildfire risks and hazards, and presents attainable milestones designed to reduce potential losses from wildfire. Individual communities and private landowners can take further action by developing specific fire plans or by participating in county-wide activities for prevention and protection.

9. Monitoring and Evaluation

The HFRA authority for the CWPP requires adoption of this plan, as does the FEMA Disaster Mitigation Act of 2000. With formal adoption by the Core Team, participating agencies and WUI neighborhoods will be competitive for available funding that may assist with plan implementation. Furthermore, adoption of this plan highlights a collaborative planning and development process between the county, public agencies, and residents.

9.2 Sustaining CWPP Momentum

A CWPP can serve as the foundation for a safer and healthier WUI through hazard assessment and strategic planning focusing on the threat of wildfire. The mitigation strategies outlined in this plan will greatly reduce that risk, but only if implemented. Converting strategy into action is the key to achieving this important goal.

Communities can be made safer, and this CWPP has outlined realistic measures to achieve that goal. The CWPP process encourages homeowners to take an active role as fuel treatment strategies are developed and prioritized. Ownership of CWPP implementation at that same local level is the most effective means to achieving successful results and sustaining the effort from year to year.

Proactive neighborhoods can seek support and guidance through a variety of local, state, and federal resources identified in this plan including CCC, the CSFS, and the USFS.

9.3 Monitoring and Evaluation

Monitoring is a critical component of all natural resource management programs. Monitoring provides information on whether a program is meeting its goals and objectives. The purpose of this monitoring strategy is to track implementation of planned activities and evaluate how the goals of the CCC CWPP are being met over time. The data gathered will help to determine if the objectives of the plan are being met, if updates need to be made, and if the plan is useful and being implemented as envisioned. This CWPP is a “living” document and must be continually monitored and updated as conditions and community values change. Monitoring of the Healthy Forest Initiative and HFRA activities has been identified as a major weakness at the national level. It is recommended that monitoring CWPP progress be maintained by local jurisdiction and submitted to the CSFS on a regular basis.

The purpose of this monitoring strategy is to track implementation of activities and evaluate how well the goals of the CWPP are being met over time. The following are the three different types of monitoring:

- **Implementation:** Did you do what you said you would do?
- **Effectiveness:** Did treatments meet the objectives?
- **Verification:** Did our actions lead to the outcomes we expected?

Each functional element of the CCC CWPP provides monitoring tasks for recommended action items. Table 16 provides a summary of monitoring tasks for each of these functional areas. Evaluations are to be conducted on an annual basis.

Table 16. Monitoring and Evaluation Worksheet

Objective	Tasks
Risk Assessment	<ul style="list-style-type: none"> • Update GIS for fire occurrence and fire perimeter. Compile USFS and local data. • Update hazards and risk assessments as new data becomes available. • Continue to assess values at risk and include additions in CWPP updates.
Fuels Reduction	<ul style="list-style-type: none"> • Identify and prioritize fuels treatment projects. • Track total acres of treatment on public and private lands. • Track grants and other funding sources and make appropriate application. • Track defensible space projects on private lands. • Monitor beetle-kill activity and coordinate activities and strategies with USFS and CSFS.
Emergency Management	<ul style="list-style-type: none"> • Maintain visibility with the county EOP process. • Track progress on emergency water supply improvements. • Track progress of emergency resource qualifications. • Review mutual aid resources and agreements.
Public Outreach	<ul style="list-style-type: none"> • Review public outreach material and update as necessary. • Maintain web presence on county site. • Facilitate slash removal. • Coordinate with HOAs for presentations. • Coordinate with CSFS for neighborhood beetle seminars and include CWPP discussion. • Evaluate techniques used to motivate and educate private landowners.

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A

Glossary of Terms

Aerial Fuels	All live and dead vegetation in the forest canopy or above surface fuels, including tree branches, twigs and cones, snags, moss, and high brush.
Aspect	Direction a slope faces.
Chain	A unit of linear measurement equal to 66 feet.
Chimney	A steep gully or canyon conducive to channeling strong convective currents, potentially resulting in dangerous increases in rates of fire spread and fireline intensity.
Crown Fire	The movement of fire through the crowns of trees or shrubs more or less independently of the surface fire.
Dead Fuels	Fuels with no living tissue in which moisture content is governed almost entirely by atmospheric moisture (relative humidity and precipitation), dry-bulb temperature, and solar radiation.
Defensible Space	An area either natural or manmade where material capable of causing a fire to spread has been treated, cleared, reduced, or changed to act as a barrier between an advancing wildland fire and the loss of life, property, or resources. In practice, “defensible space” is defined as an area a minimum of 30 feet around a structure that is cleared of flammable brush or vegetation.
Direct Attack	A method of fire suppression where actions are taken directly along the fire’s edge. In a direct attack, burning fuel is treated directly, by wetting, smothering, or chemically quenching the fire or by physically separating burning from unburned fuel.
Fire Behavior	The manner in which a fire reacts to the influences of fuel, weather, and topography.
Fire Danger	The broad-scale condition of fuels as influenced by environmental factors.
Fire Front	The part of a fire within which continuous flaming combustion is taking place. Unless otherwise specified, the fire front is assumed to be the leading edge of the fire perimeter. In ground fires, the fire front may be mainly smoldering combustion.
Fire Hazard	The presence of ignitable fuel coupled with the influences of terrain and weather.
Fire Intensity	A general term relating to the heat energy released by a fire.

Fire Regime	The characterization of fire’s role in a particular ecosystem, usually characteristic of particular vegetation and climatic regime, and typically a combination of fire return interval and fire intensity (i.e., high frequency, low intensity/low frequency, high intensity).
Fire Weather	Weather conditions that influence fire ignition, behavior, and suppression.
Flame Length	The distance from the base to the tip of the flaming front. Flame length is directly correlated with fire intensity.
Flaming Front	The zone of a moving fire where combustion is primarily flaming. Behind this flaming zone combustion is primarily glowing. Light fuels typically have a shallow flaming front, whereas heavy fuels have a deeper front.
Forest	A special district created pursuant to Article 18 of the Colorado State Revised Statutes that protects communities from wildfires and improves the condition of forests in the District.
Fuel Loading	The amount of fuel present expressed quantitatively in terms of weight of fuel per unit area.
Fuel Model	Simulated fuel complex (or combination of vegetation types) for which all fuel descriptors required for the solution of a mathematical rate of spread model have been specified.
Fuel Type	An identifiable association of fuel elements of a distinctive plant species, form, size, arrangement, or other characteristics that will cause a predictable rate of fire spread or difficulty of control under specified weather conditions.
Fuel	Combustible material that includes vegetation such as grass, leaves, ground litter, plants, shrubs, and trees that feed a fire. Not all vegetation is necessarily considered fuel. Deciduous vegetation such as aspen actually serve more as a barrier to fire spread and many shrubs are only available as fuels when they are drought-stressed.
Ground Fire	Fire that consumes the organic material beneath the surface litter ground, such as a peat fire.
Ground Fuel	All combustible materials below the surface litter, including duff, tree or shrub roots, punchy wood, peat, and sawdust that normally support a glowing combustion without flame.
Indirect Attack	A method of fire suppression where actions are taken some distance from the active edge of the fire due to intensity, terrain, or other factors that make direct attack difficult or undesirable.

Intensity	The level of heat radiated from the active flaming front of a fire, measured in British thermal units (BTUs) per foot.
Ladder Fuels	Fuels that provide vertical continuity between strata, thereby allowing fire to carry from surface fuels into the crowns of trees or shrubs with relative ease. Ladder fuels help initiate and ensure the continuation of crowning.
Live Fuels	Living plants, such as trees, grasses, and shrubs, in which the seasonal moisture content cycle is controlled largely by internal physiological mechanisms, rather than by external weather influences.
National Fire Danger Rating System (NFDRS)	A uniform fire danger rating system that focuses on the environmental factors that control the moisture content of fuels.
One-Hour Timelag Fuels	(a.k.a., one-hour fuels) Fuels consisting of dead herbaceous plants and roundwood less than about ¼ inch (6.4 mm) in diameter. Also included is the uppermost layer of needles or leaves on the forest floor.
One-Hundred-Hour Timelag Fuels	(a.k.a., hundred-hour fuels) Dead fuels consisting of roundwood in the size range of 1 to 3 inches (2.5 to 7.6 cm) in diameter and very roughly the layer of litter extending from approximately ¾ of an inch (1.9 cm) to 4 inches (10 cm) below the surface.
One-Thousand-Hour Timelag Fuels	(a.k.a., thousand-hour fuels) Dead fuels consisting of roundwood 3 to 8 inches in diameter and the layer of the forest floor more than about 4 inches below the surface.
Prescribed Fire	Any fire ignited by management actions under certain predetermined conditions to meet specific objectives related to hazardous fuels or habitat improvement. A written, approved prescribed fire plan must exist, and National Environmental Policy Act (NEPA) requirements must be met prior to ignition.
Rate of Spread	The relative activity of a fire in extending its horizontal dimensions. It is expressed as a rate of increase of the total perimeter of the fire, rate of forward spread of the fire front, or rate of increase in area, depending on the intended use of the information. Usually it is expressed in chains or acres per hour for a specific period in the fire’s history. Sometimes it is expressed as feet per minute; one chain per hour is equal to 1.1 feet per minute.
Risk	The probability that a fire will start from natural- or human-caused ignition.
Surface Fire	Fire that burns loose debris on the surface, which includes dead branches, leaves, and low vegetation.

Surface Fuels	Loose surface litter on the soil surface, normally consisting of fallen leaves or needles, twigs, bark, cones, and small branches that have not yet decayed enough to lose their identity; also grasses, forbs, low and medium shrubs, tree seedlings, heavier branchwood, downed logs, and stumps interspersed with or partially replacing the litter.
Ten-Hour Timelag Fuels	(a.k.a. ten-hour fuels) Dead fuels consisting of roundwood ¼ to 1 inch (0.6 to 2.5 cm) in diameter and, very roughly, the layer of litter extending from immediately below the surface to ¾ inch (1.9 cm) below the surface.
Topography	Referred to as “terrain.” The term also refers to parameters of the “lay of the land” that influence fire behavior and spread. Key elements are slope (in percent), aspect (the direction a slope faces), elevation, and specific terrain features such as canyons, saddles, “chimneys,” and chutes.
Torching	(a.k.a. passive crown fire) The burning of the foliage of a single tree or a small group of trees, from the bottom up.
Wildfire	An unplanned and unwanted wildland fire that is not meeting management objectives and thus requires a suppression response.
Wildland Fire	Any fire burning in wildland fuels, including prescribed fire, fire use, and wildfire.
Wildland Fire Use	The management of naturally ignited wildland fires to accomplish specific pre-stated resource management objectives in pre-defined geographic areas outlined in fire management plans.

B

Potential Fire Behavior

Analysis Methodology

This Appendix describes the data and methodology used to estimate the potential fire behavior maps for CCC under typical and worse-case scenario weather and climatological parameters. This includes an assessment of surface fire behavior (flame length and rate of spread) and crown fire potential.

Fire Behavior Models

The primary fire behavior modeling tool used was FlamMap (ver. 3). FlamMap was developed by the Fire Sciences Laboratory (USDA Forest Service, Missoula, MT), Systems for Environmental Management (Missoula, MT), and the Bureau of Land Management. FlamMap is a fire behavior mapping and analysis program that computes potential fire behavior characteristics over an entire landscape for given weather and fuel moisture conditions.

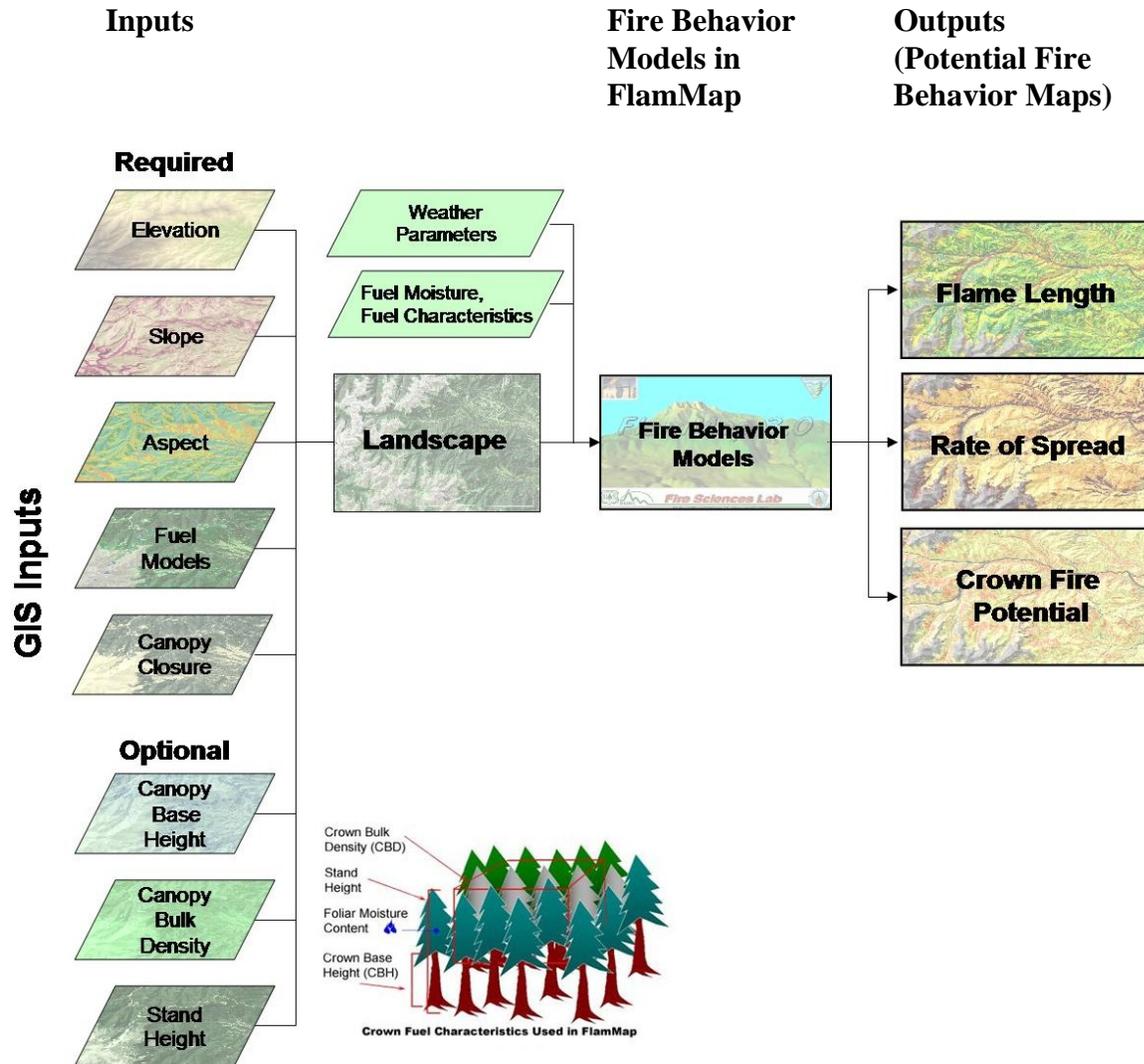
FlamMap uses GIS-based raster inputs for terrain and fuel characteristics (elevation, slope, aspect, fire behavior fuel models, and canopy characteristics), computes fire behavior outputs for a given landscape using standard fire behavior prediction models, and generates raster maps of potential fire behavior characteristics (spread rate, flame length, crown fire activity, etc.) over an entire landscape.

FlamMap and BehavePlus both employ the same surface fire behavior models (Rothermel's 1972 surface fire model). As such, the following assumptions apply to both:

- Fire behavior is predicted for the flaming front of a surface fire;
- The fire is free-burning;
- Fine fuels are the primary carrier of the initial fire front; and
- Fuels are continuous and uniform.

However, FlamMap employs additional crown fire and fuel moisture models (VanWagner's 1977 crown fire initiation model, Rothermel's 1991 crown fire spread model, and Nelson's 2000 dead fuel moisture model). Another key distinction is the type of inputs the two programs use, and how they display the outputs. BehavePlus provides tabular and graphical outputs for surface fire behavior based on inputs that are static in space and time. Because FlamMap uses GIS-based, spatially variable inputs, it can provide landscape-based outputs that depict the variable potential fire behavior that occurs over a landscape that is non-uniform in terrain, fuels, and other factors. By querying any given location on the landscape within FlamMap, one can also obtain tabular outputs for that particular location.

Below is a schematic diagram of how FlamMap incorporates GIS and non-GIS inputs to generate maps of fire behavior potential. The first five raster-based GIS inputs are mandatory (elevation, slope, aspect, fuel models, and percent canopy closure). Other layers that describe canopy characteristics may also be included, and are useful for improving crown fire potential assessments. All of these layers were used for the CCC fire behavior modeling.



The GIS-based input layers were obtained from the Landfire Project (see www.landfire.gov for detailed information), and were at a resolution of 30m. These included:

- Elevation (meters).
- Slope (rise/run, in percent). Steeper slopes increase the intensity and rate of spread of a fire.
- Aspect (degrees). The direction a slope faces, in degrees from north (0); aspect influences fuel moisture, fuel loadings, and the direction of fire spread.
- Fuel model (standard 13 Fire Behavior Fuel Models). A fuel model quantifies the amount, arrangement of dead and live fuels, as well as fuel bed characteristics;
- Canopy closure (percent). This is the horizontal percentage of the landscape that is covered by tree canopy (crowns). Canopy closure affects shading of surface fuels, and the potential development and propagation of a crown fire. More continuous crown fuels make an area more vulnerable to crown fire.

- Canopy Base Height (meters). A lower canopy base height allows a fire to more readily enter the crown fuels and develop into a crown fire
- Canopy bulk density (kg/m^3). This relates to the amount of crown fuels in a given volume of canopy, and is a factor in the propagation and intensity of a crown fire.
- Stand height (meters).



Aspect influences fuel type, fuel moisture, and fire movement.



Variation in canopy closure – Clear Creek county. Three distinct fuel types can also be seen - grass (upper center), grass understory with timber(left), and timber understory (right)

Weather and Fuel Characteristics - Non-GIS inputs

Weather observations from four Remote Automated Weather Stations (RAWS) were examined for use in fire behavior modeling. These stations included Corral Creek, Bailey, and Pickle Gulch (as described in Section 4.2.3). From this data, three sets of weather parameters were chosen for use in modeling, based on depth of data and how representative each site was. These three sets of weather inputs represent “Average” conditions for June through September (50th Percentile), “Severe” conditions (90th Percentile), and “Extreme” conditions (97th Percentile). 50th and 90th percentile weather are the most useful for planning purposes; the 97th percentile represents a worst-case scenario. From the RAWS weather data, weather and fuel moisture values were identified individually for each percentile category. These are provided in the table below.

Weather and Fuel Moisture Inputs Used for Fire Behavior Modeling (based on RAWS data from June through September)

Parameter	50th Percentile	90th Percentile	97th Percentile
1-hr fuel moisture, %	5	3	2
10-hr fuel moisture, %	6	4	3
100-hr fuel moisture, %	10	6	6
Herbaceous fuel moisture, %	56	30	30
Live woody fuel moisture, %	105	75	70
Foliar moisture content, %*	120	100	90
20-foot wind speed (upslope), mph	6	10	14

* Actual foliar moisture content was not available, so was estimated according to guidelines provided in the FlamMap User's Guide for average and severe conditions.

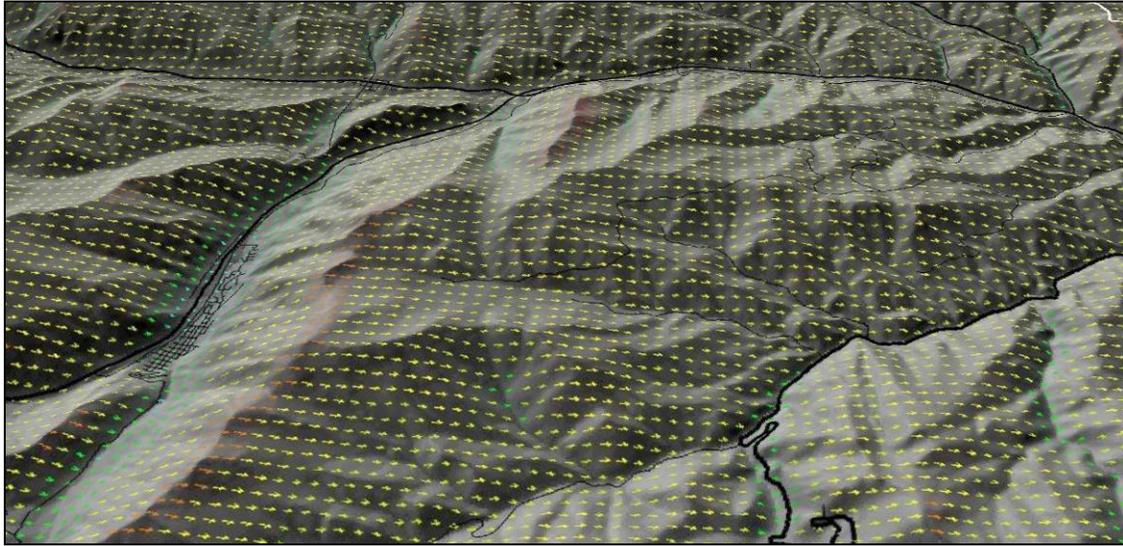
Wind Inputs

Wind is an important weather element in fire behavior, as even small changes in wind speed can have significant impacts on fire intensity, spread rate, and potential for crown fire development. Two wind scenarios were used for modeling fire behavior for Clear Creek County. One was based on typical summer conditions where surface wind direction is diurnal in nature, flowing upslope and up-canyon during the day. FlamMap provides an option for this scenario, where the user inputs the desired speed and indicates the direction to be upslope in relation to the Aspect input layer.

The other wind scenario assumed a strong downslope wind that overpowered the weaker diurnal winds, such as what happens when a Chinook wind situation develops in the Front Range of Colorado. The National Oceanic and Atmospheric Administration (NOAA) defines a "Severe Downslope Wind" as a warm, dry air flow which travels down-terrain, from higher to lower elevations and which exceeds 58 miles per hour. East of the Continental Divide along the Front Range, these winds develop from west to east.

To simulate the effect of a Chinook (downslope) wind, a wind tool called "WindNinja" was used. WindNinja was developed by the U.S. Forest Service Fire Sciences Laboratory in Missoula, MT, and simulates 20-foot surface winds that result from a strong, larger-scale wind system aloft (such as a downslope or Chinook wind). WindNinja conforms wind speed and direction to account for terrain features, similar to how a wind tunnel is used to test wind flow over uneven surfaces such as automobiles. The output from WindNinja is a "wind grid" which contains data on wind speed and direction at regular grid spacings across a landscape. This wind grid can then be used for wind speed and direction inputs in FlamMap.

Below is a graphical example of a wind grid produced by WindNinja for Clear Creek County. The wind speed chosen to produce the downslope wind inputs was one which produced ridgetop winds (indicative of the strongest winds) of approximately 60 mph.



Clear Creek County wind grid generated by the WindNinja program; higher wind speeds are indicated by yellow and red arrows, respectively.

The Modeling Process

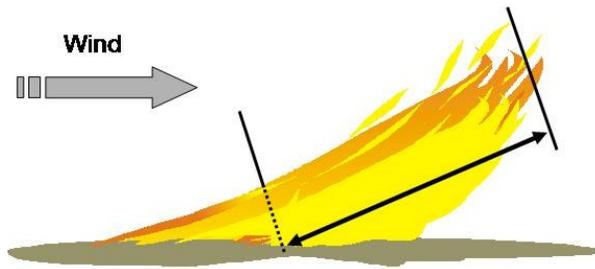
Once the GIS-based inputs are assembled within FlamMap and a Landscape is generated, the user defines the other non-GIS inputs (weather, fuel moistures) and selects the desired outputs. FlamMap then applies the appropriate fire behavior models to these inputs, and generates maps depicting the chosen outputs.

Outputs

FlamMap provides fire behavior modeling outputs in a variety of forms. The most visually intuitive is the map of potential fire behavior, for each selected output, that can be displayed to show whatever threshold values the user desires.

Flame Length

Flame length is the distance from the base of the flame (the fuel bed) to the tip of the flame in a fire burning in surface fuels (surface fire). It may be vertical (flat ground, no wind), or bent toward the ground considerably where slope or wind is present. Flame length is an indicator of fire intensity at the active, flaming front. As such, it is a good means for determining what suppression resources can be used on a fire. The intensity of a surface fire is also important in the extension of a fire into the forest canopy, and the subsequent development and propagation of a crown fire.



Depiction of flame length; in this example, the fire is wind-driven on flat terrain.

Rate of Spread

The rate of spread is the forward rate of movement at the active front (head) of a surface fire. It is typically expressed in chains per hour, which is roughly equivalent to feet per minute. One chain is 66 feet, and there are 80 chains in a mile. Rate of spread is important in indicating how fast a fire will travel and reach a point of concern, and impacts the type and number of suppression resources needed to contain a fire with a given rate of spread.

Crown Fire Potential

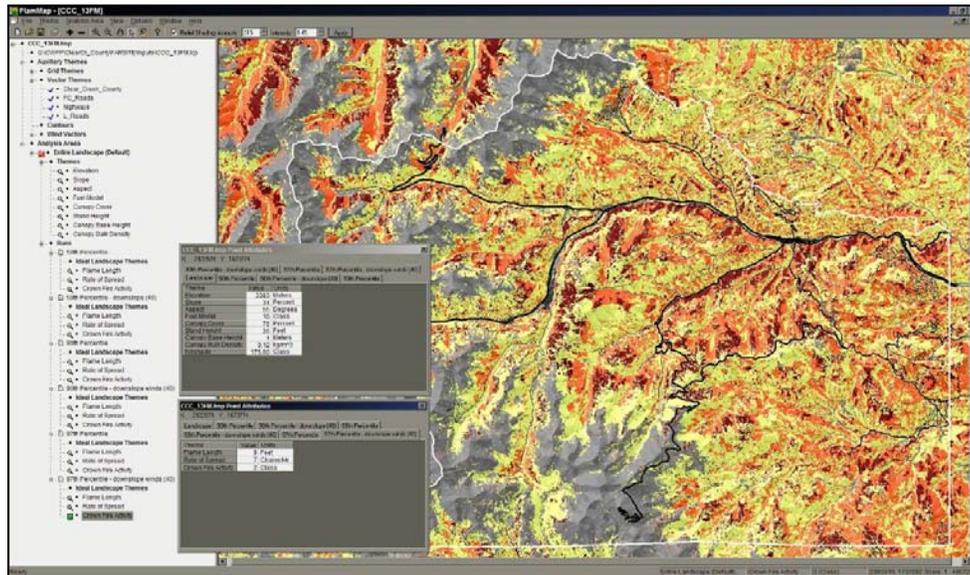
Crown fire is the movement of fire into and through the tree canopy. Crown fires typically move rapidly, and are very intense, with flaming fronts up to 100-200 feet in height. Crown fires are classified into three categories:

- Passive - fire does not carry continuously through the crown fuels, but burns crown fuels intermittently, such as when individual trees or groups of trees torch.
- Active - fire carries continuously through the crowns, but depends on surface fire intensity to continue burning as a crown fire.
- Independent - fire carries through the crowns with or without an accompanying surface fire.

FlamMap provides an estimation of crown fire potential for passive and active crown fire, and also indicates where crown fire is not expected to occur (surface fire only, or no fire activity). FlamMap does not model the potential for independent crown fire.

Types of Wind Driven Crown Fire		
Passive or Torching	Active	Independent
		
Low wind speed, low Canopy Bulk Density & Cover, high Canopy Base Height.	Higher wind speed, high Canopy Bulk Density & Canopy, low Canopy Base Height.	Very high wind speed, very high Canopy Bulk Density & Cover.
Output code of 2	Output code of 3	Not modeled in FlamMap

Types of wind-driven crown fire (illustration from the FlamMap User's Guide).



A "crown fire potential" simulation in FlamMap, for 97th percentile weather under Chinook wind conditions. Tabular outputs are obtained for a specific location by clicking a point on the landscape.

Other tabular and numerical outputs can be obtained in a variety of ways. By querying a specific point on the output map, the user can obtain detailed information about the landscape (from all of the input GIS layers) as well as the fire behavior outputs.

By setting up customized classifications to depict ranges of values, it's also possible to gather information about what proportion of the landscape falls into a particular category. For example, classifying the Crown Fire Potential output maps into the four primary groupings (No Fire Activity, Surface Fire, Passive Crown Fire, and Active Crown Fire), one can compare the effect of increasingly severe weather conditions on the fire behavior outputs, as shown in the table below. Note the "N/A" category does not change; this category represents areas that do not carry fire under any condition (bare soil/rock, ice, or water).

Percent of the landscape potentially impacted by different types of crown fire activity under different weather scenarios

	CFR category	50th Percentile	90th Percentile	97th Percentile
Diurnal Winds	N/A	26.5	26.5	26.5
	Surface	69.0	54.6	47.1
	Passive	4.5	18.9	26.1
	Active	0	0	0.3
Chinook Winds	N/A	26.5	26.5	26.5
	Surface	53.9	44.6	41.6
	Passive	19.0	24.5	23.2
	Active	0.5	4.4	8.7

Assumptions, Limitations and Interpretations in Fire Behavior Modeling

Models are an approximation or estimation of a real-world process or event. As such, they will never perfectly replicate that event. However, fire behavior models are very useful for planning purposes, particularly in being able to model and compare potential fire behavior under a variety of conditions, determine where problem areas might lie, and provide guidance for initiatives such as hazard mitigation and response planning.

Weather conditions are quite variable and dynamic across an area as large and geographically diverse as Clear Creek County, and no one weather station or set of parameters can account for all the localized conditions that may be encountered. The weather conditions used for this analysis are generalized, and thus more suited for planning purposes. Fire behavior modeling in a tactical situation on a fire suppression operation would necessarily need to use actual weather observations taken on-site, specific for that location and the current conditions.

Fire behavior modeled with FlamMap provides a point fire behavior projection for each individual 30m cell in the landscape. It does not account for changes in fire intensity over time as a fire grows, and does not account for local interactions between the fire and the terrain that can occur when a fire is burning in a chute or “chimney.”

In addition to potential fire behavior, FlamMap can also be used to examine the impacts of fuel treatments, and can show potential fire movement through a “path of least resistance” analysis. However, FlamMap cannot estimate the probability of fire occurrence, only potential fire behavior given that an ignition has occurred.

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Landfire information and technical documentation can be found at <http://www.landfire.gov/>

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WindNinja information can be found at <http://www.firemodels.org/content/view/132/169/>

C

**Fire Behavior Fuel Models of
Clear Creek County**

FBFM 1 – Short Grass



Characteristics: Grassland and savanna vegetation are dominant. Very little shrub or timber overstory is present, generally less than 30 percent of the area. Western perennial and annual grasses such as western wheatgrass, buffalograss, blue grama, and little bluestem that characterize short- to mid-grass prairie are common. Cheatgrass, medusahead, ryegrasses, and fescues occur at slightly higher elevations. Grass/shrub combinations that meet the above criteria are also represented.

Fire Behavior: Fire spread is governed by the fine, very porous, and continuous herbaceous fuels that have cured or are nearly cured. Fires burn as surface fires that move rapidly through the cured grass and associated material.

Fuel Model Values for Estimating Fire Behavior

Total Fuel Load, less than 3-inch dead and live	0.74 ton/acre
Dead Fuel Load, 0 to ¼ inch	0.74 ton/acre
Live Fuel Load, foliage	0.0 ton/acre
Fuel Bed Depth	1.0 foot

Source: Anderson 1982

FBFM 2 – Grass with Timber/Shrub Overstory



Characteristics: FBFM 2 defines surface fuels found in open conifer, shrub, or riparian stands. Ground cover generally consists of grasses, needles, and small woody litter. Conifers are typically mature and widely spaced. Limited shrub or regeneration may be present. This model favors mature conifer in the foothill to montane zones. Open shrubland, pine stands, or Rocky Mountain juniper that cover one-third to two-thirds of the area may generally fit this model. Such stands may include clumps of fuels that generate higher fire intensities that may produce firebrands (embers that stay ignited and aloft for great distances).

Fire Behavior: Fire is spread primarily through the fine herbaceous fuels, either curing or dead. These are surface fires where the herbaceous material, in addition to litter and dead-down stem wood from the open shrub or timber overstory, contribute to the fire intensity.

Fuel Model Values for Estimating Fire Behavior

Total Fuel Load, less than 3-inch dead and live	4.0 tons/acre
Dead Fuel Load, 0 to ¼ inch	2.0 tons/acre
Live Fuel Load, foliage	0.5 ton/acre
Fuel Bed Depth	1.0 foot

Source: Anderson 1982

FBFM 4 – Mature Brush



Characteristics: Stands of mature shrubs 6 or more feet in height, local oakbrush, and tall western sage with flammable foliage and a significant dead component fit this model (Figure 3). A deep litter layer may also be present. Actual brush height qualifying for this model varies and depends on local conditions.

Fire Behavior: High fire intensity and fast-spreading fires involve the foliage and live and dead fine woody material in the crowns of a nearly continuous secondary overstory.

Fuel Model Values for Estimating Fire Behavior

Total Fuel Load, less than 3-inch dead and live	13.0 tons/acre
Dead Fuel Load, 0 to ¼ inch	5.0 tons/acre
Live Fuel Load, foliage	5.0 tons/acre
Fuel Bed Depth	6.0+ feet

Source: Anderson 1982

FBFM 5 – Young Brush



Characteristics: Shrubs in FBFM 5 are younger than in FBFM 6, not as tall as in FBFM 4, and do not contain as much fuel as in FBFMs 4 and 6. Shrub height is less than 6 feet tall, and shrubs cover most of area. Young green stands with no dead wood qualify for this FBFM. Fuel situations would include young stands of oak and mountain mahogany.

Fire Behavior: Fire is generally carried on the surface fuels that are made up of litter cast by the shrubs, grasses, and forbs in the understory. The live vegetation produces poor burning qualities.

Fuel Model Values for Estimating Fire Behavior

Total Fuel Load, less than 3-inch dead and live	3.5 tons/acre
Dead Fuel Load, 0 to ¼ inch	1.0 tons/acre
Live Fuel Load, foliage	2.0 tons/acre
Fuel Bed Depth	2.0 feet

Source: Anderson 1982

FBFM 6 – Intermediate or Dormant Brush



Characteristics: Shrubs in FBFM 6 are older than in FBFM 5, not as tall as in FBFM 4, and do not contain as much fuel as in FBFM 4. Fuel situations to be considered include intermediate stands of chamise, chaparral, oakbrush, mountain mahogany, and juniper shrublands.

Fire Behavior: Fires carry through the shrub layer where the foliage is more flammable than in FBFM 5; however, this requires moderate winds (greater than 8 mph at midflame height). Fire will drop to the ground at low wind speeds or break in continuous stands.

Fuel Model Values for Estimating Fire Behavior

Total Fuel Load, less than 3-inch dead and live	6.0 tons/acre
Dead Fuel Load, 0 to ¼ inch	1.5 tons/acre
Live Fuel Load, foliage	0.0 ton/acre
Fuel Bed Depth	2.5 feet

Source: Anderson 1982

FBFM 8 – Closed or Short-Needle Timber Litter – Light Fuel Load



Characteristics: Closed canopy stands of short-needle conifers or hardwoods that have leafed out support fire in the compact litter layer. This layer is mainly needles, leaves, and twigs because little undergrowth is present in the stand. Representative conifer types are white pine, Lodgepole Pine, spruce, and fir. Ponderosa pine can also be included if the understory reflects these characteristics.

Fire Behavior: Fires associated with this model are generally slow-burning, low-intensity ground fires, although a fire may encounter an occasional area of heavy fuels concentration that can flare up (jackpot). Only under severe fire weather conditions does this fuel model pose a significant fire hazard, and this is typically due to fire becoming active in the crowns of trees.

Fuel Model Values for Estimating Fire Behavior

Total Fuel Load, less than 3-inch dead and live	5.0 tons/acre
Dead Fuel Load, 0 to ¼ inch	1.5 tons/acre
Live Fuel Load, foliage	0.0 ton/acre
Fuel Bed Depth	0.2 foot

Source: Anderson 1982

FBFM 9 – Hardwood or Long-Needle or Timber Litter – Moderate Ground Fuel Load



Characteristics: Both long-needle conifer and hardwood stands, especially the oak-hickory types, are characterized by FBFM 9. Closed stands of long-needle pine such as ponderosa pine are grouped in this model.

Fire Behavior: Fires run through the surface litter faster than in FBFM 8 and have longer flame lengths. Fall fires in hardwoods are predictable; however, high winds will actually cause higher rates of spread than predicted because of spotting caused by rolling or blowing embers and fire brands. Concentrations of dead-down woody material will contribute to possible torching, crowning, and spotting.

Fuel Model Values for Estimating Fire Behavior

Total Fuel Load, less than 3-inch dead and live	3.5 tons/acre
Dead Fuel Load, 0 to ¼ inch	2.9 tons/acre
Live Fuel Load, foliage	0.0 ton/acre
Fuel Bed Depth	0.2 foot

Source: Anderson 1982

FBFM 10 – Mature/Over Mature Timber and Understory



Characteristics: Any forest type may be considered FBFM 10 if heavy downed woody material is present. Locally this model is represented by dense stands of over mature ponderosa pine, Lodgepole Pine, mixed conifer, and continuous stands of Douglas fir. Examples include insect or disease-ridden stands, wind-thrown stands, over mature situations with deadfall, and aged light thinning or partial-cut slash. Dead-down fuels include large quantities of 3-inch or larger limbwood resulting from over maturity or natural events that create a large load of dead material on the forest floor.

Fire Behavior: Fire will burn in the surface and ground fuels with greater intensity than the other timber litter models. Crowning out, spotting, and torching of individual trees is more frequent in this fuel situation, leading to potential fire control difficulties.

Fuel Model Values for Estimating Fire Behavior

Total Fuel Load, less than 3-inch dead and live	12.0 tons/acre
Dead Fuel Load, 0 to ¼ inch	3.0 tons/acre
Live Fuel Load, foliage	2.0 tons/acre
Fuel Bed Depth	1.0 foot

FBFMs present in the District are summarized in Table XX, Section XX.

Source: Anderson 1982

D

**Community Wildfire Hazard and
Risk Assessments**

WILDLAND FIRE RISK AND HAZARD SEVERITY ASSESSMENT FORM		
Assign a value to the most appropriate element in each category and place the number of points in the column on the right.		
Element	Points	
A. Means of Access		
1. Ingress and egress		
a. Two or more roads in/out	0	_____
b. One road in/out	7	_____
2. Road width		
a. ≥7.3 m (24 ft)	0	_____
b. ≥6.1 m (20 ft) and <7.3 m (24 ft)	2	_____
c. <6.1 m (20 ft)	4	_____
3. All-season road condition		
a. Surfaced road, grade <5%	0	_____
b. Surfaced road, grade >5%	2	_____
c. Non-surfaced road, grade <5%	2	_____
d. Non-surfaced road, grade >5%	5	_____
e. Other than all-season	7	_____
4. Fire Service Access		
a. ≤91.4 m (300 ft) with turnaround	0	_____
b. >91.4 m (300 ft) with turnaround	2	_____
c. <91.4 m (300 ft) with no turnaround	4	_____
d. ≥91.4 m (300 ft) with no turnaround	5	_____
5. Street signs		
a. Present [10.2 cm (4 in.) in size and reflectorized]	0	_____
b. Not present	5	_____
B. Vegetation (Fuel Models)		
1. Characteristics of predominate vegetation within 91.4 m (300 ft)		
a. Light (e.g., grasses, forbs, sawgrasses, and tundra) NFDRS Fuel Models A, C, L, N, S, and T	5	_____
b. Medium (e.g., light brush and small trees) NFDRS Fuel Models D, E, F, H, P, Q, and U	10	_____
c. Heavy (e.g., dense brush, timber, and hardwoods) NFDRS Fuel Models B, G, and O	20	_____
d. Slash (e.g., timber harvesting residue) NFDRS Fuel Models J, K, and L	25	_____
2. Defensible space		
a. More than 30.48 m (100 ft) of vegetation treatment from the structure(s)	1	_____
b. 21.6 m to 30.48 m (71 ft to 100 ft) of vegetation treatment from the structure(s)	3	_____
c. 9.14 m to 21.3 m (30 ft to 70 ft) of vegetation treatment from the structure(s)	10	_____
d. <9.14 m (30 ft) of vegetation treatment from the structure(s)	25	_____
C. Topography Within 91.4 m (300 ft) of Structure(s)		
1. Slope <9%	1	_____
2. Slope 10% to 20%	4	_____
3. Slope 21% to 30%	7	_____
4. Slope 31% to 40%	8	_____
5. Slope >41%	10	_____

(NFPA 1144, 1 of 2)

Element	Points
D. Additional Rating Factors (rate all that apply)	
1. Topographical features that adversely affect wildland fire behavior	0–5 _____
2. Areas with a history of higher fire occurrence than surrounding areas due to special situations (e.g., heavy lightning, railroads, escaped debris burning, and arson)	0–5 _____
3. Areas that are periodically exposed to unusually severe fire weather and strong dry winds	0–5 _____
4. Separation of adjacent structures that can contribute to fire spread	0–5 _____
E. Roofing Assembly	
1. Class A roof	0 _____
2. Class B roof	3 _____
3. Class C roof	15 _____
4. Nonrated	25 _____
F. Building Construction	
1. Materials (predominate)	
a. Noncombustible/fire-resistive siding, eaves, and deck (see Chapter 8)	0 _____
b. Noncombustible/fire-resistive siding and combustible deck	5 _____
c. Combustible siding and deck	10 _____
2. Building setback relative to slopes of 30% or more	
a. ≥9.14 m (30 ft) to slope	1 _____
b. <9.14 m (30 ft) to slope	5 _____
G. Available Fire Protection	
1. Water source availability	
a. Pressurized water source availability	
1892.7 L/min (500 gpm) hydrants ≤304.8 m (1000 ft) apart	0 _____
946.4 L/min (250 gpm) hydrants ≤304.8 m (1000 ft) apart	1 _____
b. Nonpressurized water source availability (off site)	
≥946.4 L/min (250 gpm) continuous for 2 hours	3 _____
<946.4 L/min (250 gpm) continuous for 2 hours	5 _____
c. Water unavailable	10 _____
2. Organized response resources	
a. Station ≤8 km (5 mi.) from structure	1 _____
b. Station >8 km (5 mi.) from structure	3 _____
3. Fixed fire protection	
a. NFPA 13, 13R, 13D sprinkler system	0 _____
b. None	5 _____
H. Placement of Gas and Electric Utilities	
1. Both underground	0 _____
2. One underground, one aboveground	3 _____
3. Both aboveground	5 _____
I. Totals for Home or Subdivision (Total of all points)	

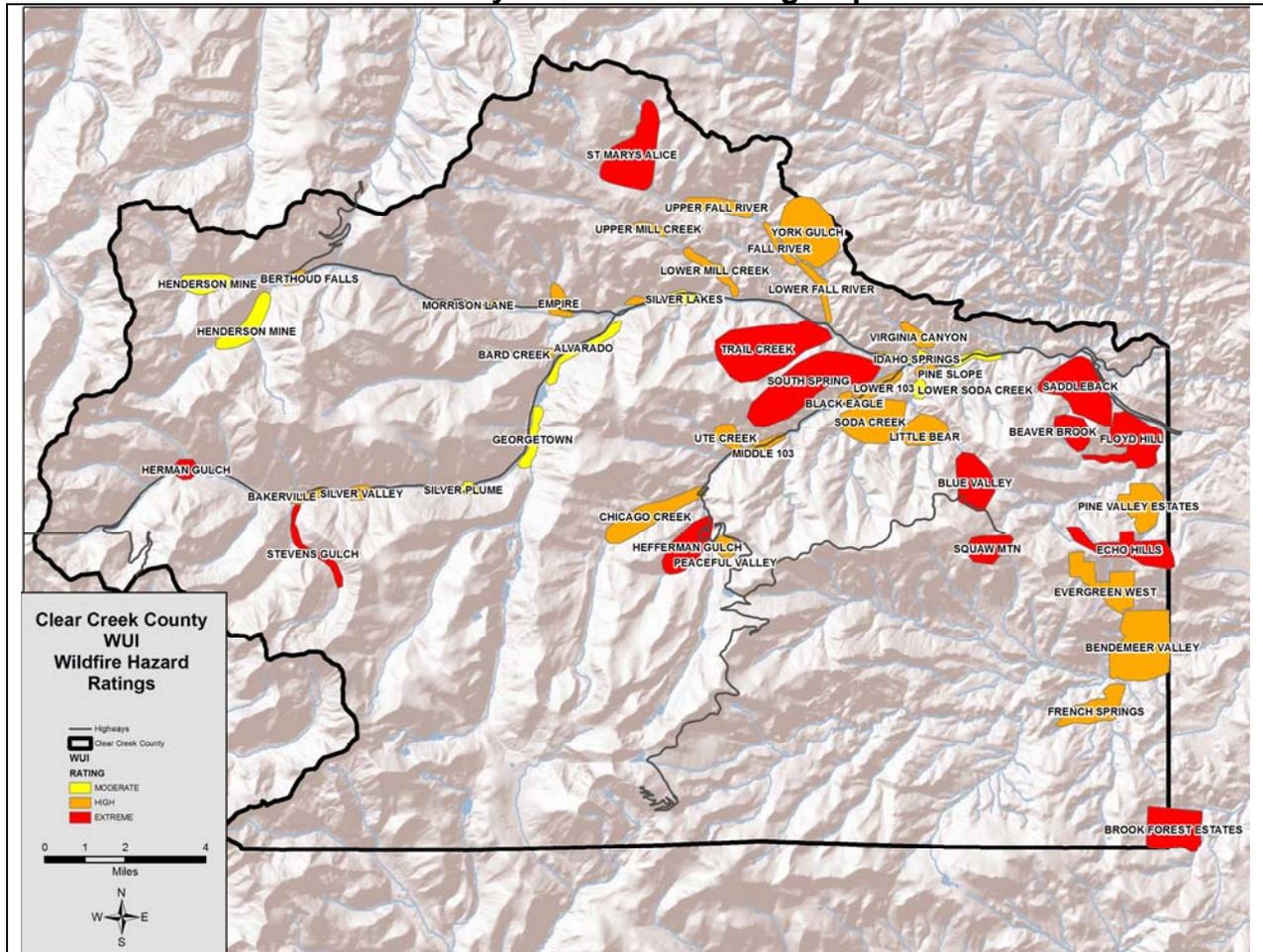
Hazard Assessment	Total Points
Low hazard	<40
Moderate hazard	40–69
High hazard	70–112
Extreme hazard	>112

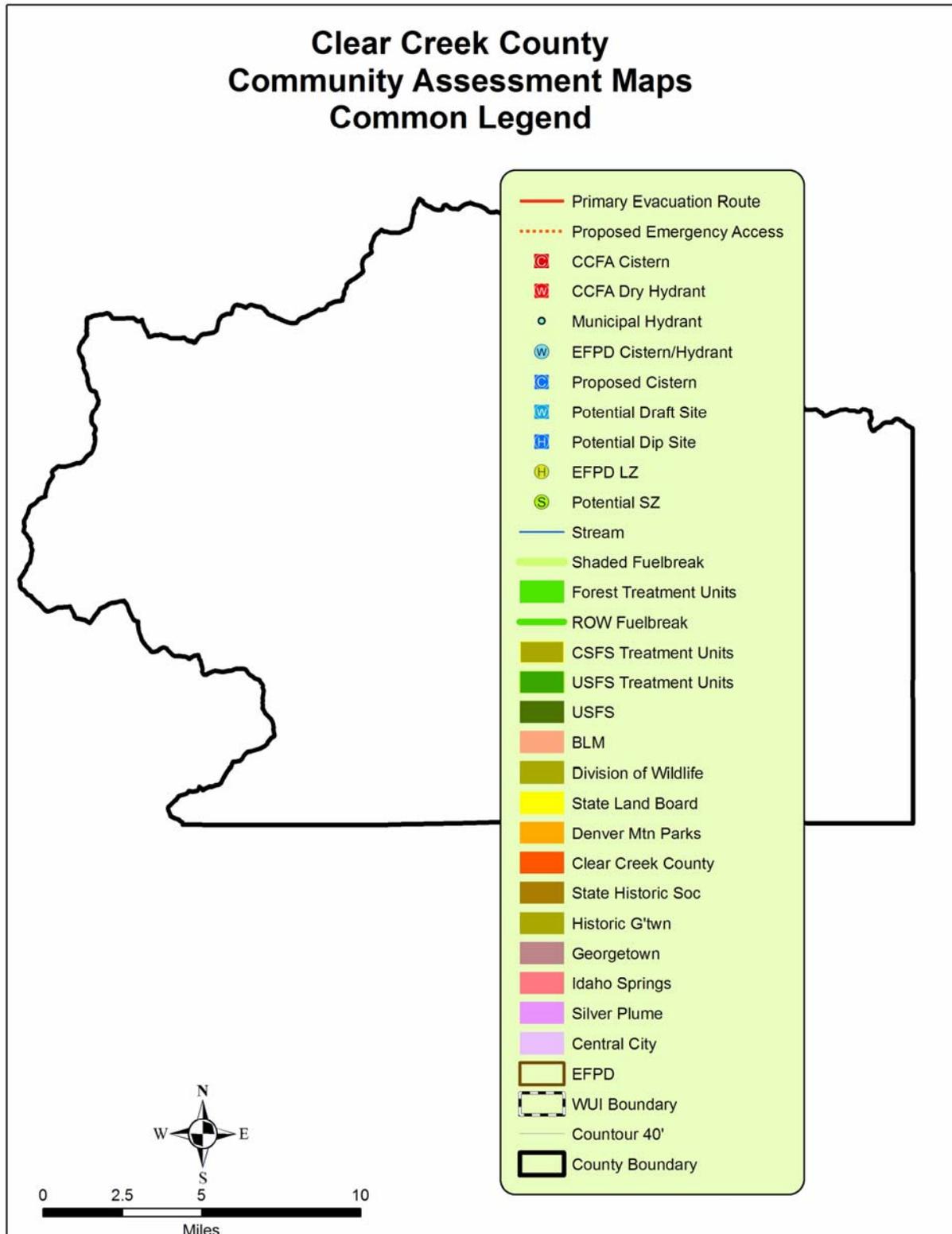
(NFPA 1144, 2 of 2)

Community Survey Summaries and Hazard Ratings

CLEAR CREEK COUNTY WUI	Means of Access					Vegetation		Topography		Other Factors				Construction		Fire Protection			Score	Survey Hazard Rating	
	Ingress/Egress (7)	Road Width (4)	Road Condition (7)	Fire Service Access (5)	Street Signs/Address (5)	Vegetation/Fuels (25)	Defensible Space (25)	Slope w/in 300 ft of structure (10)	Topography affecting fire behavior (5)	Ignition Potential (5)	Fire Weather Potential (5)	Density of Structures (5)	Utilities (5)	Roofing (25)	Construction (15)	Set-back from slope >30% (5)	Water Availability (10)	Emergency Resources (3)			Fixed Fire Protection (5)
Alvarado	2	2	0	2	1	7	7	4	2	3	2	1	5	3	15	1	5	1	4	67	MODERATE
Bakerville	0	2	2	5	3	9	22	1	3	4	2	2	5	3	15	1	5	1	5	90	HIGH
Bard Creek	7	2	2	3	0	10	10	2	4	5	2	3	5	3	15	1	5	3	5	87	HIGH
Beaver Brook	7	3	6	5	5	10	21	7	5	4	3	0	5	3	15	4	5	3	5	116	EXTREME
Bendemeer Valley, etc. EFPD	0	3	4	4	0	8	21	3	4	4	4	2	5	3	14	2	5	3	5	94	HIGH
Berthoud Falls	1	3	2	4	5	10	15	4	3	5	2	4	1	2	15	1	5	3	5	90	HIGH
Black Eagle	3	4	6	5	4	5	7	7	4	5	3	1	5	5	15	4	5	3	5	96	HIGH
Blue Valley	2	3	5	3	3	15	18	8	5	3	3	3	5	3	15	5	5	3	5	112	EXTREME
Brook Forest EFPD	7	4	5	5	2	18	20	5	5	4	3	3	5	3	15	4	5	1	5	119	EXTREME
Chicago Creek	7	3	2	5	0	8	20	7	5	3	2	4	5	3	15	3	5	3	5	105	HIGH
Echo Hills EFPD	7	3	4	5	3	18	21	7	5	4	3	3	5	4	15	4	5	3	5	124	EXTREME
Empire	1	1	1	1	1	5	1	5	2	4	2	5	3	3	15	1	0	3	4	58	MODERATE
Evergreen West EFPD	3	2	2	3	0	13	20	7	5	4	4	2	5	10	13	4	3	3	5	108	HIGH
Fall River	7	2	2	5	0	10	10	8	5	4	2	4	5	3	15	5	5	3	5	100	HIGH
Floyd Hill EFPD	7	3	4	5	3	12	21	7	5	3	3	4	5	3	13	5	5	3	4	115	EXTREME
Floyd/Saddback	7	1	5	4	3	12	20	7	5	5	3	3	5	3	15	5	5	3	4	115	EXTREME
French Springs EFPD	7	2	2	4	0	10	21	3	3	4	4	2	5	2	14	2	5	3	5	98	HIGH
Georgetown	3	2	1	1	1	7	1	3	2	4	2	5	3	3	15	1	0	1	4	59	MODERATE
Hefferman Gulch	7	4	5	5	4	10	25	7	5	3	2	4	5	3	15	4	5	3	5	121	EXTREME
Henderson Mine	7	0	2	0	0	18	1	8	5	2	2	0	0	0	0	1	1	1	1	49	MODERATE
Herman Gulch	7	3	4	5	3	10	25	7	4	5	2	3	5	3	15	5	5	3	5	119	EXTREME
Hidden Valley	7	2	5	2	2	8	18	3	4	5	3	4	3	3	15	2	5	1	5	97	HIGH
Idaho Springs	1	1	2	1	1	5	1	2	2	4	3	5	3	3	15	1	0	1	4	55	MODERATE
Little Bear	5	3	5	4	4	10	10	8	5	3	3	1	5	3	15	5	5	3	5	102	HIGH
Lower 103	1	0	2	0	2	7	12	4	3	4	3	5	5	7	15	5	5	1	4	85	HIGH
Lower Fall River	1	3	2	4	3	7	12	4	4	5	3	5	5	2	15	4	5	1	5	90	HIGH
Lower Mill Creek	7	2	2	5	3	8	12	8	4	5	3	4	5	2	13	4	5	1	5	98	HIGH
Lower Soda Creek	1	0	2	2	2	6	6	7	2	3	3	4	3	3	13	2	5	1	5	70	MODERATE
Middle 103	1	0	0	0	2	6	15	8	4	3	3	5	5	3	15	5	5	2	5	87	HIGH
Montane Park	7	4	2	5	3	9	20	7	5	5	3	4	1	3	13	4	1	1	5	102	HIGH
Morrison Lane	7	2	2	5	5	10	25	2	2	5	2	1	3	1	15	3	5	3	5	103	HIGH
Peaceful Valley	7	3	5	3	5	7	18	1	3	4	2	1	5	3	15	1	5	3	5	96	HIGH
Pine Slope	1	3	4	3	3	6	12	4	2	4	3	4	3	3	15	2	5	1	5	83	HIGH
Pine Valley Estates EFPD	0	3	4	4	4	9	15	3	2	4	4	3	5	3	15	2	5	3	5	93	HIGH
Silver Lakes	0	2	2	3	2	6	8	2	2	3	3	5	3	3	12	2	1	1	4	64	MODERATE
Silver Plume	1	3	2	2	1	5	3	3	2	5	2	5	3	3	15	1	0	1	4	61	MODERATE
Silver Valley	0	2	2	2	1	10	20	4	2	5	2	5	1	2	15	2	5	1	5	86	HIGH
Soda Creek	7	3	5	5	3	10	9	5	3	3	3	1	5	5	14	4	5	2	5	97	HIGH
South Spring	5	3	5	5	3	12	14	7	5	5	3	1	5	10	15	4	5	2	5	114	EXTREME
Squaw Mountain	7	2	5	4	4	14	18	8	5	3	3	1	5	3	14	5	5	3	5	114	EXTREME
Stevens Gulch	7	4	7	5	4	18	15	8	5	2	2	0	5	3	15	2	5	3	5	115	EXTREME
St Marys/Alice	7	3	5	5	5	17	15	8	5	2	2	4	5	3	15	5	10	3	4	123	EXTREME
Trail Creek	7	3	5	5	3	12	20	7	5	5	3	1	5	2	15	4	5	3	5	115	EXTREME
Upper Fall River	7	2	2	2	3	8	12	3	4	3	2	2	5	3	15	2	5	3	5	88	HIGH
Upper Mill Creek	7	3	5	3	1	10	20	5	5	3	2	5	5	3	15	3	5	3	5	108	HIGH
Ute Creek	7	3	5	5	2	10	18	6	5	4	3	1	5	2	15	5	5	3	5	109	HIGH
Virginia Canyon	1	2	2	1	2	6	10	8	5	5	3	3	5	3	12	5	5	1	5	84	HIGH
York Gulch	3	3	5	5	3	8	12	5	5	4	3	1	5	3	10	4	5	3	5	92	HIGH

County WUI Hazard Rating Map





Alvarado



Community Hazard Assessment - 67

MODERATE

Community Design

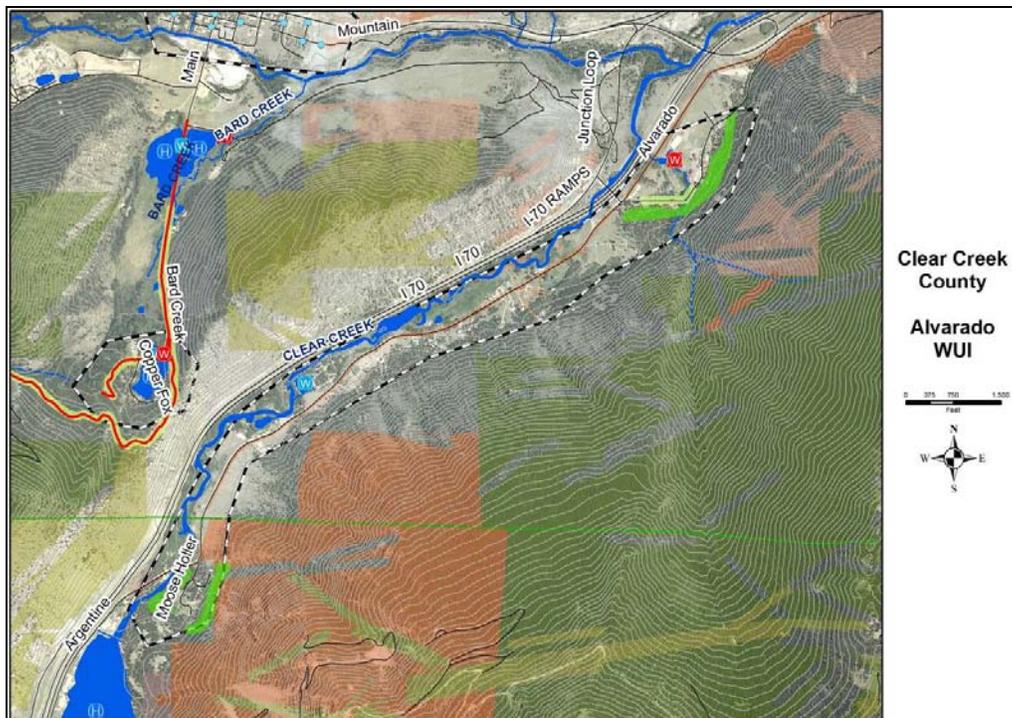
Approximately 38 addresses. Valley interface with through 2 lane paved road access. Structure density is greatest at the east end with the Easter Seals Camp and at the west end in the Moose Holler subdivision. Structures in the central portion are in more open irrigated meadow and bottom land. Structures in the east and west ends are built in timbered areas with some in need of defensible space improvements, Clear Creek runs through the WUI, west to east. Predominant construction and roofing materials are flammable although metal roofing is noted in the Easter Seals facility. Topography is flat. Existing dry hydrant at the east end, and several potential draft sites were noted. .

Fuels

Riparian deciduous trees and shrubs and meadow along creek and valley floor. Dense lodgepole pine, mixed conifer, and aspen stands on steep north facing slopes. Meadow mixed with old growth fir and spruce along creek. Very dense in some areas. Light to moderate beetle kill. Twenty year regeneration noted along roadway. Shrub fuel models and FBFM 1, 2, and 8.

Mitigation Recommendations

Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. Develop and maintain shaded fuelbreak along entrance to Easter Seals Camp. Strategic forest treatment zones identified along forested subdivision perimeters. Survey potential draft site.



Bakerville



Community Hazard Assessment

HIGH

Community Design

15 Addresses. Primary neighborhood access 1½ lane to 1 lane dirt dead end with limited turn around. Easy access to 2-lane paved frontage road and I-70 for adequate ingress/egress. All lots are adjacent to Clear Creek. Restricted single-lane bridge present. Most homes have inadequate defensible space. Predominant construction and roofing materials are flammable. Topography is flat. No emergency water supply observed.

Fuels

Riparian deciduous mixed with old growth fir and spruce along creek. Very dense in some areas. Mixed conifer on slopes with Lodgepole. Moderate beetle kill. Twenty year regeneration noted along roadway. FBFM 5, 8, 10.

Mitigation Recommendations

Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. Develop and maintain shaded fuelbreak along Silver Valley frontage road and neighborhood access road. Develop an emergency water supply with a cistern or maintained dip site near the entrance of the subdivision. Possible multiple tender supply site just west of I-70 access, south side of Clear Creek. Strategic forest treatment zone identified in dense timber stand between Silver Valley Road and Clear Creek.



Bard Creek



Community Hazard Assessment

HIGH

Community Design

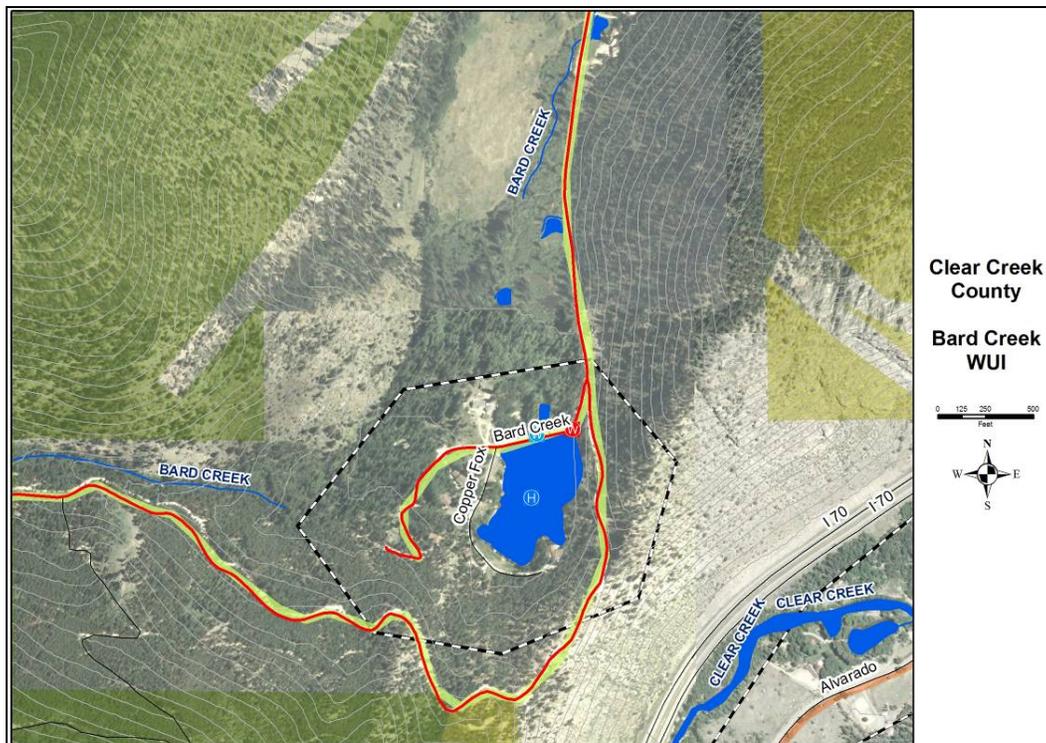
9 Addresses. Primary neighborhood access 1½ lane gravel dead end with several turnarounds. Valley access is low grade and wide. Most homes circle a small reservoir, have adequate defensible space, and are situated on a broad saddle at the south end of the valley. Predominant construction and roofing materials are flammable. Road does not completely loop around. High tension power lines corridor runs through area. I-70 is adjacent and downslope from the subdivision. Topography along access and homes is generally flat or low sloping but steep slopes downhill to the southeast and uphill to the northwest are significant. No emergency water supply was observed but many potential dip and draft sources are in the immediate area.

Fuels

Short grass and sparse juniper dominate south facing slopes. Riparian shrubs and grass are common around ponds. Mixed conifer favors Douglas fir on north slopes. Aspen common throughout conifers. FBFM 1, 5, 8, 9, 10.

Mitigation Recommendations

Maintain access road right of way by cutting back brush from shoulder. Develop a shaded fuelbreak along main access east, south and southwest of reservoir as buffer from downslope I-70 ignitions. Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. Extend shaded fuelbreak along Bard Creek Road west of WUI as need to support primary evacuation designation. Formalize draft source lower on access road with adequate turnaround. Hazard survey all ponds in area for potential dip sources



Beaver Brook



Community Hazard Assessment

EXTREME

Community Design

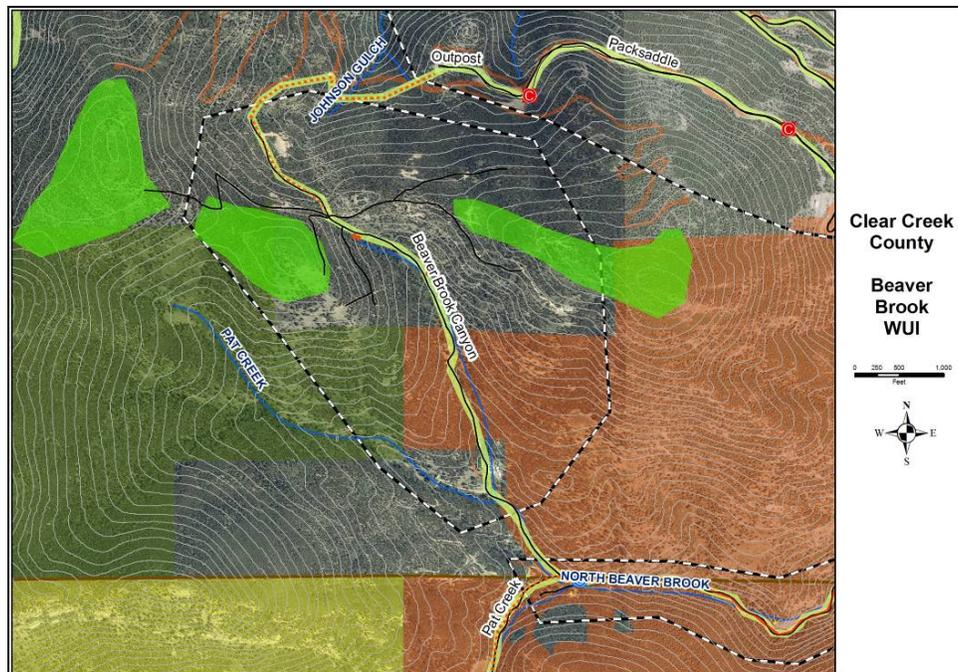
17 Addresses. Primary access > four miles, 1½ to single-lane gravel/dirt dead end with no adequate turnarounds. Access follows Beaver Brook Canyon from Floyd Hill then climbs a chimney to a high saddle west of Saddleback Mountain. Most homes are dispersed along the saddle and upper part of the chimney. Predominant construction and roofing materials are flammable. Fuel clearing on many homes was noted between roadway and structure, but all homes backed to forest with little to no fuelbreak to structure. Grade of road along this approach is steep. No emergency water supply was noted in the area.

Fuels

Moderate to heavy Douglas-fir in chimney on approach. Mixed conifer with aspen near and on saddle. More open stands of Ponderosa, Juniper, and scrub on the few south-facing slopes. FBFM 5, 8, 9, 10.

Mitigation Recommendations

Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. Develop and maintain shaded fuelbreak along primary access in Beaver Brook Canyon and Upper Beaver Brook Canyon Road. Secondary evacuation route development along from Beaver Brook Canyon to Evergreen in Evergreen FPD, or along Pat Creek to Old Squaw Pass Rd. Improve emergency access with a turnaround at the upper intersection of driveways. Accessible forest treatment zones for thinning or patch cutting are identified for areas between Saddleback Mountain and Sante Fee Mountain. Consider development of a community safety zone for shelter-in-place in case of entrapment. Emergency water supply cistern installation recommended near Pat Creek and North Beaver Brook. Create pre-suppression plan for mutual aid with Evergreen FPD.



Bendemeer Valley - EFPD



Community Hazard Assessment

HIGH

Community Design

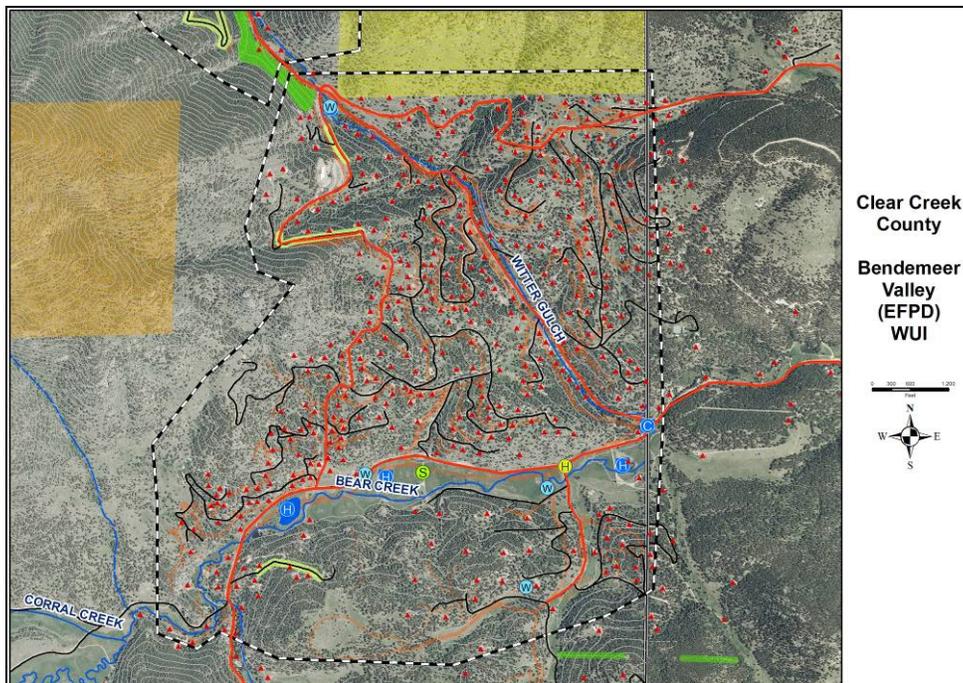
378 observed homes. Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. The area is served by several main through roads. Most neighborhoods have multiple ingress/egress routes. Primary and secondary roads are 2 lane, paved or well groomed, low to moderate grade except lower Witter Gulch (steep grade), tertiary roads 1 lane and limited maintenance; of >20 dead ends, 5 had adequate turnarounds. Predominant aspect is south/south east. 56% of homes have <30 feet and 38% have 30-70 feet defensible space. Construction and roofing materials primarily flammable. Static emergency water sources at Witter Gulch and Stagecoach, and along Upper Bear Creek Rd.

Fuels

Vegetation type is controlled largely by slope aspect with grass, brush and ponderosa pine stands predominant on most south facing aspects. Heavier stands of mixed conifer are more common on most north facing slopes. Majority of homes are located in ponderosa pine with grassy understory. Several drainages maintain heavy mixed conifer stands on north aspects. Bendemeer Valley forms a broad flat grassy meadow through which Bear Creek meanders. FBFM 1, 2, 4, 8, 9, 10.

Mitigation Recommendations

Perform defensible space improvements including fuel reduction, seasonal mowing, and slash disposal. Reduce structural ignitability; reduce percentage of flammable roofs, siding and decking. Create shaded fuelbreaks along forested primary and secondary roads. Improve or construct secondary road turnarounds at dead ends. Develop emergency water availability at Witter Gulch and Upper Bear Creek. Improve home addressing on all homes so addresses are Visible and consistent throughout community.



Berthoud Falls



Community Hazard Assessment

HIGH

Community Design

42 Addresses. Primary access is Hwy 40 with single-lane dirt/unimproved secondary roads providing access to homes. Town site is located primarily along the valley floor lower south-facing slopes between two highway switch backs which provide significant community scale fuelbreaks. Homes are closely spaced with minimal defensible space. No turnarounds are present in the subdivision. Metal roofs were observed on 20 percent of the structures but predominant construction and roofing materials are flammable. Topography around the homes is low to moderate. Several high-tension power lines and associated right-of-ways follow the valley through or close to the homes. No emergency water supply was observed but the West Fork of Clear Creek runs through the area.

Fuels

High altitude firs are evenly mixed with aspen although stand-replacement scale beetle epidemic will soon favor aspen as firs die off. Red attack is in full swing and will likely alter FBFM of surface fuels in the next two to three years. South facing slopes are less forested with shrub and grass dominating some areas. Timber continuity is broken by a four-lane highway and a major switchback, power line right-of-ways, and avalanche chutes. FBFM 1, 5, 8, 10.

Mitigation Recommendations

Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. Improve emergency access within the community with fuel reduction along shoulders, road maintenance, and strategic turnarounds. Treat (RX) regeneration in lower section of the avalanche chute south and east of town. Maintain and improve existing utility right-of-way fuelbreaks. Recommend emergency water supply/cistern installation in accessible area along Hwy 40.



Black Eagle



Community Hazard Assessment

HIGH

Community Design

17 Addresses. Primary access single-lane gravel with limited or no turnarounds. Road width supports one-way traffic with no shoulder to pull over. Black Eagle Rd continues through to Spring Gulch but is unimproved 4WD. Home sites are dispersed and built into a dry south-facing slope. Predominant construction and roofing materials are flammable. Lack of forested fuels assist predominance of defensible space but dry grass would carry an upslope surface fire from Co 103 through the subdivision in a matter of minutes. Defensible space here requires seasonal mowing of grass fuel. No emergency water supply or convenient water source was observed.

Fuels

Short grass, scrub, sparse juniper and isolated Ponderosa dominate the south facing slope. Some open Ponderosa stands in protected drainages. FBFM 1, 2, 5, 6, 9.

Mitigation Recommendations

Restrict access to non 4WD emergency vehicles unless primary access is widened with strategic adequate turnarounds. Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. Promote seasonal mowing around structures. Recommend emergency water supply cistern installed at intersection of Black Eagle Road and Co 103.



Blue Valley



Community Hazard Assessment

EXTREME

Community Design

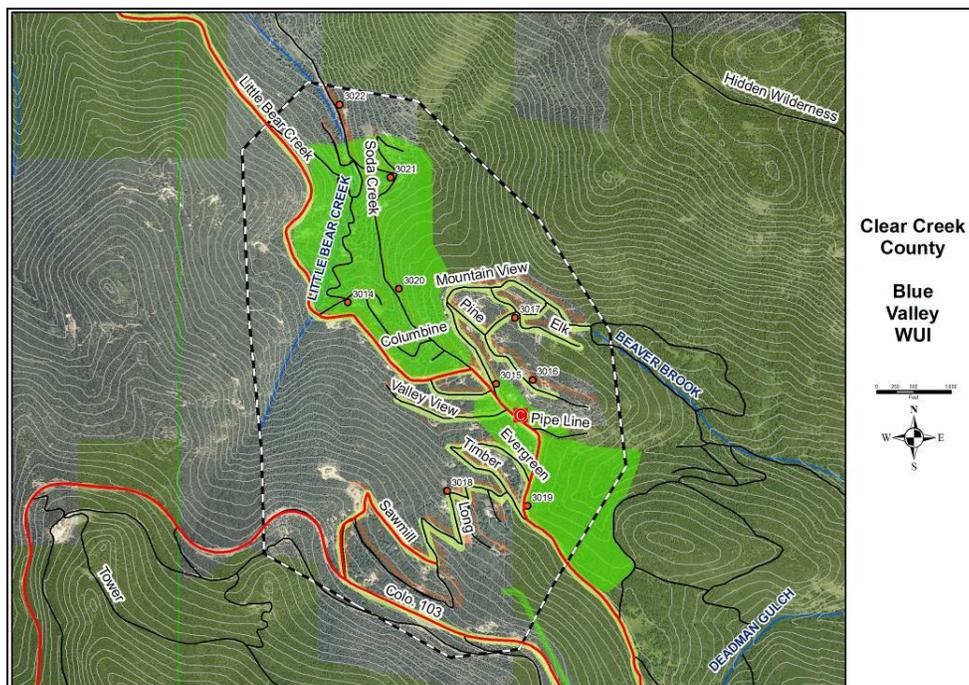
123 Addresses. Homes are located along the valley, slopes, and upper saddle of upper Old Little Bear Creek. Primary road provides two-way ingress/egress from Soda Creek to upper Co 103. Secondary roads are steep, single to 1½ lane, some requiring 4WD. Turnarounds are observed on dead ends but switchbacks are very tight. Predominant construction and roofing materials are flammable. Defensible space resulting from fuels treatment or meadow construction was observed with approximately 30 homes. One cistern for emergency water supply was observed at the saddle adjacent to a wide section of road. No other potential draft sites were noted.

Fuels

Dense stands of mixed conifer dominate the area. Homogeneous stands of Douglas-fir and Lodgepole Pine were observed within larger stands of mixed conifer. More open stands of Ponderosa are located on south facing around the saddle. Here grassy understory would carry a surface fire. FBFM 2, 8, 9, 10.

Mitigation Recommendations

Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. Develop shaded fuelbreak along primary county evacuation route Little Bear Creek Road. Develop shaded fuelbreaks along forested secondary neighborhood access routes. Develop shaded fuelbreak along primary county evacuation route Co 103 and upper Sawmill Road. Improve and maintain existing right-of-way fuelbreak along Co 103. Forest treatment thinning or patch cutting recommended for the chimney along Little Bear Creek and Beaver Brook drainages leading to and including the Valley View saddle area. Emergency water supply noted on saddle – maintenance recommended.



Brook Forest - EFPD



Community Hazard Assessment

HIGH

Community Design

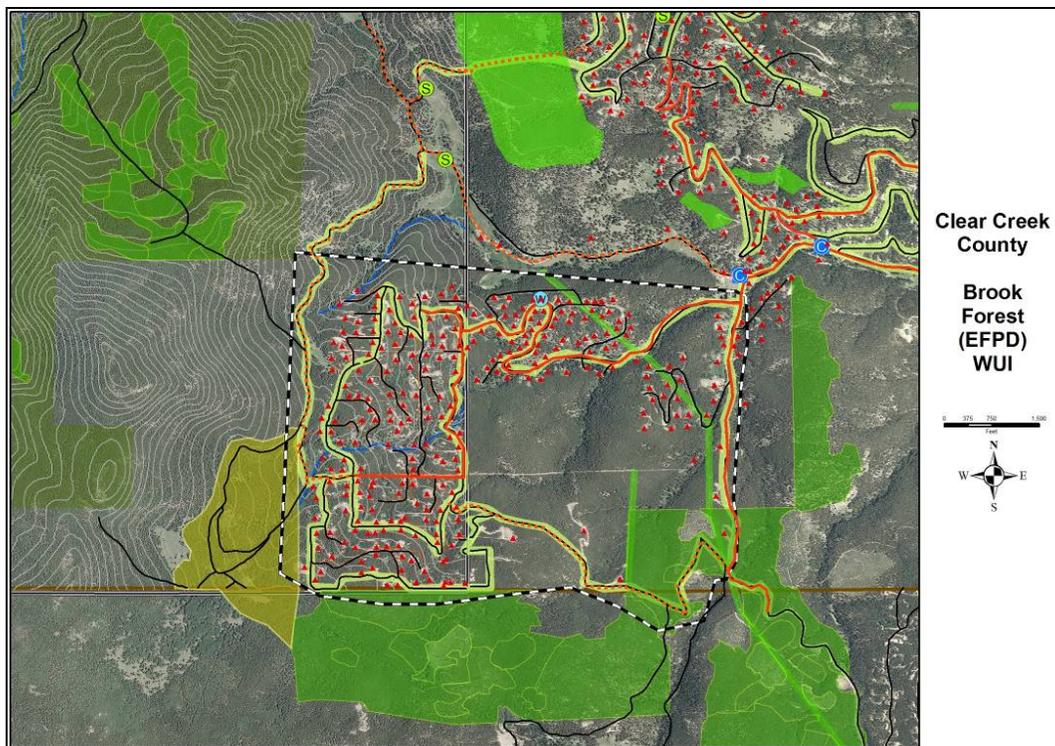
285 observed homes. Single access road is paved, 2 lanes in the lower portion of the area and constructed in a topographic chimney. Roads in the upper half are unpaved and range from 2 lane low slope to steep 4WD. 17 dead ends were noted with no turnarounds. The area is characterized as an isolated subdivision with home sites concentrated on north and east facing slopes. 48% of homes have < 30 feet and 44% have 30-70 feet defensible space. Construction and roofing materials predominantly combustible. No emergency water supply not observed.

Fuels

Lodgepole pine dominates the assessment area with heavy dead and down timber in some areas. South aspect in the north central area supports ponderosa pine and blue spruce growth. FBFM 8, 10.

Mitigation Recommendations

Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. Create shaded fuelbreaks along forested primary and secondary roads including Peaceful Hills to North Turkey Creek Road, High to North Turkey Creek, High around Meadow and Caldwell. Develop emergency water availability at primary accesses along North Turkey Creek and South Mountain Park. Fuel reduction in identified treatment zones. Expand existing utility right of ways as fuelbreaks. Potential safety zone in meadows in the southeast portion of the assessment area. Visible and consistent home addressing. Community training for "shelter-in-place."



Chicago Creek



Community Hazard Assessment

HIGH

Community Design

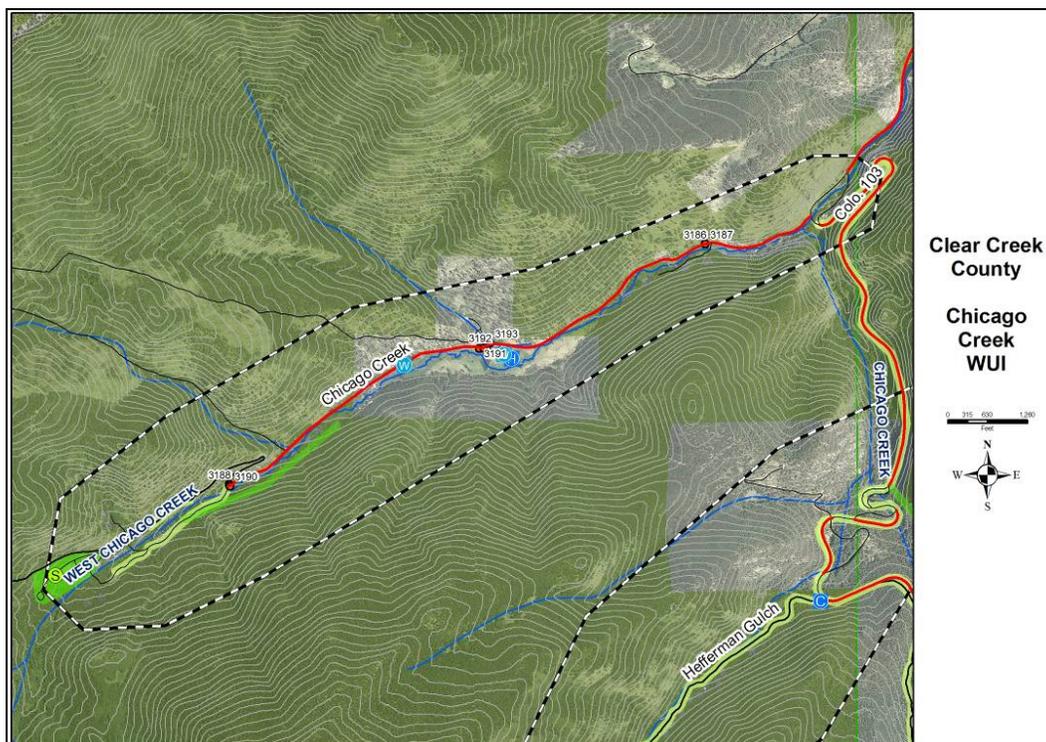
48 Addresses. From I-70, head south on Co 103 out of Idaho Springs. Primary access is a flat gravel/dirt road between 1½ to 2 lanes. No adequate turnarounds, but periodic pull-outs along main ingress. Predominant construction and roofing materials are flammable. Two ponds for emergency water supply are accessible off main ingress/adjacent to Gray Wolf Place. At least 70% of homes observed had <30 feet defensible space. Approximately 30% of homes were gated and not accessible for direct observation.

Fuels

Small patches of mixed conifer with aspens interspersed among a dominantly lodgepole overstory. Little to no regeneration/fuel build-up in the understory. Approximately 5% of trees afflicted by Mountain Pine Beetle kill. FBFM 2, 8.

Mitigation Recommendations

Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. Improve and maintain primary county evacuation route of Chicago Creek Road including grading, turnout construction where feasible. Timber fuels not encroaching to warrant shaded fuelbreak. Develop a shaded fuelbreak along West Chicago Creek Road. Recommend forest treatment at west end of area to accommodate a community safety zone in case of entrapment. Investigate drafting potential and helicopter dip sites at identified locations.



Echo Hills - EFPD



Community Hazard Assessment

EXTREME

Community Design

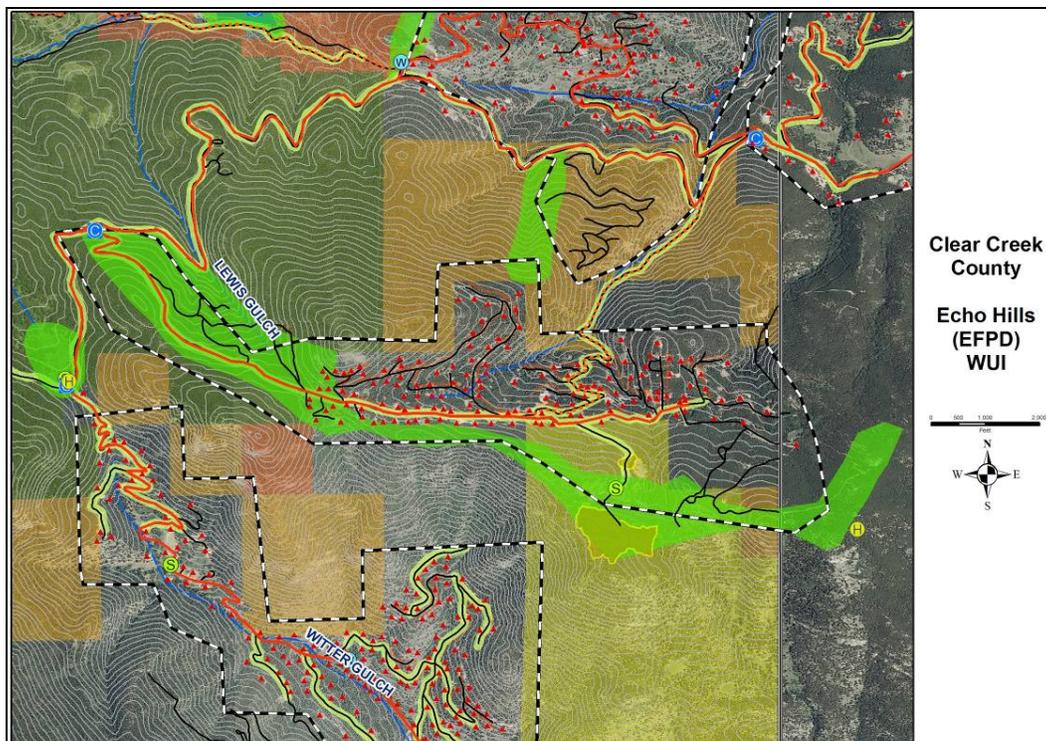
110 observed homes. Single paved access from Co 103 climbs 600 vertical feet through a topographic chimney to subdivision. Secondary roads groomed and unpaved. All roads are 1½ to 2 lanes with the exception of a group of steep narrow roads in the upper Castlewood Gulch area. 1 out of 14 dead ends has a turnaround. Housing density is moderate with a predominance of 1 acre lots with majority on slopes exceeding 20%. Majority of home sites have <30 feet defensible space. Construction and roofing materials primarily combustible. One cistern was observed at the east end of the subdivision.

Fuels

Predominant north aspect and high elevation favors the growth of dense stands of Lodgepole pine. In Echo Hills, many stands are over-mature with large amounts of timber litter on the ground in addition to short needle conifer litter. FBFM 2, 8, 10.

Mitigation Recommendations

Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. Shaded fuelbreaks along forested primary and secondary access roads including designated emergency access routes. Fuel reduction in identified treatment zones. Develop and maintain emergency access to Old Squaw Pass Road through Castlewood Gulch. Emergency water source development at subdivision entrance. Safety zone development and access improvement in meadow south of Sinton Road. Street signage, home addressing, and turnaround improvements. Community training for “shelter-in-place.”



Empire



Community Hazard Assessment

MODERATE

Community Design

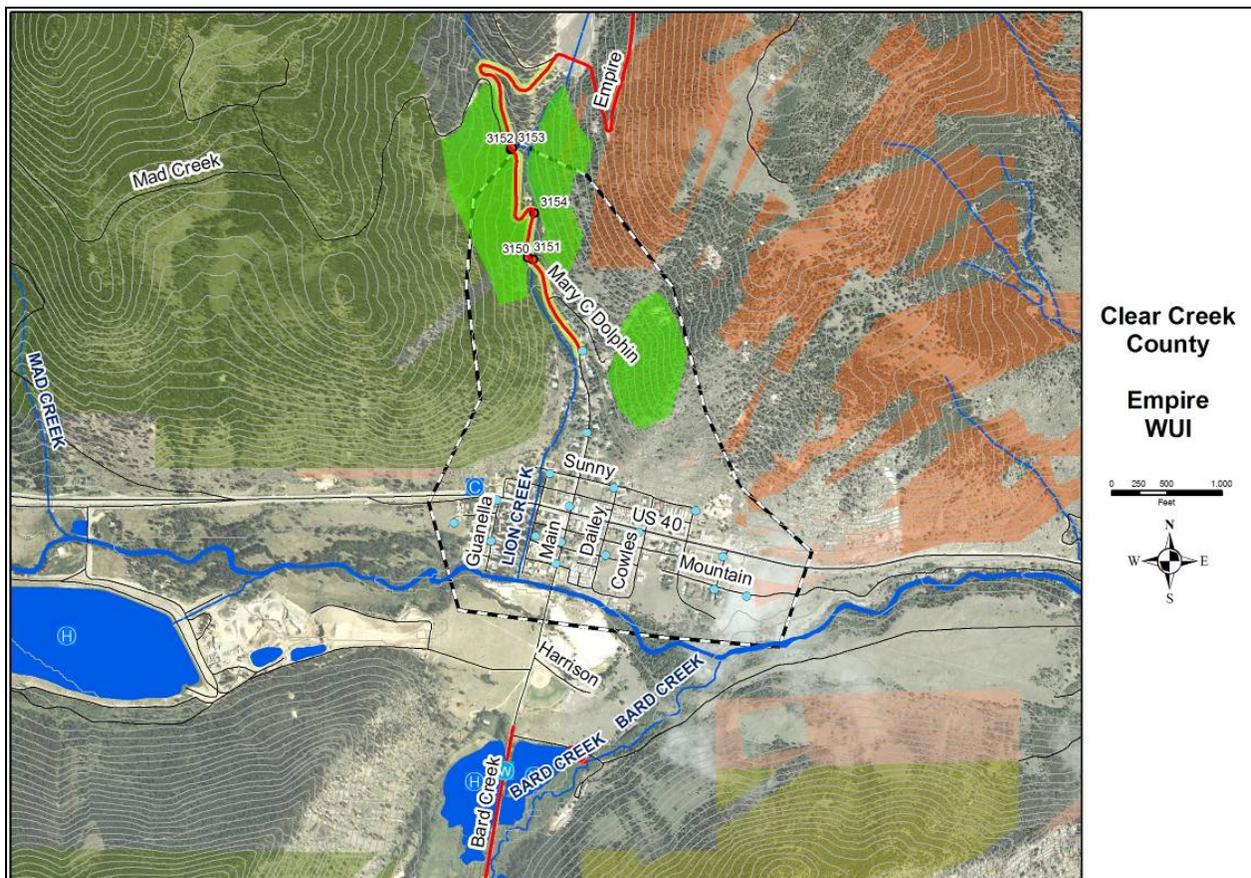
Municipality. Primary through access paved 2+ lane highway. Secondary roads are groomed 1 ½ to 2 lane. Generally flat valley floor bounded by steep south-facing slopes to the north. Municipal hydrant grid observed. Structure density is high but adjacent fuels are light. Empire Road runs north up a steep narrow forested chimney.

Fuels

Dense structures in town. Light fuels on south slopes. Dense mixed conifer on protected slopes along Empire Road. Moderate to heavy beetle kill on slopes south of town. FBFM 1, 2, 6, 8.

Mitigation Recommendations

Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. Shaded fuel break and strategic thinning areas identified along Empire Road. Recommend emergency water supply backup at west end of town.



Evergreen West - EFPD



Community Hazard Assessment

HIGH

Community Design

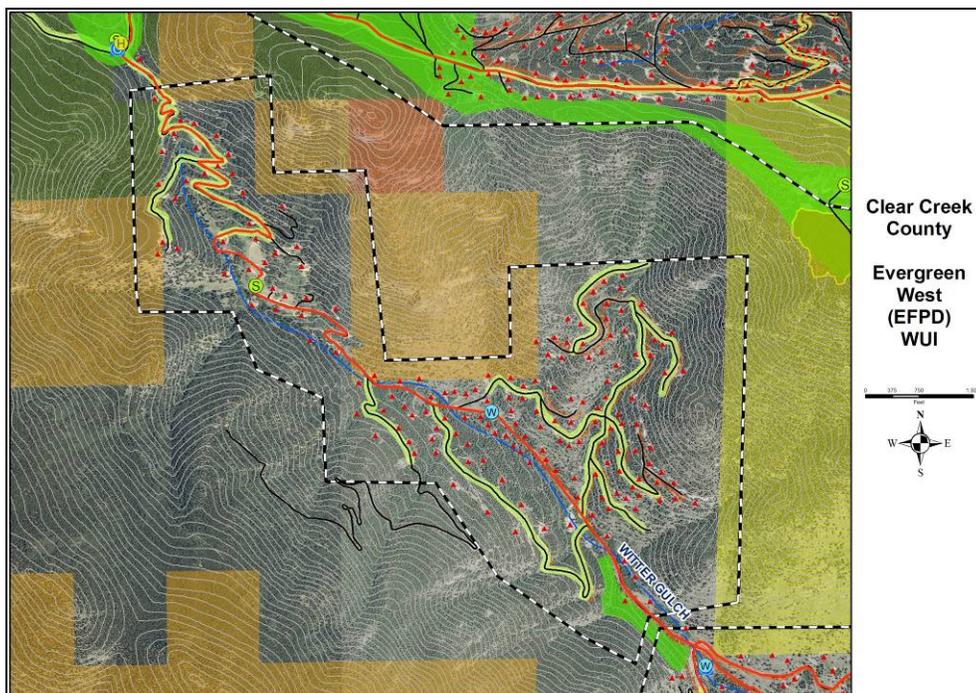
145 observed homes. Primary access 2 lane. 50% paved lower, 50% groomed unpaved upper and 13 switchbacks on upper portion. Secondary roads generally 1½ lanes groomed unpaved, steep in some areas. 2 good turnarounds and 3 tight turnarounds. Housing density is light to moderate with some concentrated lots along Witter Gulch Creek and Snyder Mountain Road. 51% of homes have <30 feet and 49% have 30-70 feet defensible space. Construction and roofing materials primarily flammable. One large cistern at Witter Gulch & Aspen Dr, flowing creek along Witter Gulch Road, multiple ponds along valley floor.

Fuels

Vegetation type is controlled largely by slope aspect with grass, brush and open ponderosa pine stands predominant on south facing aspects. Denser stands of short needle lodgepole pine, Douglas fir, and spruce favoring north facing aspects. Upper Witter Gulch lodgepole pine, expansive valley meadow at base of climb to the west saddle, ponderosa pine, grass/shrub on south aspects, mixed short needle conifer on north aspects, old growth noted south side of lower Witter Gulch, dense mixed conifer in Snyder Mountain Road chimney. FBFM 1, 2, 4, 8, 9, 10.

Mitigation Recommendations

Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. Shaded fuelbreaks along forested primary and secondary access roads including designated emergency access routes. Improve or construct secondary road turnarounds at dead ends. Develop emergency water availability at upper Witter Gulch Road and Co 103. Potential safety zone in meadow along Witter Gulch Road below Aspenwood. Visible and consistent home addressing. Community training for "shelter-in-place."



Fall River



Community Hazard Assessment

HIGH

Community Design

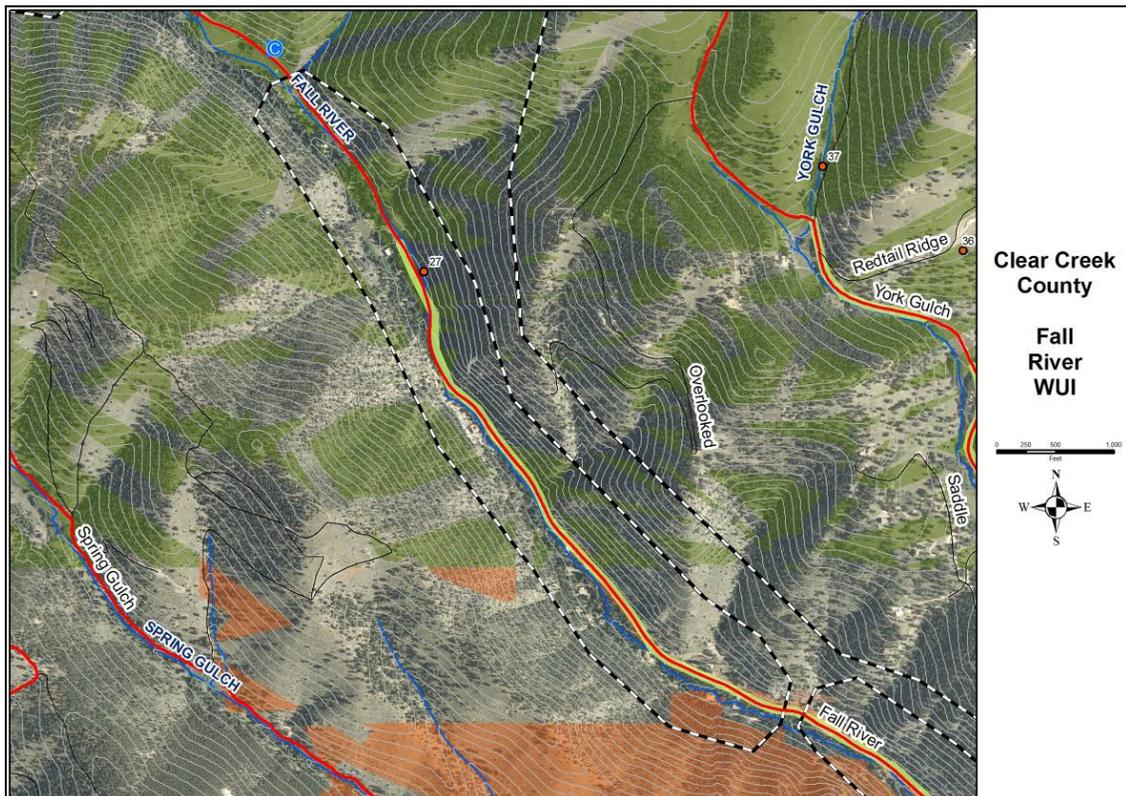
23 Addresses. Primary access 2-lane gravel/dirt with no turnarounds. Home sites are dispersed along a valley bottom with approximately 80% of slopes ranging between 10-20% in steepness near homes. Construction materials are flammable. Roofing materials are flammable on ~50% of home sites. Approximately 50% of homes had between 30-70 feet of defensible space. No emergency water supply or convenient water source observed.

Fuels

Light overstory vegetation along roads and toe of slopes. Heavy mixed conifer overstory with lodgepole and slash build-up on higher slopes adjacent to main road. Very dense in some areas. FBFM 1, 2, 8, 10.

Mitigation Recommendations

Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. Improve and maintain primary county evacuation route along Fall Creek Road including shade fuelbreaks margins where needed. Recommend emergency water supply cistern installed near west end of community to serve both Fall River and Upper Fall River WUIs.



Floyd Hill - EFPD



Community Hazard Assessment

EXTREME

Community Design

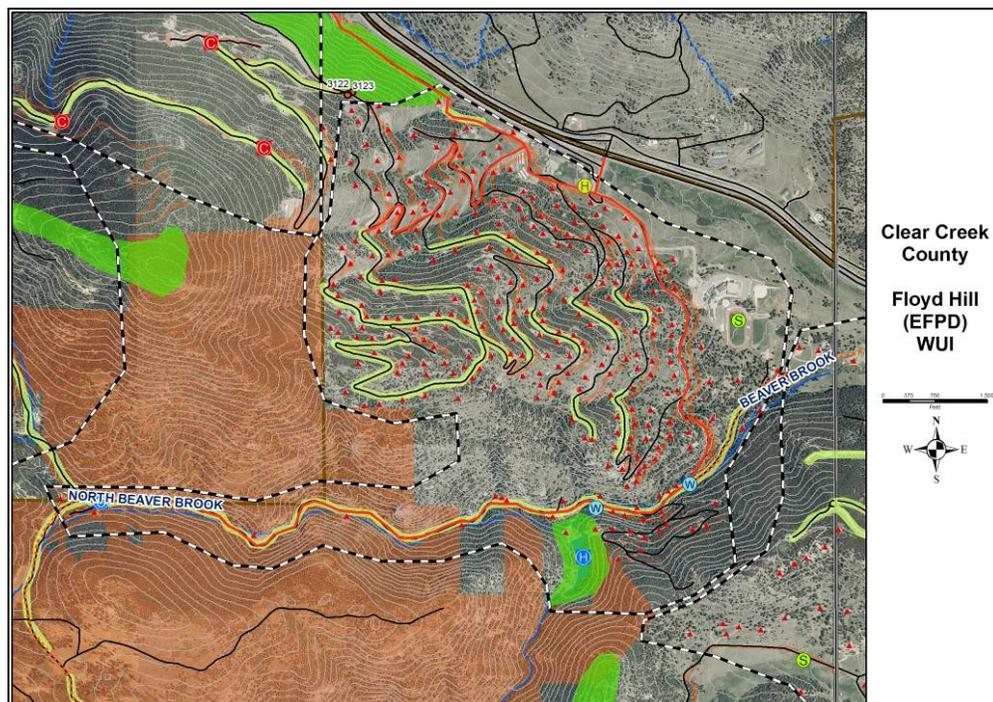
236 observed homes. Single access route for main subdivision and Beaver Brook Canyon. Road surface is mixed paved and non-surfaced but generally good with 2-way access throughout, grade is steep at switchbacks. Two +2,000 foot secondary roads with very tight turnarounds. Sinuous road layout. Housing density is moderate with 1 to 5 acre lots. 49% of homes <30 feet and 46% of homes with 30-70 feet defensible space. Construction and roofing materials predominantly flammable. Emergency water supply sources were not observed.

Fuels

Vegetation type is controlled largely by slope aspect with grass, brush and open ponderosa pine stands predominant on south and southeast facing slopes, and heavier stands of mixed conifer, lodgepole pine and Douglas fir on most north facing slopes; vegetation has an upslope linear consistency with meadows forming. FBFM 2, 4, 8, 9, 10

Mitigation Recommendations

Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. Shaded fuelbreaks along all forested access roads and forested emergency access routes including Upper Beaver Brook Canyon Rd. Road access improvements including switchback widening and turnarounds on S. Ponderosa and S. Hyland. Street signage and home addressing improvements. Emergency access W. Beaver Brook Rd. to Sante Fe Mt. Rd. and E. Beaver Brook Rd to Elm Green Rd., high school to Elm Green Rd., out-of-district with Clear Creek County-Sawmill Creek Rd to I-70 corridor. Potential Forest treatment areas west of WUI on saddles between Saddleback Mtn and Sante Fe. Local school ideal for area evacuation enter, ICP, emergency water source location. Community training for "shelter-in-place."



Floyd/Saddleback



Community Hazard Assessment

EXTREME

Community Design

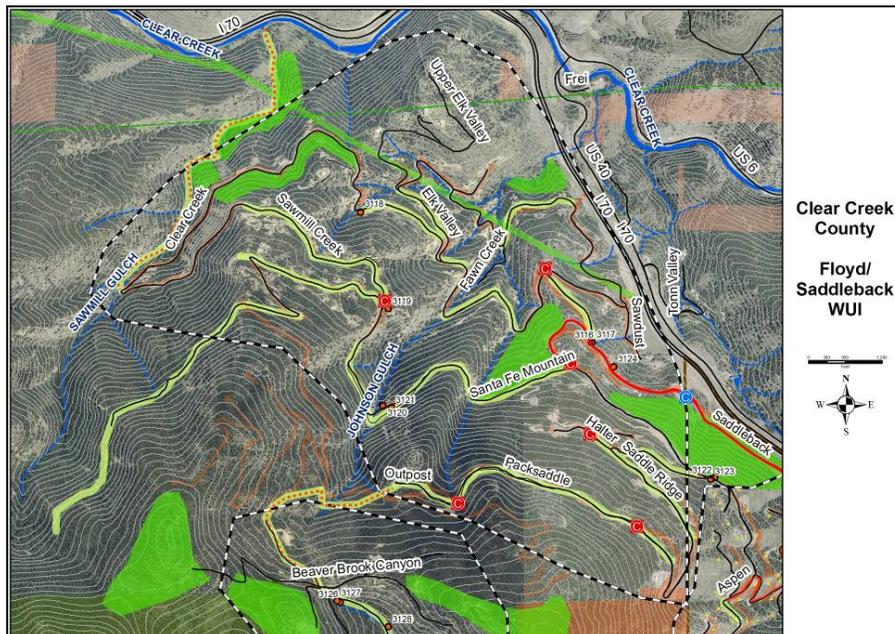
151 Addresses. Primary 2 lane access on Saddleback Rd. with paved/compact gravel surfaces that are soft in many places. Many switchbacks hard to navigate. Most secondary roads lead out of neighborhood so community map recommended to emergency responders navigate. One turnaround at neighborhood entrance. Half of the homes observed have <30 feet defensible space. Close to 40% of home sites built within 300 feet of a ~40% slope. Construction and roofing materials predominantly flammable. No emergency water supply observed.

Fuels

Rocky understory with tall grasses including smooth brome and a light litter/slash build-up. Vegetation type is controlled largely by slope aspect with grass, brush and open ponderosa pine stands predominant on south and southeast facing slopes, and heavier stands of mixed conifer, lodgepole pine and Douglas-fir on most north facing slopes; meadows and open forest areas have a rocky understory with tall grasses including smooth brome and a light litter/slash build-up. FBFM 1, 2, 4, 8, 9, 10.

Mitigation Recommendations

Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. Develop shaded fuelbreaks along all forested secondary community access routes. Anchor shaded fuelbreaks to meadows. Improve and maintain existing right-of-way fuelbreaks along utility corridors. Potential strategic forest treatment zones identified in areas of dense timber and downed timber in understory within the community. Potential secondary evacuation/emergency access routes are identified along Sawmill Gulch and at Elk Valley. Cisterns noted throughout the community but recommend emergency water supply, either hydrant or cistern installed at primary entrance to the community on lower Saddleback Road.



French Springs - EFPD



Community Hazard Assessment

HIGH

Community Design

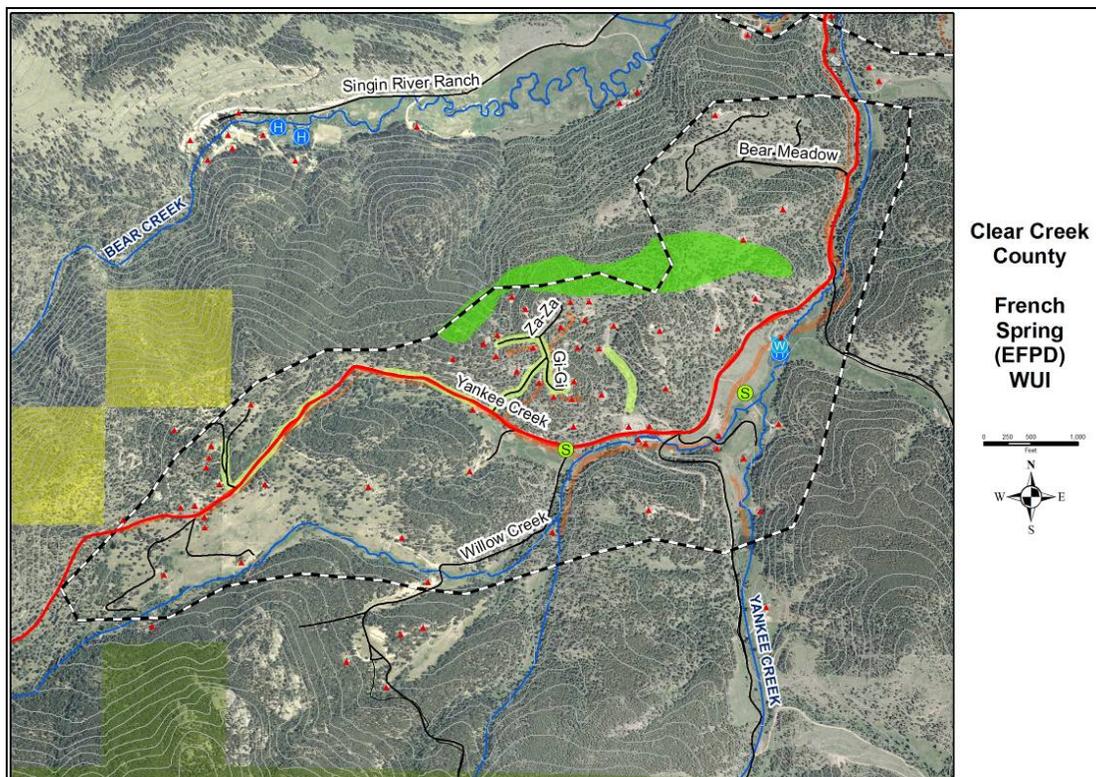
47 observed homes. Primary access is Yankee Creek Rd—a paved 2-lane low grade road. Secondary roads consist of 4 unpaved, 1 paved (north side steep), 4 dead ends, and 1 turnaround. Housing density low. 51% of homes have < 30 feet and 43% have 30-70 feet defensible space. Construction and roofing materials primarily flammable. No observed established emergency water sources.

Fuels

Vegetation controlled largely by slope aspect with grass, brush and ponderosa pine stands predominant on most south facing aspects. Heavier stands of mixed conifer are more common on most north facing slopes. Broad open grassy meadow along primary and secondary drainages. Heavier mixed conifer on north aspects with open ponderosa pine slopes on direct south aspects. Heavier stands, some mixed, on less direct aspects. FBFM 1, 2, 4, 8, 9, 10.

Mitigation Recommendations

Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. Create shaded fuelbreaks along forested primary and secondary access roads including Yankee Creek, Normandy, and private drives. Fuel reduction in identified treatment zones. Develop emergency water availability in existing stock ponds along Yankee Creek Rd. Potential safety zone in meadow system along Yankee Creek. Visible and consistent home addressing.



Georgetown



Community Hazard Assessment

MODERATE

Community Design

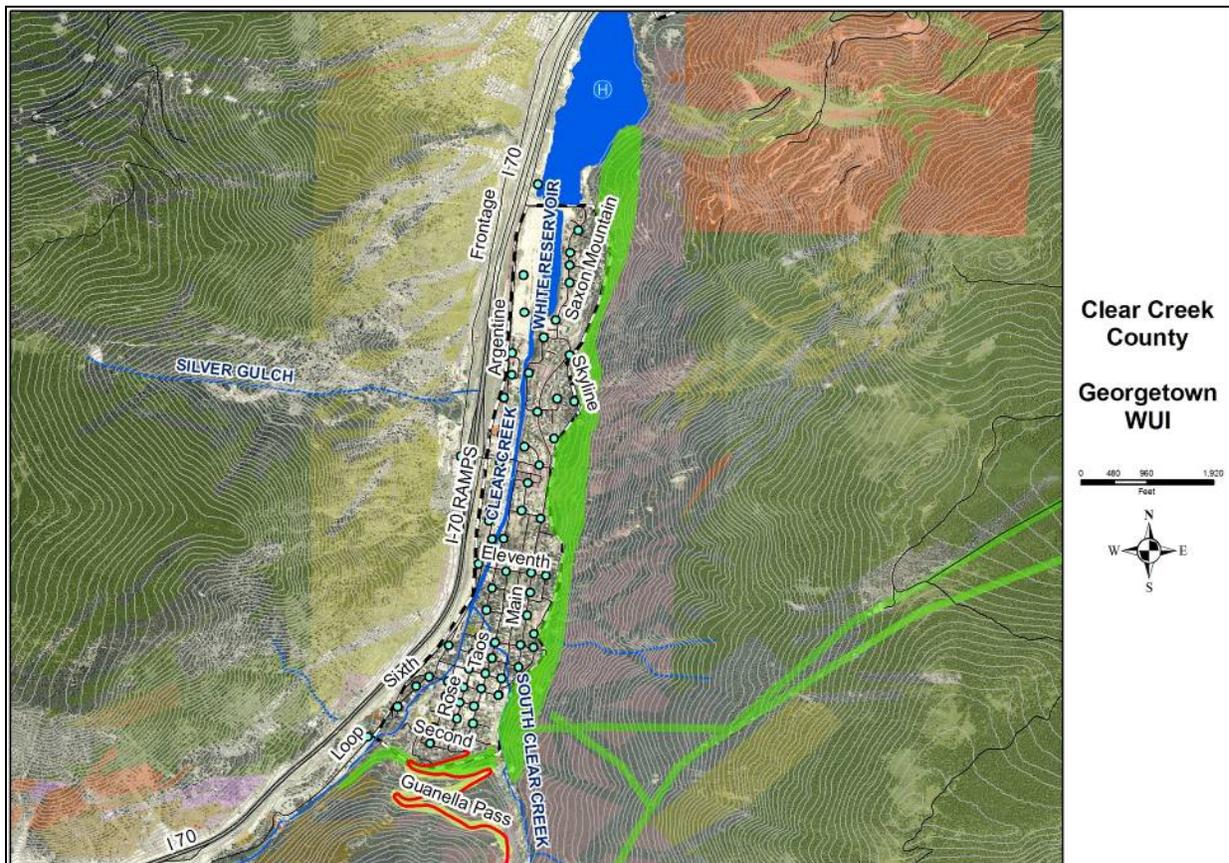
Municipality. Access across town paved or groomed 1 ½ to 2 lane. Somewhat limited access across Clear Creek to Argentine Rd. and I-70. Generally flat valley floor bounded by steep slopes east, south, and west of town. I-70 provides buffer to the west. Dense timber adjacent to structures on the south and east town margins. Municipal hydrant grid observed. Moderate beetle-kill noted.

Fuels

East facing slopes across I-70 light grass, shrub and rock. Dense lodgepole pine and mixed conifer adjacent to town on steep west and north facing slopes. Housing density is high in town limits with mature urban forestry mix. FBFM 1, 2, 4, 8, 9, 10 noted in area.

Mitigation Recommendations

Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. Develop shaded fuelbreaks along lower Guanella Pass Road. Strategic forest treatment zones identified along forested town margins.



Hefferman Gulch



Community Hazard Assessment

EXTREME

Community Design

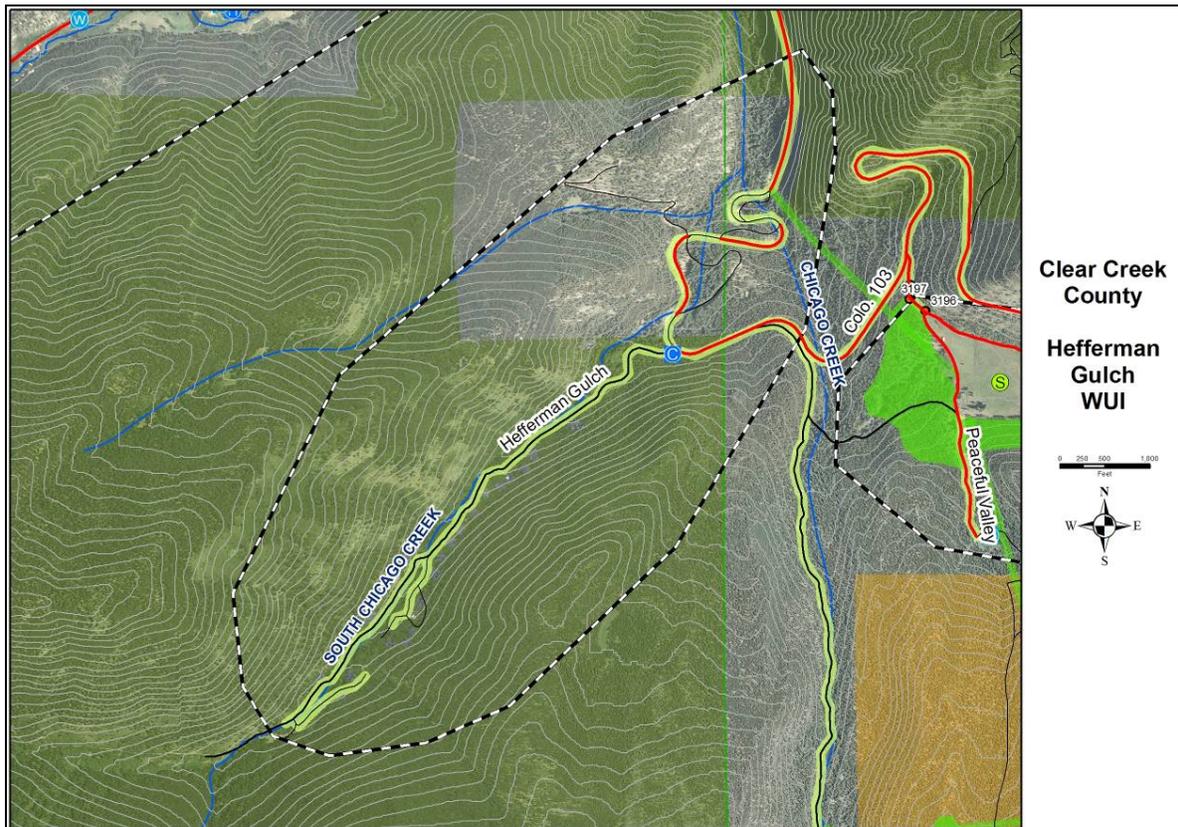
Approximately 30 addresses. Primary access is Hefferman Gulch Rd., a gravel 2 lane road. Majority of home sites located adjacent to primary access road and close to one another. Construction and roofing materials primarily flammable. No emergency water sources observed.

Fuels

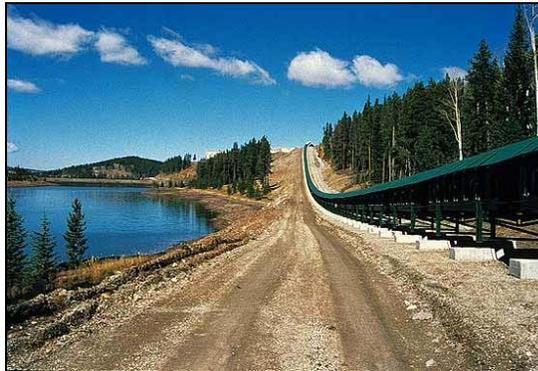
Medium to heavy density mixed conifer species around and on slopes above majority of home sites. Some riparian vegetation associated with creek corridor along community's primary access road. FBFM 2, 4, 8, 10.

Mitigation Recommendations

Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. Develop shaded fuelbreaks along primary county evacuation route Co 103 and secondary community access route Hefferman Gulch Road. Emergency water cistern installation recommended at Hefferman Gulch Road and Co 103. No feasible community safety zone site identified.



Henderson Mine



Community Hazard Assessment

MODERATE

Community Design

High altitude industrial wildland interface. Facilities occupy highly disturbed valley floor. Dense lodgepole pine on north facing slopes, open mixed conifer on south facing slopes. Moderate to high beetle activity noted. Significant topography. Commercial hydrants noted.

Fuels

High altitude firs and lodgepole pine are dense on north facing slopes and mixed with aspen on south facing slopes. Riparian deciduous and meadow bogs on valley floor downstream from facilities. Stand-replacement scale beetle-kill possible on south facing slopes. Red attack is in full swing and will likely alter FBFM of surface fuels in the next two to three years. Industrial complex valley floor devoid of vegetative fuels. Timber continuity broken by avalanche chutes, utility corridors, and man-made fuelbreaks. FBFM 1, 5, 8, 9, 10.

Mitigation Recommendations

Maintain existing fuelbreaks and expand shaded fuelbreak down Jones Pass Rd. Treat beetle where possible. Evolve strategic emergency plan for evacuation and emergency response as environmental and infrastructure changes occur.



Herman Gulch



Community Hazard Assessment

EXTREME

Community Design

9 Addresses. Primary access is a 2 lane gravel road with turnarounds. Access is gated. The majority of homes have <30 feet defensible space. Construction and roofing materials primarily flammable. No emergency water supply sources near homes on north side of I-70, but creek could potentially provide a modest drafting source.

Fuels

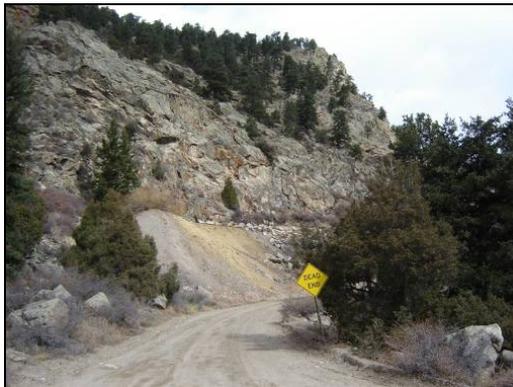
Closely-spaced mixed conifer overstory near homes. A more open riparian area associated with the creek corridor exists south of I-70, but no home sites are in the area. FBFM 2, 4, 5, 8, 10.

Mitigation Recommendations

Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. Develop a shaded fuelbreak along primary neighborhood access – Herman Gulch Road. Improve and maintain existing utility right-of-way fuelbreak. Develop and maintain a fuelbreak along the uphill perimeter of the parking area. Recommend installing emergency water supply cistern near frontage road intersection.



Hidden Valley



Community Hazard Assessment

HIGH

Community Design

6 Addresses. Primary access on Hidden Valley Rd. It is a single to 1½ lane gravel road, but it is initially steep as it turns off frontage road and approaches home sites. The end of the main road is a loop turnaround in the middle of the neighborhood. Predominant construction and roofing materials are flammable. 80% of home sites have <30 feet of defensible space. No emergency water supply observed.

Fuels

Open areas of rock. Scattered willow shrubs, conifers, and standing dead snag trees. More dense mixed conifer overstory near homes with some build up in the understory. FBFM 1, 2, 4, 5, 8.

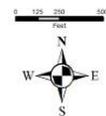
Mitigation Recommendations

Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. Develop shaded fuelbreaks along forested stretch of Hidden Valley Road. Recommend installing emergency water supply cistern near frontage road intersection to serve trailers, facility and homes on Hidden Valley Road.



Clear Creek County

Hidden Valley WUI



Idaho Springs



Community Hazard Assessment

MODERATE

Community Design

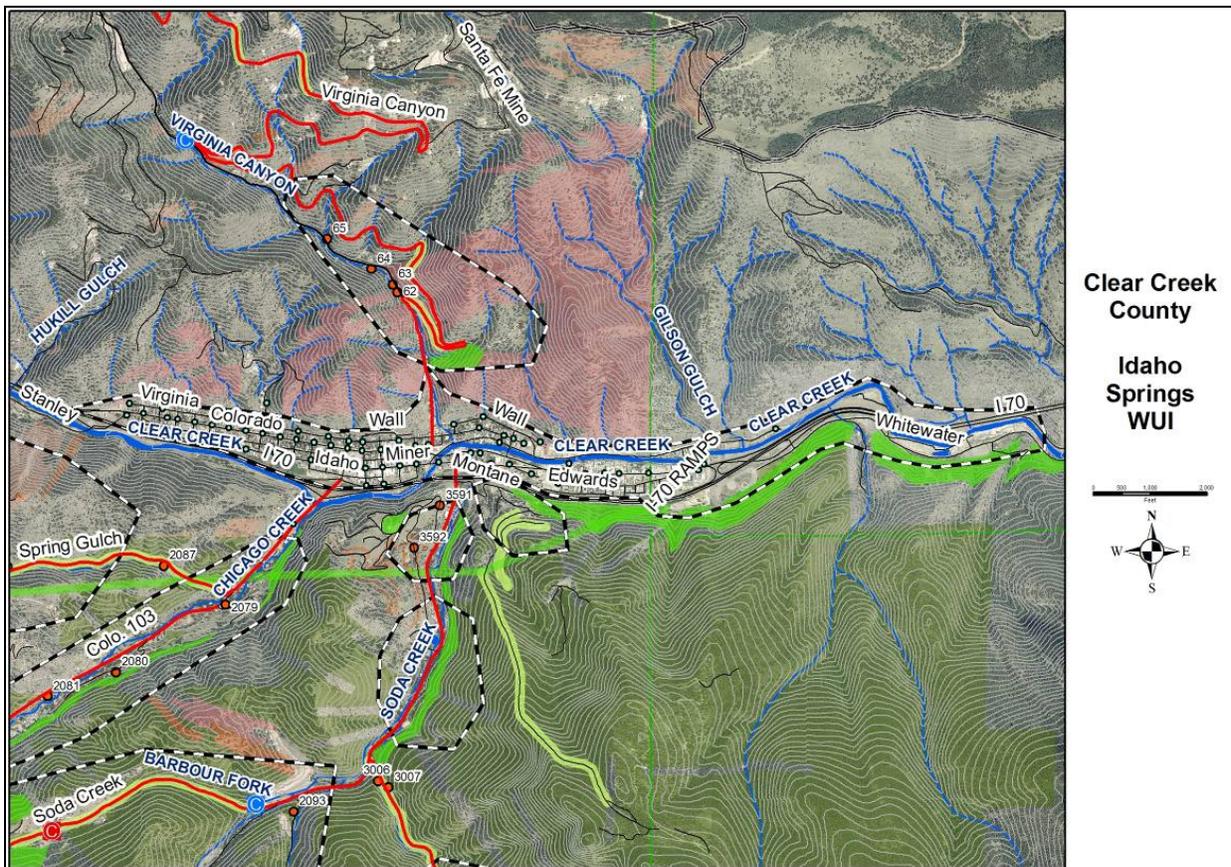
Municipality. Through access across town on paved 2 lane roads. Flat valley floor bounded by steep slopes east, south, and west of town. I-70 and Clear Creek provide buffer to the south. Rocky slopes and light fuels adjacent to structures on the north margin. Municipal hydrant grid observed.

Fuels

Dense structures and urban/residential ornamental trees and shrubs in town. Light fuels adjacent to structures to the north. Dense lodgepole pine and mixed conifer adjacent to I-70 south of the highway. . FBFM 1, 2, 4, 5, 8.

Mitigation Recommendations

Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. Strategic forest treatment zones identified along forested valley margins south of town and south of I-70.



Little Bear



Community Hazard Assessment

HIGH

Community Design

17 Addresses. Primary access is a 1½ lane smooth gravel road that has a ~30% slope and is too steep for all season road conditions. Many secondary roads are single-lane dirt with ruts and turnarounds at their switchbacks. Half of the surveyed home sites have <30 feet defensible space. Construction and roofing materials predominantly flammable. No emergency water supply observed.

Fuels

Mixed conifer fuels are moderately dense to dense depending on the varied elevation and slope aspects within the community. Some timber slash has accumulated on the ground. FBFM 2, 4, 8, 10.

Mitigation Recommendations

Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. Develop and maintain shaded fuelbreak along all forested designated county primary evacuations routes and secondary neighborhood access routes. Potential forest treatment zones identified in dense timber stands on strategic north and west facing slopes. Recommend installing emergency water supply cistern near intersection of Warren Gulch and Little Bear Creek Road.



Lower 103



Community Hazard Assessment

HIGH

Community Design

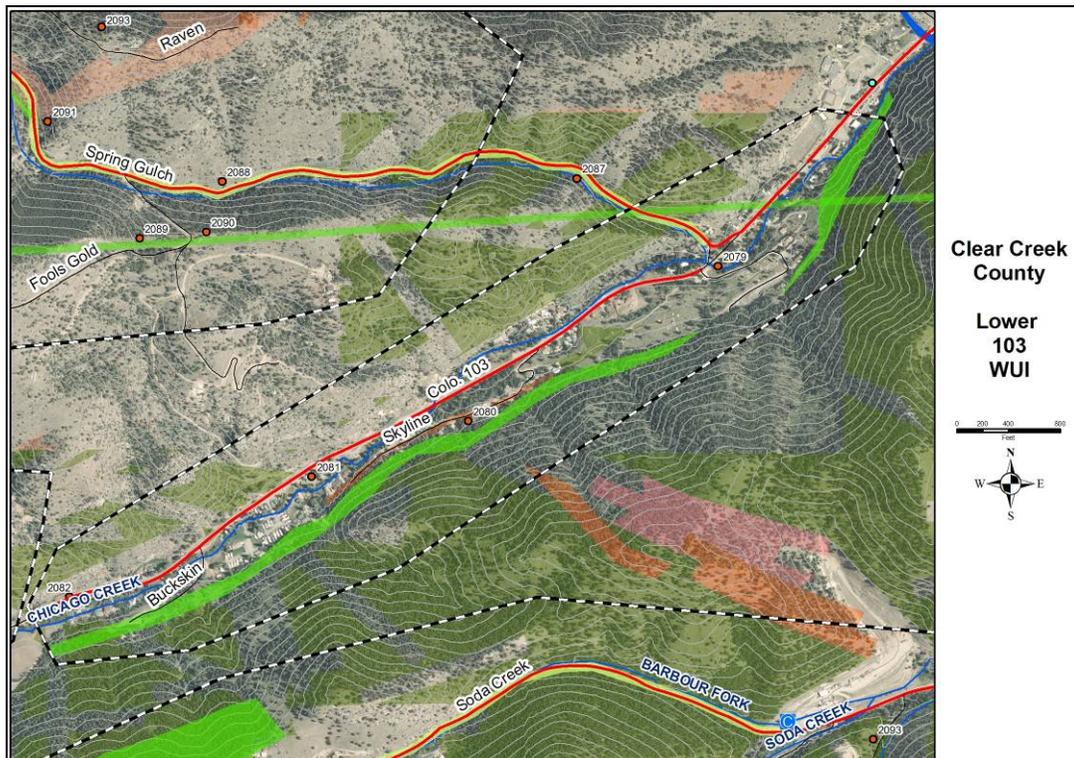
78 Addresses. Co 103 is the 2 lane paved primary access road. Secondary roads 1½ to 2 lane smooth gravel lacking turnarounds. Roads are rougher and steeper at higher elevations. Approximately 75% of homes have between 30-70 feet of defensible space and the majority of home sites are situated adjacent to the community's main access road. Construction materials and roofing predominantly flammable. No emergency water supply observed.

Fuels

Community is situated between a fairly open southwest-facing slope and a northeast-facing slope with a dense mixed conifer overstory. Vegetation around homes is generally lighter and more cleared out than on the north facing slopes. FBFM 1, 2, 4, 8.

Mitigation Recommendations

Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. No significant forest encroachment along primary county evacuation route Co 103. Potential forest treatment zone along lower forested slopes southeast of Chicago Creek backing to structures. Emergency water supply from hydrants in nearby Idaho Springs.



Lower Fall River



Community Hazard Assessment

HIGH

Community Design

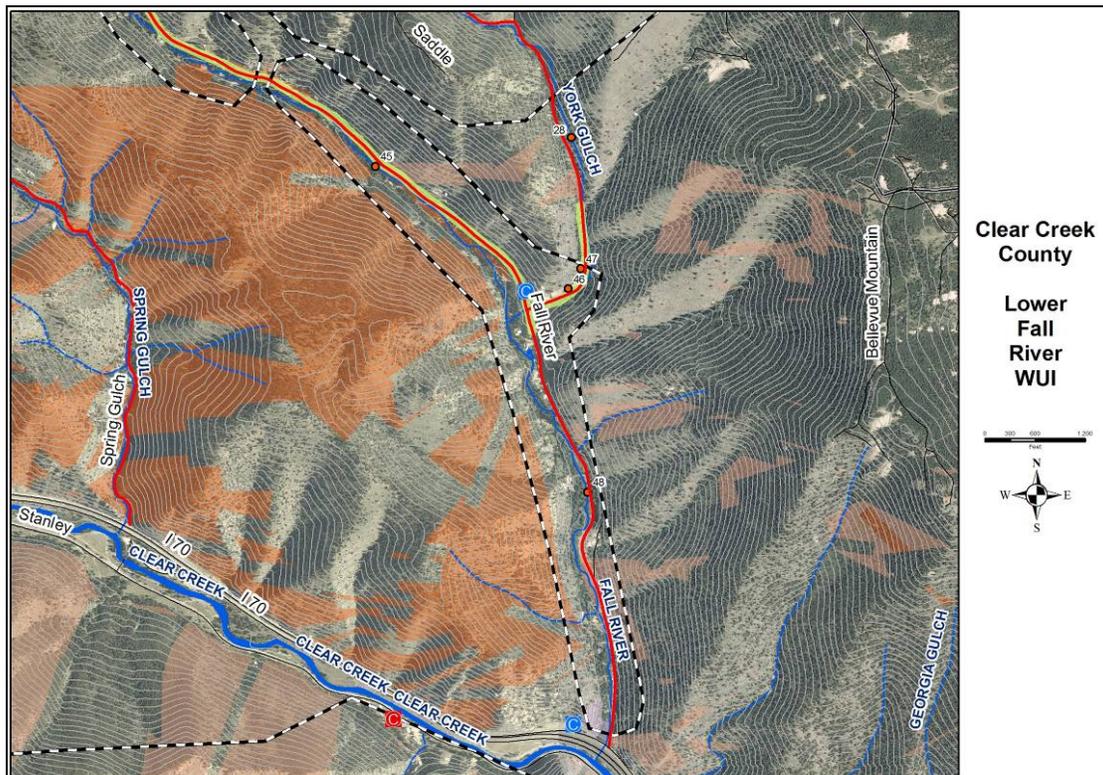
54 Addresses. Primary access via Mill Creek Rd. on a 2 lane paved surface with few turnarounds other than driveways. Construction materials predominantly flammable. Roofing materials 50% flammable/50% nonflammable. Depending on snowmelt/drought conditions, Mill Creek could be accessed as a draft source for the immediate area.

Fuels

Vegetation ranges from mainly large open areas with short grasses and coniferous vegetation with low-hanging branches to a more closed conifer overstory with light litter build-up on the ground. Vegetation along creek is spruce and fir mixed with riparian species including willows and aspens. FBFM 1, 2, 4, 5, 8.

Mitigation Recommendations

Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. Develop and maintain shaded fuelbreak along forested areas of primary county evacuation route Mill Creek Road. Recommend installing emergency water supply/cistern near intersection of Mill Creek Road and frontage road to service Dumont and lower Mill Creek.



Lower Mill Creek



Community Hazard Assessment

HIGH

Community Design

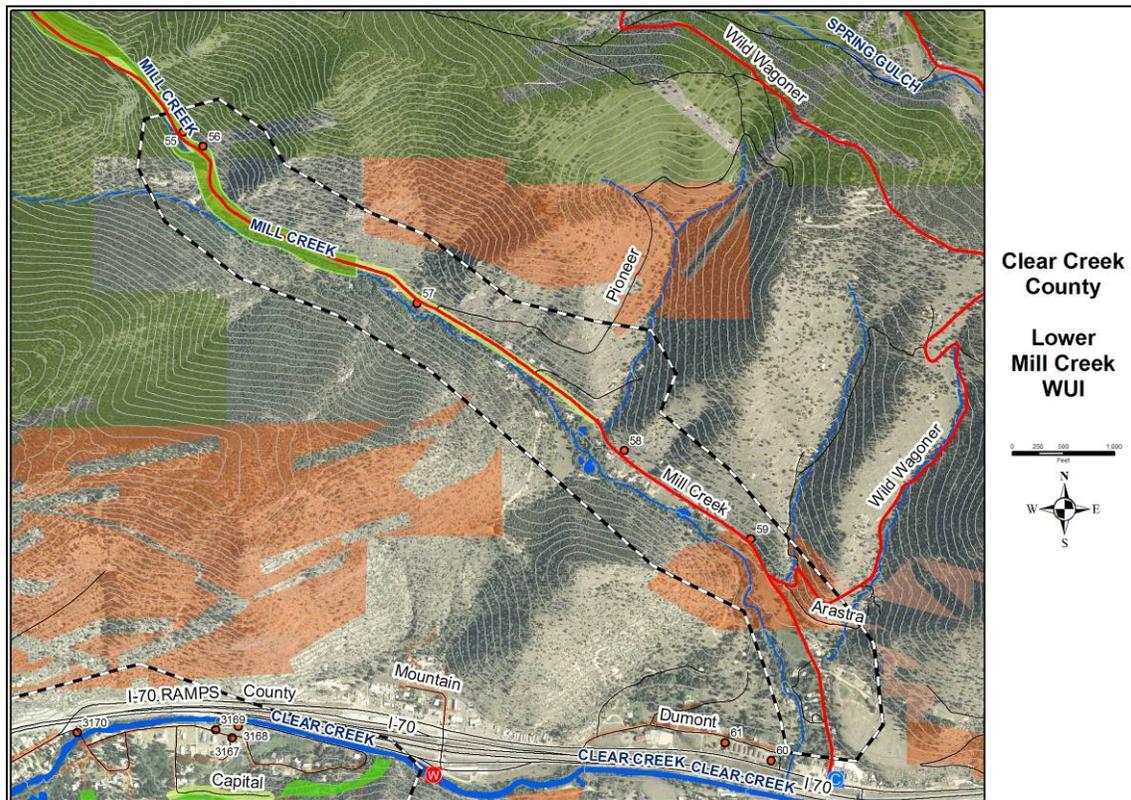
54 Addresses. Primary access via Mill Creek Rd. on a 2 lane paved surface with few turnarounds other than driveways. Construction materials predominantly flammable. Roofing materials 50% flammable/50% nonflammable. Depending on snowmelt/drought conditions, Mill Creek could be accessed as a draft source for the immediate area.

Fuels

Vegetation ranges from mainly large open areas with short grasses and coniferous vegetation with low-hanging branches to a more closed conifer overstory with light litter build-up on the ground. Vegetation along creek is spruce and fir mixed with riparian species including willows and aspens. FBFM 1, 2, 4, 5, 8.

Mitigation Recommendations

Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. Develop and maintain shaded fuelbreak along forested areas of primary county evacuation route Mill Creek Road. Recommend installing emergency water supply/cistern near intersection of Mill Creek Road and frontage road to service Dumont and lower Mill Creek.



Lower Soda Creek



Community Hazard Assessment

MODERATE

Community Design

20 Addresses. Main access is 2 lane paved. It runs through the middle of the community with many driveways leading off of it and a modest turnaround area at the end of Two Moon Rd. Construction materials primarily flammable. Roofing materials are a mixture of flammable and nonflammable. No emergency water supply sources observed.

Fuels

Community is situated in a valley bottom with open sparse vegetation to the west and medium density mixed conifer and shrub vegetation near homes and to the east. FBFM 1, 2, 4, 5, 8.

Mitigation Recommendations

Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. No significant forest encroachment along primary county evacuation route Soda Creek Road. Potential forest treatment zone along lower forested slopes east of Soda Creek backing to structures. Existing fuelbreak along ridge east of WUI should be improved and maintained. Emergency water supply from hydrants in nearby Idaho Springs.



Middle 103



Community Hazard Assessment

HIGH

Community Design

29 Addresses. Primary access road is low grade, 2 lane paved with no turnarounds. 50% of home sites have <30 feet defensible space. Construction and roofing materials predominantly flammable. Lake on south side of Co 103 can be used as an emergency water supply in the immediate area.

Fuels

Community is situated in a valley bottom with rocky open slopes and disbursed conifers on the southeast-facing slope and dense mixed lodgepole and spruce/fir on the northwest-facing slope. FBFM 1, 2, 4, 5, 8.

Mitigation Recommendations

Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. No significant forest encroachment along primary county evacuation route Co 103. Potential forest treatment zone along lower forested slopes southeast of Chicago Creek backing to structures. Recommend emergency water supply/cistern development at intersection of Ute Creek Road and Co 103. Survey identified pond for potential draft and helicopter dip resource.



Montane Park



Community Hazard Assessment

HIGH

Community Design

23 Addresses. Primary access is a low grade paved road, 2 lane width with dead ends at driveways. Turnaround areas are modest and located at switchback turns. Community is flanked by high voltage power lines and the highway. Construction and roofing materials predominantly flammable. No emergency water supply source observed.

Fuels

Overstory vegetation is moderately dense mixed conifer, shrubs, and short grasses with little build up in the understory. Potentially hazardous topography in the area includes slopes and chimneys. FBFM 1, 2, 5, 8.

Mitigation Recommendations

Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. Develop and maintain shaded fuelbreaks along all forested secondary community access roads. Improve and maintain utility right-of-way fuelbreak. Emergency water resources in nearby Idaho Springs.



Morrison Lane



Community Hazard Assessment

HIGH

Community Design

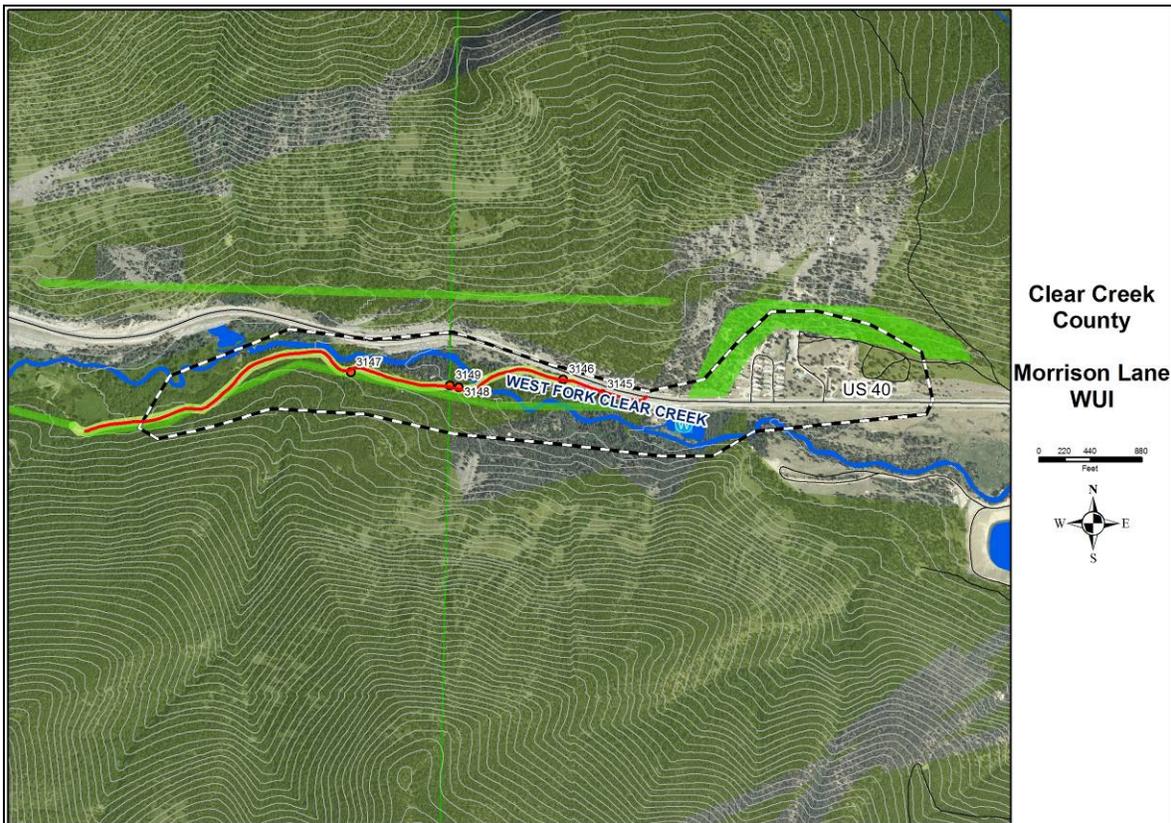
17 Addresses. Primary access is a 1½ to 2 lane gravel road with one small turnaround approximately 0.5 miles off highway and ¾ of the way into the community on main access. All home sites observed have <30 feet defensible space. Construction materials 100% flammable. Majority of roofing materials nonflammable. No emergency water source observed.

Fuels

Fuels mainly lodgepole and aspen with lots of rock outcroppings and fairly dark, moist soil near homes. A reasonable amount of slash build-up on the ground, but only a small amount of needle litter. FBFM 2, 5, 8, 9.

Mitigation Recommendations

Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. Develop and maintain shaded fuelbreak along all forested sections of primary neighborhood access route. Improve and maintain existing utility right-of-way fuelbreaks. Survey identified pond for potential draft resource.



Peaceful Valley



Community Hazard Assessment

HIGH

Community Design

5 Addresses. Primary access off Co 103 is a well-groomed 1 to 1½ lane road with a moderately steep grade, lacking clear labeling. No turnarounds on narrow secondary road near homes, but loop around meadow can be utilized. Topography near homes is generally flat. Majority of homes have <30 feet defensible space. Construction and roofing materials predominantly combustible. No emergency water supply was observed. A pond in the meadow could be used as a dipping and drafting source.

Fuels

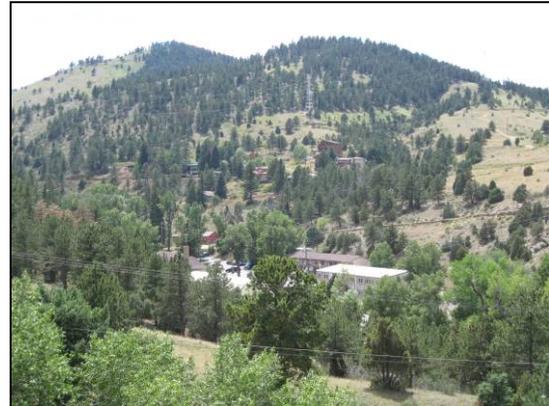
Dense mixed conifer overstory surrounds home sites. A large open meadow in the middle of the community contains dry and mesic grasses and is likely maintained as a cattle pasture. FBFM 1, 8.

Mitigation Recommendations

Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. Develop and maintain shaded fuelbreak along all forested sections of primary county evacuation route Co 103 and secondary community access route. Large flat open meadow potential back-country safety zone. Potential strategic forest treatment zones identified in dense timber stands along meadow perimeter. Improve and maintain existing utility right-of-way fuelbreaks. Survey identified pond for potential draft and helicopter dip resource.



Pine Slope



Community Hazard Assessment

HIGH

Community Design

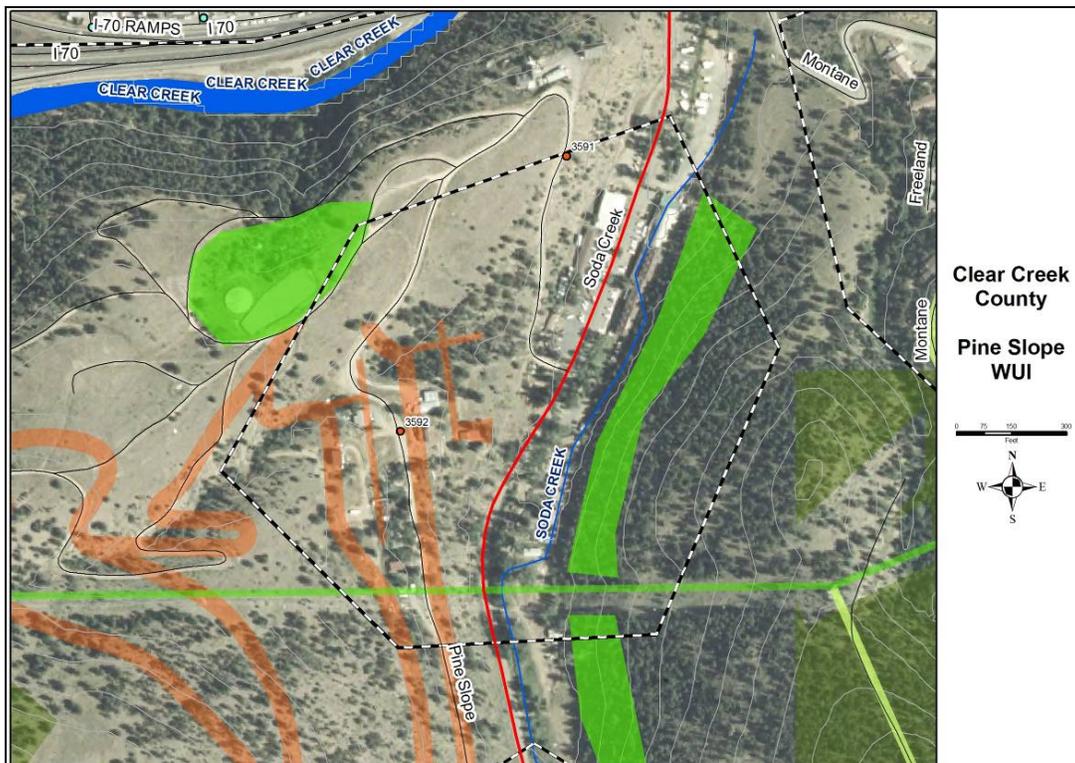
18 Addresses. Primary access road is a 1 to 1½ lane dirt road with one primary and one secondary exit. Most homes with 30-70 feet defensible space. Construction and roofing materials primarily combustible. Lake west of community could be used as a potential water source for community.

Fuels

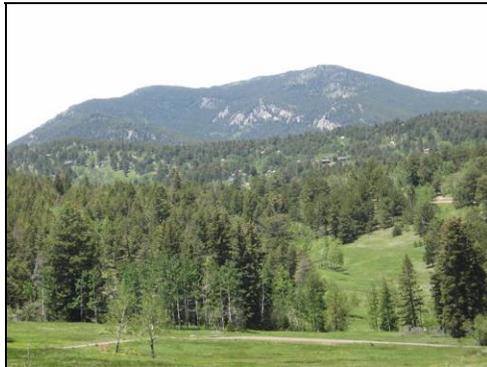
Low grade to flat topography on either side of Soda Creek. Fuels generally light in open areas west of Soda Creek with medium density mixed conifer overstory east of the creek. FBFM 1, 2, 5, 8.

Mitigation Recommendations

Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. No significant forest encroachment along primary county evacuation route Co 103 or secondary neighborhood access. Potential forest treatment zone along lower forested slopes east of Soda Creek backing to structures. Recommend seasonal mowing and other identified fuels reductions around municipal water facility just west of WUI. Improve and maintain existing utility right-of-way fuelbreaks. Road improvement along north access. Emergency access should use south access. Emergency water available in nearby Idaho Springs.



Pine Valley Estates/Hoffer Heights - EFPD



Community Hazard Assessment

HIGH

Community Design

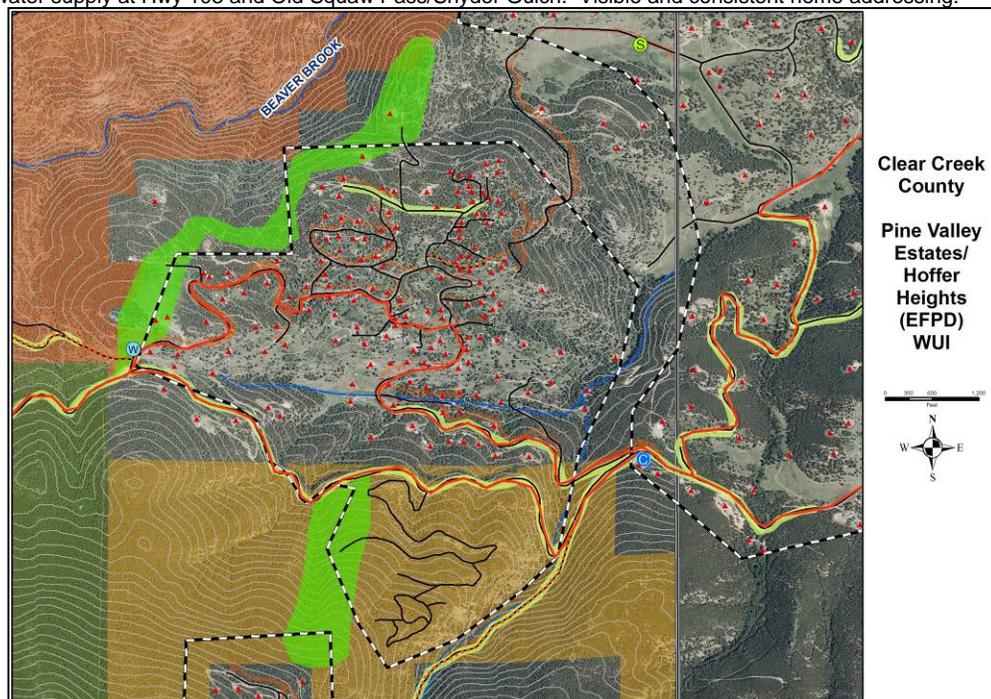
102 observed homes. Two primary access roads. 10% paved, 2 lane. 70% secondary groomed good grade, 1½ to 2 lanes. 20% secondary single lane, rough or steep. Four turnarounds, 7 dead ends. 35% of homes have <30 feet and 57% of homes have 30-70 feet defensible space. Construction and roofing materials predominantly flammable. Existing emergency water supply noted as cistern near Old Squaw Pass and Co 103 at west end of assessment area.

Fuels

Vegetation type is controlled largely by slope aspect with grass, brush and open Ponderosa pine stands predominant on south and southeast facing slopes. Heavier stands of lodgepole pine and Douglas fir on most north facing slopes. Lower north slopes of Mount Pence and north slopes facing Beaver Brook support dense lodgepole stands and mixed stands of lodgepole and Douglas fir. A stand of old-growth Douglas fir noted near Timber Lane. Open south-facing slopes dominate the area and support grass, shrub, and open stands of ponderosa pine. FBFM 1, 2, 4, 8, 9, 10.

Mitigation Recommendations

Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. Develop and maintain a emergency access from Meadow to Old Squaw Pass. Create shaded fuelbreaks along forested primary, secondary, and designated emergency access roads. Fuel reduction in identified treatment zones. Develop emergency water supply at Hwy 103 and Old Squaw Pass/Snyder Gulch. Visible and consistent home addressing.



St Marys/Alice



Community Hazard Assessment

EXTREME

Community Design

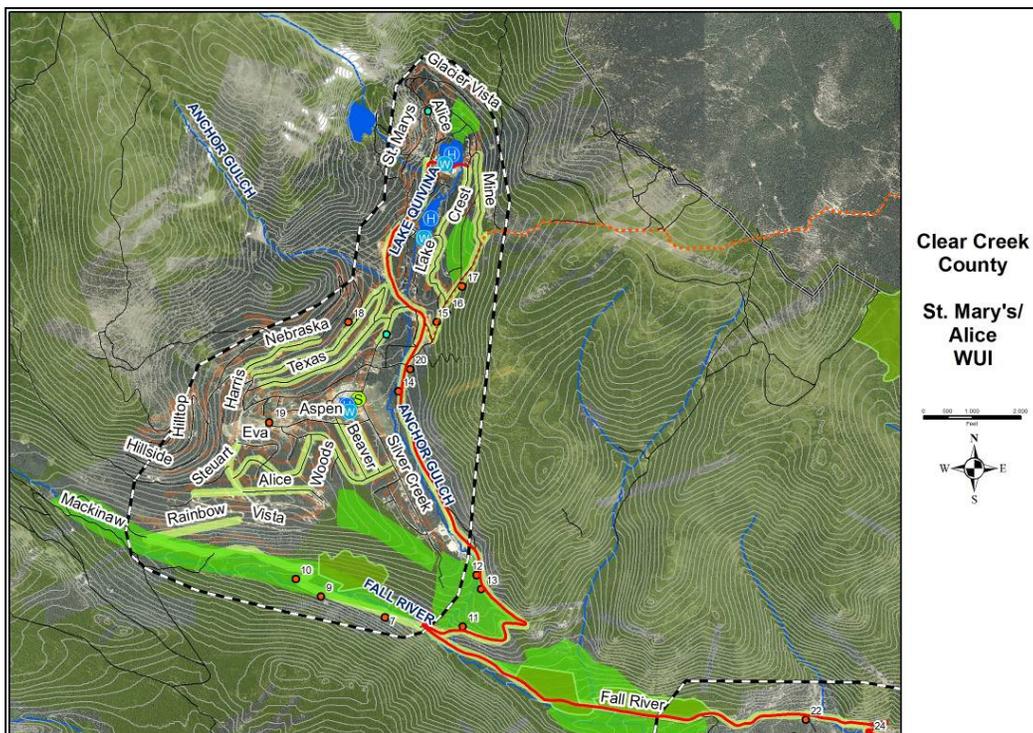
300 Addresses. Primary access 1½ lane road with winding switchbacks and no turnarounds. All gravel roads except Fall River. Some 4WD secondary roads. Approximately 75% of homes have 30-70 feet defensible space. Construction and roofing materials predominantly flammable. Community hydrants available as an emergency water source.

Fuels

Fuels generally medium to heavy density short-needle mixed conifers. FBFM 5, 8, 10.

Mitigation Recommendations

Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. Develop and maintain shaded fuelbreaks along all forested sections of primary county evacuation route Fall River Road and all secondary community access routes. Potential strategic forest treatment zones identified in dense timber stands along Mackinaw Road/Upper Fall River valley, along ridge at southeast access to community, along Crest Road/Lake Quivina, northeast of Silver Lake, and along Fall River Valley southeast of the WUI. Implement USFS treatment units as identified in the Yankee Hill mitigation project (dark green on map inset). Develop and maintain secondary emergency access route from Mine Road to identified safety zones and evacuation routes in Gilpin County. Hydrants were noted in the community survey but not included in county GIS data. Recommend survey of identified ponds/lakes for potential draft and helicopter dip resource. Back country safety zone development recommended in open area near intersection of Silver Creek Road and Aspen Road.



Silver Lakes



Community Hazard Assessment

MODERATE

Community Design

83 Addresses. Primary access is a 2 lane paved frontage road with multiple entrances in the community including one that needs to cross a 1 lane gravel bridge. Secondary roads dead end and have no turnarounds other than driveways. Secondary roads are generally 1½ lane groomed gravel with flat to low grades. Construction and roofing materials primarily flammable. No emergency water source observed. Creek could be accessed as a draft source for the immediate area.

Fuels

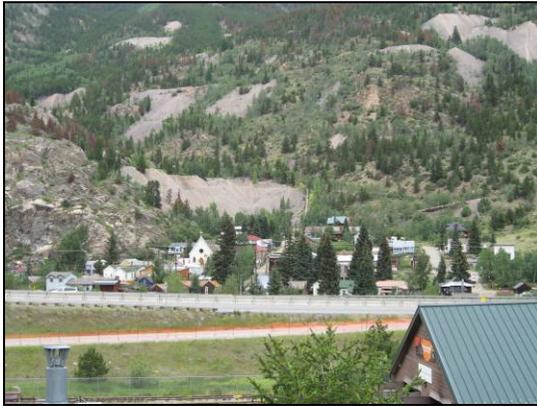
Much of the area is open and flat in the floodplain of the creek with aspens, willows, and cattails on the creek banks. North of I-70 is an open rocky slope/rock slide area. South of community slope is comprised of medium-density mixed conifer fuels including ponderosa and fir species. No evidence of Mountain pine beetle kill in the community. FBFM 1, 2, 4, 5, 8, 9.

Mitigation Recommendations

Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. Develop and maintain shaded fuelbreaks along all forested secondary neighborhood access routes. Potential forest treatment zone along lower forested slopes south of town backing to structures. Regular maintenance of CCFA dry hydrant east of town



Silver Plume



Community Hazard Assessment

MODERATE

Community Design

Municipality. Primary through access paved and groomed 2 lane frontage road. Secondary roads are groomed 1 ½ to 2 lane. Generally flat valley floor bounded by steep slopes north and south. Municipal hydrant grid observed. Structure density is high but adjacent fuels on south facing slopes are light. I-70 provides fuel buffer to the south. Historic narrow gauge rail line terminates in town south of I-70. A small forested subdivision is located at the train terminus.

Fuels

Dense structures and urban/residential ornamental trees and shrubs in town. Light fuels on adjacent south facing slopes. Dense lodgepole pine and mixed conifer on north facing slopes.

Mitigation Recommendations

Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. Shaded fuel break is identified along strategic stretch of train tracks should the rail line re-activate. Strategic forest thinning identified around subdivision south of town. Potential draft site observed west of town on Clear Creek.



Silver Valley



Community Hazard Assessment

HIGH

Community Design

20 Addresses. Primary access is a 2 lane frontage road with some small turnaround areas. Secondary roads are 1 lane gravel roads, steep in places. All home sites located south of I-70. Construction and roofing materials predominantly combustible. No emergency water supply observed. Clear Creek could be accessed as a draft source for the immediate area.

Fuels

Vegetation is moderately dense with closely spaced, small diameter lodgepole and fir species interspersed with deciduous aspens and willows. FBFM 1, 2, 8, 9.

Mitigation Recommendations

Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. Develop and maintain shaded fuelbreaks along all forested primary and secondary neighborhood access routes. Potential forest treatment zone along lower forested slopes south of homes backing to structures. Regular maintenance of CCFA dry hydrant. Recommend survey of identified water access points for potential draft and helicopter dip sites.



Soda Creek



Community Hazard Assessment

HIGH

Community Design

33 Addresses. WUI covers 3 drainages. Steve Canyon Drive and Van Eden Drive sparsely populated with no general community mitigation recommendations. Soda Creek Road is primary neighborhood access and primary county evacuation route. Road ranges between 2 lane groomed and single-lane dirt dead end with turnaround. A majority of structures have up to 70 feet of defensible space due to open meadow sites or mitigation. Construction and roofing materials are primarily combustible. One CCFA cistern is noted in GIS data along Soda Creek Road.

Fuels

Fuels are predominantly light to medium density mixed conifer, especially near home sites in the western portion of the community. Grassy meadows, dispersed shrubs and open ponderosa stands on south facing slopes. FBFM 1, 2, 4, 8.

Mitigation Recommendations

Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. For home sites located in grassy meadows, seasonal mowing is recommended. Develop and maintain shaded fuelbreaks along all forested primary county evacuation route of Soda Creek Road and secondary neighborhood access routes. Potential forest treatment zones north and west of Barbour Heights/Rosebud Roads and on steeper slopes southeast of Soda Creek Road. Potential back country safety zones with support from thinning operations at intersection of Gold Run Road and Soda Creek Road and at the west end of Soda Creek Road at the turnaround. CCFA cistern noted in county GIS. Regular maintenance recommended. Recommend additional emergency water supply/cistern at facility located at Vane Eden and Soda Creek Roads.



South Spring



Community Hazard Assessment

EXTREME

Community Design

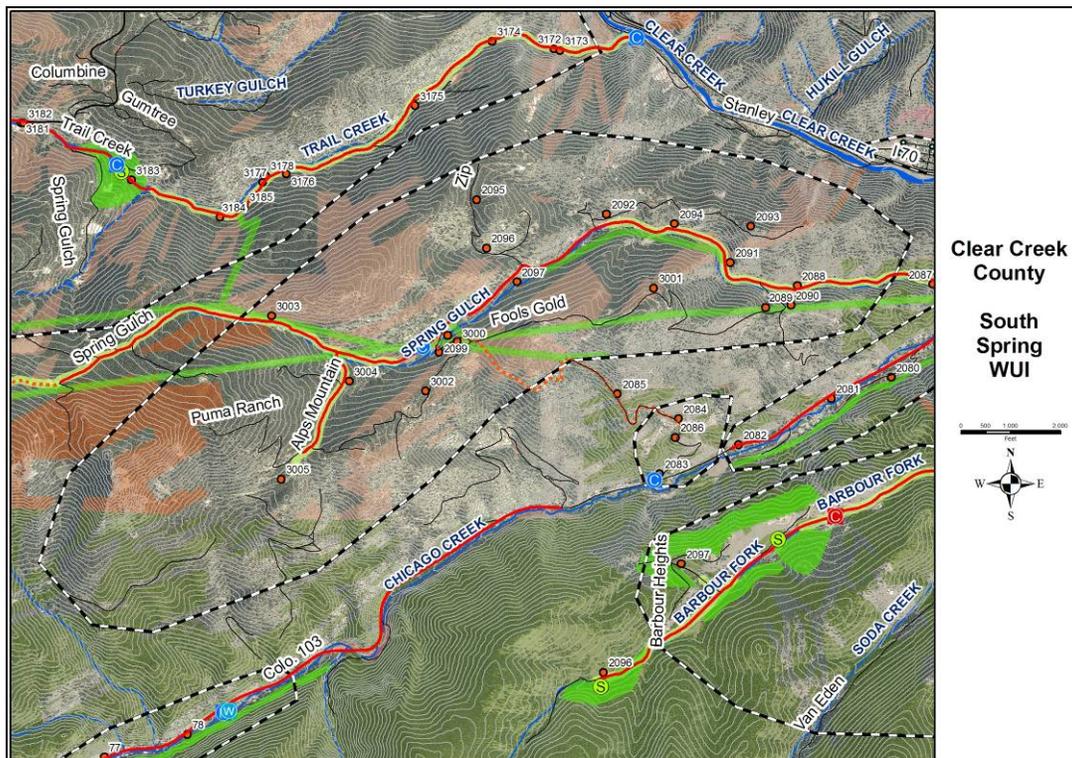
42 Addresses. Primary access 2 lane dirt road with turnarounds. Secondary roads single-lane dirt and too steep to access/survey in some areas. Potential secondary evacuation routes appear unimproved and not passable. Approximately half of the homes appear to be used as seasonal residences. The majority of homes have <30 feet defensible space. Construction and roofing material primarily flammable. No emergency water supply source observed.

Fuels

Vegetation and fuels range widely and are entirely slope dependent. Heavy mixed conifer on steep north facing slopes. FBFM 8, 9, 10. Open south facing slopes support open ponderosa, juniper, shrubs and grassy meadows. FBFM 1, 2, 4, 9.

Mitigation Recommendations

Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. Develop and maintain shaded fuelbreaks along all forested sections of primary and secondary neighborhood access routes. Improve and maintain existing utility right-of-way fuelbreaks. Recommend investigating, developing, and maintaining potential secondary emergency access routes to Black Eagle Road, Trail Creek, or Ute Creek. Recommend emergency water supply/cistern installation in central portion of WUI along Spring Gulch Road.



Squaw Mountain



Community Hazard Assessment

EXTREME

Community Design

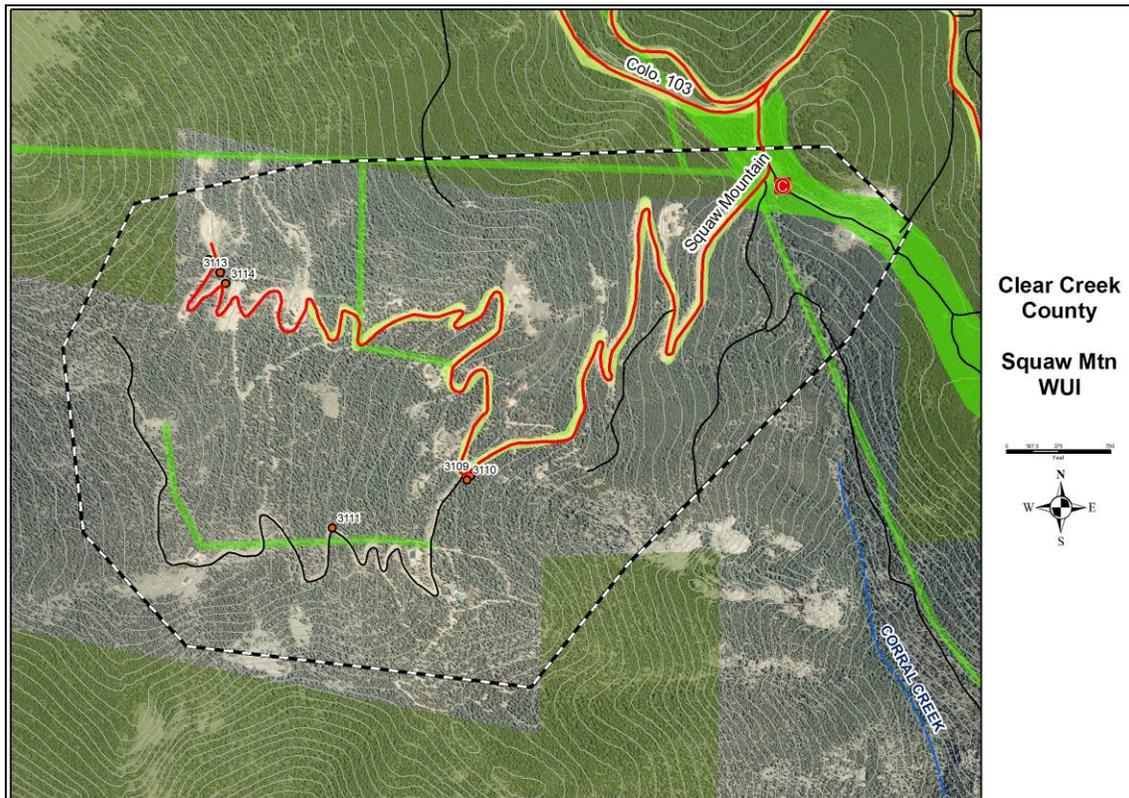
16 Addresses. Primary access is 2 lane gravel road with one turnaround at beginning of Aspen road. Secondary road is a switchback with a 1½ to 2 land width ending with a dead end. Almost all home sites located <30 feet from a 30% slope. Approximately 50% of home sites were mitigated to at least 70 from the structure. Construction and roofing materials primarily flammable. CCFA cistern noted at base of Squaw Mountain Road on saddle.

Fuels

Dense stands of lodgepole pine and mixed conifer with areas of downed timber scattered throughout, but little litter build up in the understory. No natural breaks observed in timber canopy. FBFM 8, 9, 10.

Mitigation Recommendations

Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. Develop and maintain shaded fuelbreaks along all forested sections of primary and secondary neighborhood access routes. Improve and maintain existing utility right-of-way fuelbreaks. Regular cistern inspection and maintenance. Potential forest treatment zone along Squaw Mountain Saddle and southeast on ridge/saddle above Co 103.



Steven’s Gulch



Community Hazard Assessment

EXTREME

Community Design

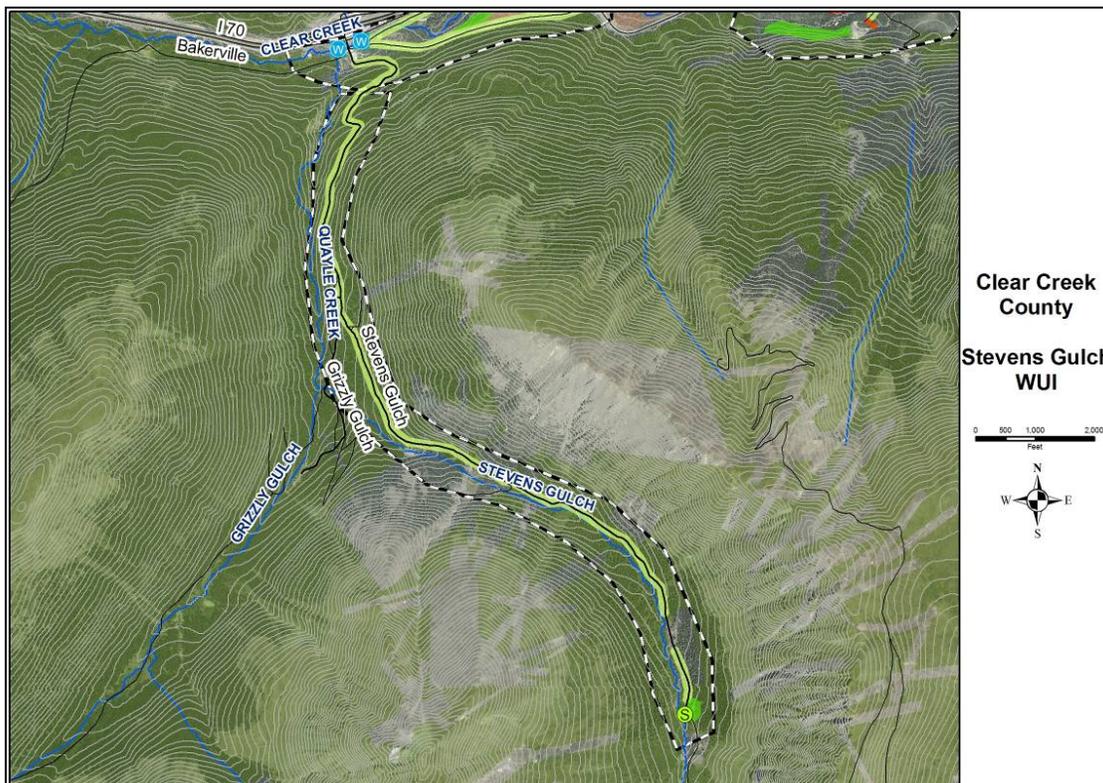
Approximately 12 addresses. Primary access 1 to 1/2/ lane unimproved 4WD dirt road. Heavy use due to trail head parking at south terminus. No adequate turnaround for several miles. Dense lodgepole pine with moderate beetle kill encroaches road most of the way. Very low structure density but heavy use due to popular trail head parking at south terminus. Entrapment potential is significant.

Fuels

Dense stands of high elevation lodgepole pine with areas of downed timber scattered throughout. Areas of beetle-related build up of surface needle litter noted. Timberline encroaches on stand development at this elevation. FBFM 2, 6, 8, 10.

Mitigation Recommendations

Develop shaded fuelbreak where possible along Stevens Gulch Rd. Treat area around trailhead parking for safety zone development. Seasonally grade road to allow for emergency apparatus access.



Trail Creek



Community Hazard Assessment

EXTREME

Community Design

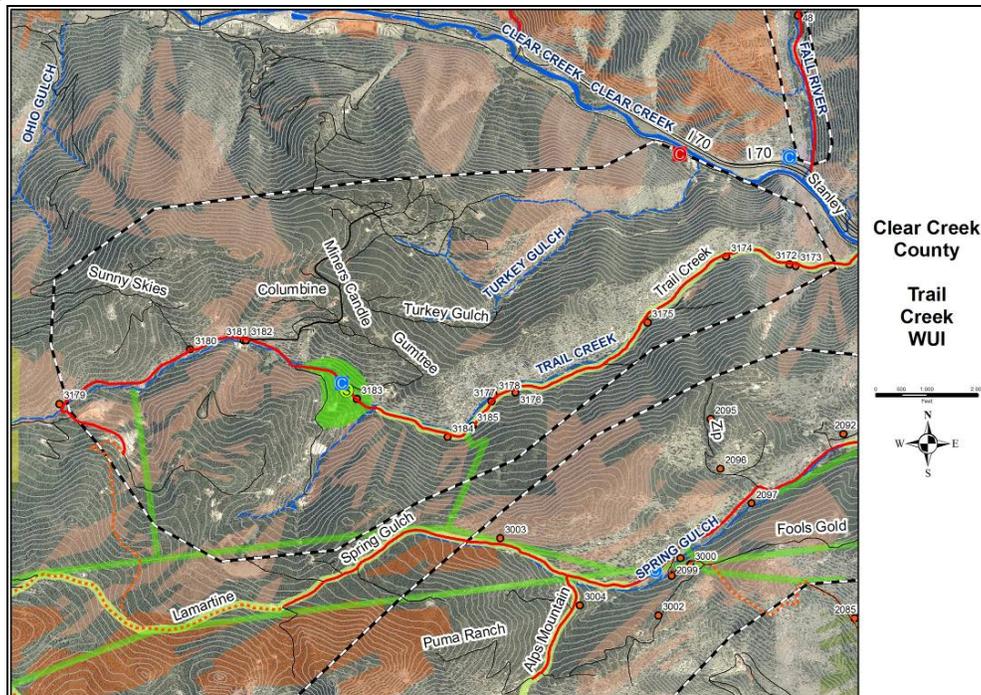
27 Addresses. One main access into community off frontage road (a second potential access, Turkey Gulch, does not connect to frontage road) ranging between 1 to 1½ lane widths which narrow and get rougher as you go higher/onto higher grade secondary roads e.g. Miner’s Candle. Pullouts along main road, but no sufficient turnarounds. Construction and roofing materials predominantly flammable. Many home sites hidden and difficult to observe, but the majority had <30 feet defensible space. No emergency water resources observed on Trail Creek road, but cistern noted on frontage road west of Turkey Gulch.

Fuels

South facing slopes dominated by grasses, willow, and juniper shrubs with scattered ponderosa. Dense spruce, fir, lodgepole, and aspen overstory on north and east facing slopes. FBFM 1, 2, 8, 10.

Mitigation Recommendations

Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. Develop and maintain shaded fuelbreaks along all forested sections of primary and secondary neighborhood access routes. Improve and maintain existing utility right-of-way fuelbreaks. Recommend investigating, developing, and maintaining potential secondary emergency access routes to Spring Gulch and Ute Creek. Recommend forest treatment zone in the central portion of the WUI along Trail Creek Road to support a back country safety zone and central emergency water supply/cistern location. Additional emergency water supply/cistern location may be considered at the intersection of Trail Creek Road and the frontage road.



Upper Fall River



Community Hazard Assessment

HIGH

Community Design

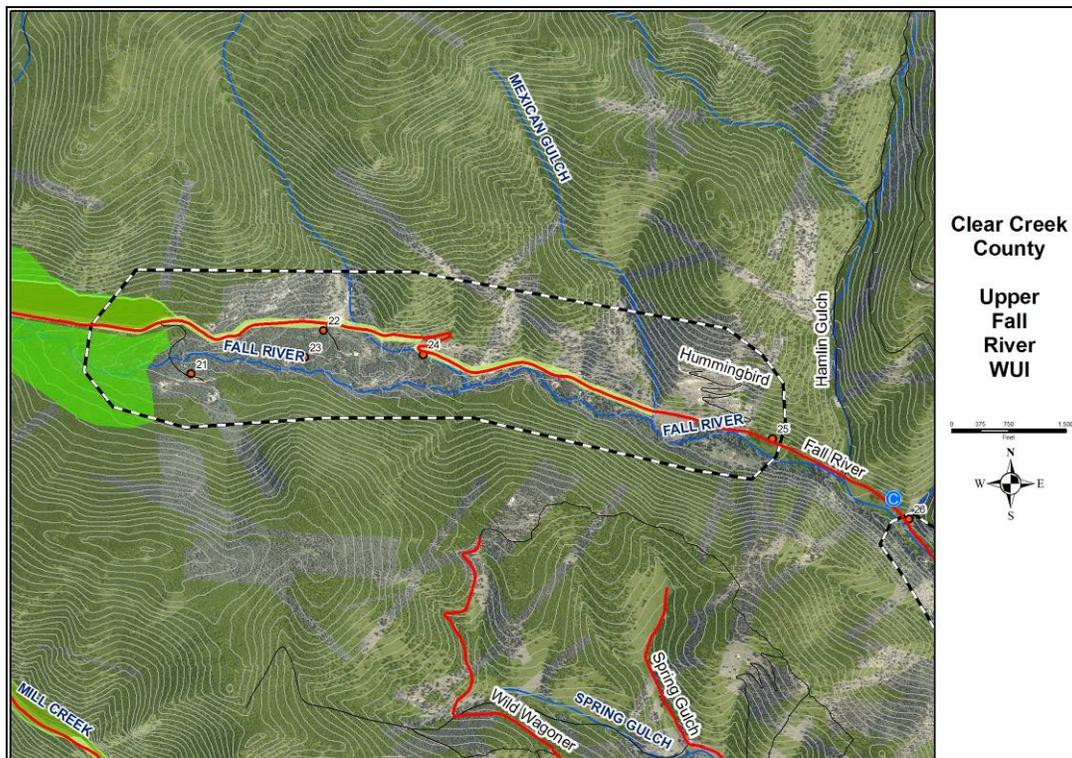
26 Addresses. Primary access is Fall River Rd. which is 2 lane paved. Secondary roads are gravel/dirt, some with grades up to 30%. The majority of homes maintain between 30-70 feet defensible space. Construction and roofing materials primarily flammable. No emergency water supply identified.

Fuels

Deciduous riparian zone along Fall River and roadway. Open timbered slopes primarily ponderosa on south facing slopes. Overstory vegetation is lighter along roadways and heavier on slopes. Heavy mixed conifer on north facing slopes. Douglas fir and interspersed aspen stands were observed. FBFM 2, 8, 9.

Mitigation Recommendations

Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. Develop and maintain shaded fuelbreaks along all forested sections of primary county evacuation route of Fall River Road. Improve and maintain existing utility right-of-way fuelbreaks. Implement USFS treatment units as identified in the Yankee Hill mitigation project (dark green on map inset). Potential forest treatment zone independently identifies west of WUI along the Fall River drainage. Recommend emergency water supply/cistern installation east of WUI to serve both Upper Fall River and Fall River.



Upper Mill Creek



Community Hazard Assessment

HIGH

Community Design

41 Addresses. Primary access road is an unpaved 1½ lane road that narrows to single lane with 20% slope in some areas. Some turnarounds. Construction and roofing materials predominantly flammable. Housing density is greatest between Mill Creek and Columbine Roads. Defensible space around home sites varies between <30-70 feet. Construction and roofing materials primarily combustible. Emergency water ‘fire pond’ sign observed in community along Mill Creek Rd.

Fuels

North facing slope support dense continuous stands of Douglas-fir and Lodgepole pine, South facing slopes dominated by open stands of ponderosa and shrubs with grassy understory.. FBFM 2, 8, 9, 10.

Mitigation Recommendations

Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. Develop and maintain shaded fuelbreaks along all forested sections of primary and secondary neighborhood access routes. Implement USFS treatment units as identified in the Yankee Hill mitigation project (dark green on map inset). Potential forest treatment zones upslope from shaded fuelbreaks along Moss and Columbine and along west end of Mill Creek Road. Recommend emergency water supply/cistern installation at east end of WUI.



Ute Creek



Community Hazard Assessment

HIGH

Community Design

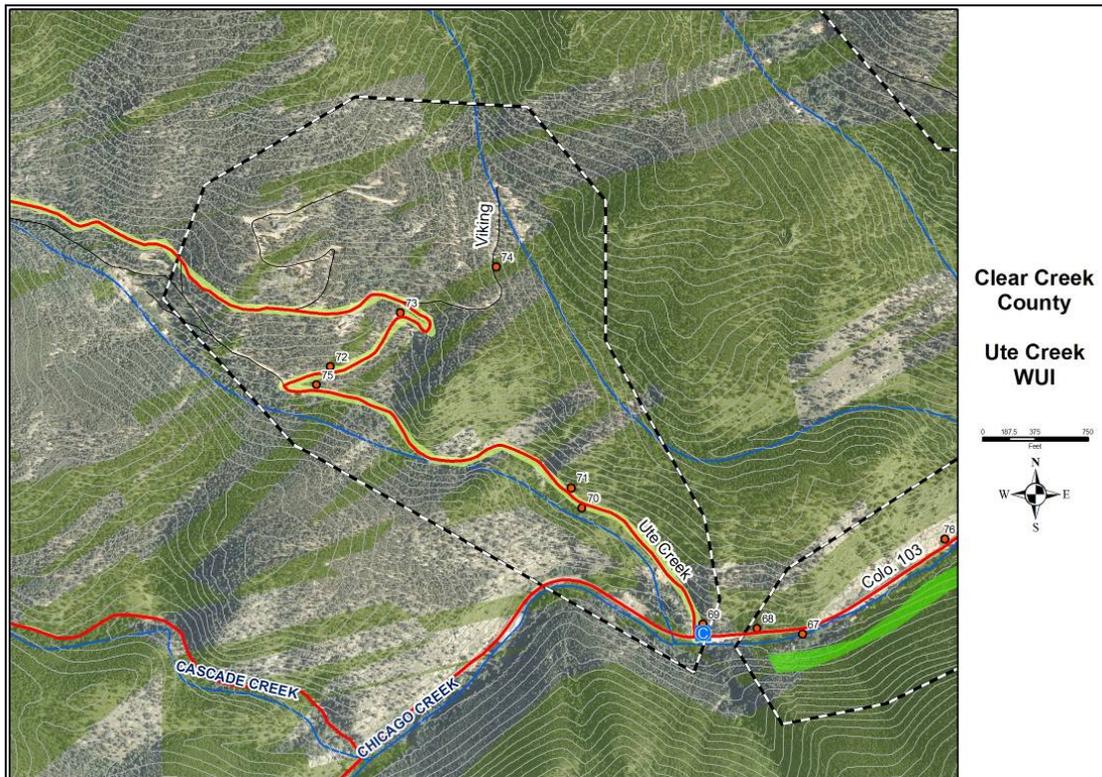
8 Addresses. Primary access is a dirt road 1½ to single lane with no established turnarounds. Defensible space around home sites varies between <30-70 feet and many homes are adjacent or on steep slopes. Construction materials are flammable and 50% of homes with nonflammable roofing. No emergency water resources observed.

Fuels

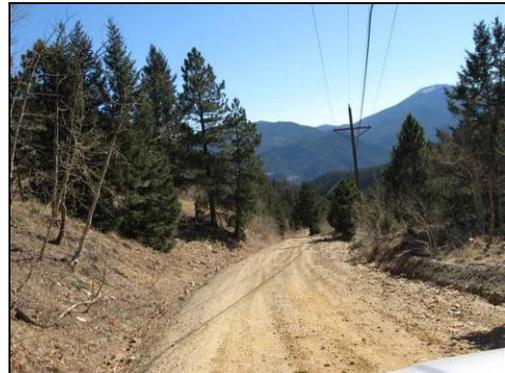
Some steep open stands of ponderosa and juniper with grassy understory on south facing slopes along lower Ute Creek Road. Dense mixed conifer on higher slopes. Some areas of dead and down timber in understory. Riparian zone in creek bed. FBFM 1, 2, 8, 9, 10.

Mitigation Recommendations

Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. Develop and maintain shaded fuelbreaks along all forested sections of primary and secondary neighborhood access routes. Recommend investigating, developing, and maintaining potential secondary emergency access route to South Spring along Lamaretine Road. Recommend emergency water supply/cistern installation at Ute Creek and Co 103.



Virginia Canyon



Community Hazard Assessment

HIGH

Community Design

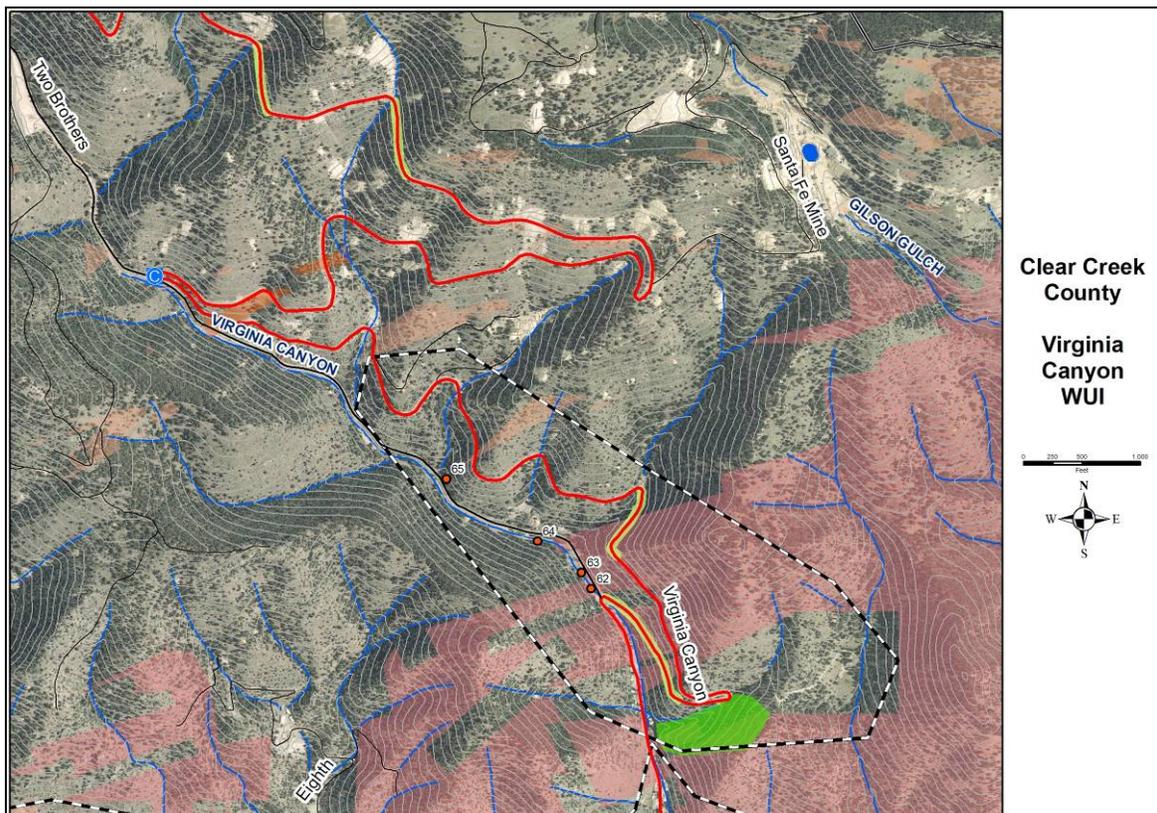
10 Addresses. Primary access is a rough gravel road varying between single to 1½ lane with a turnaround at the intersection of Two Brothers and Virginia Canyon Roads. Very low housing density with most homes exhibiting between 30-70 feet defensible space but located on eroding slopes. Construction materials 50% flammable/50% nonflammable. Roofing materials predominantly flammable. No emergency water resources observed.

Fuels

Vegetation relatively dense on north facing slopes consisting of mixed conifer. Along roadways and south facing slopes, vegetation was light to medium with large open areas of short grasses, juniper, shrub and disbursed ponderosa. FBFM 1, 2, 4, 5, 8, 9

Mitigation Recommendations

Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. Develop and maintain shaded fuelbreaks along all forested sections of primary county evacuation route. Recommend emergency water supply/cistern installation north west of WUI at Virginia Canyon and Two Brothers.



York Gulch



Community Hazard Assessment

HIGH

Community Design

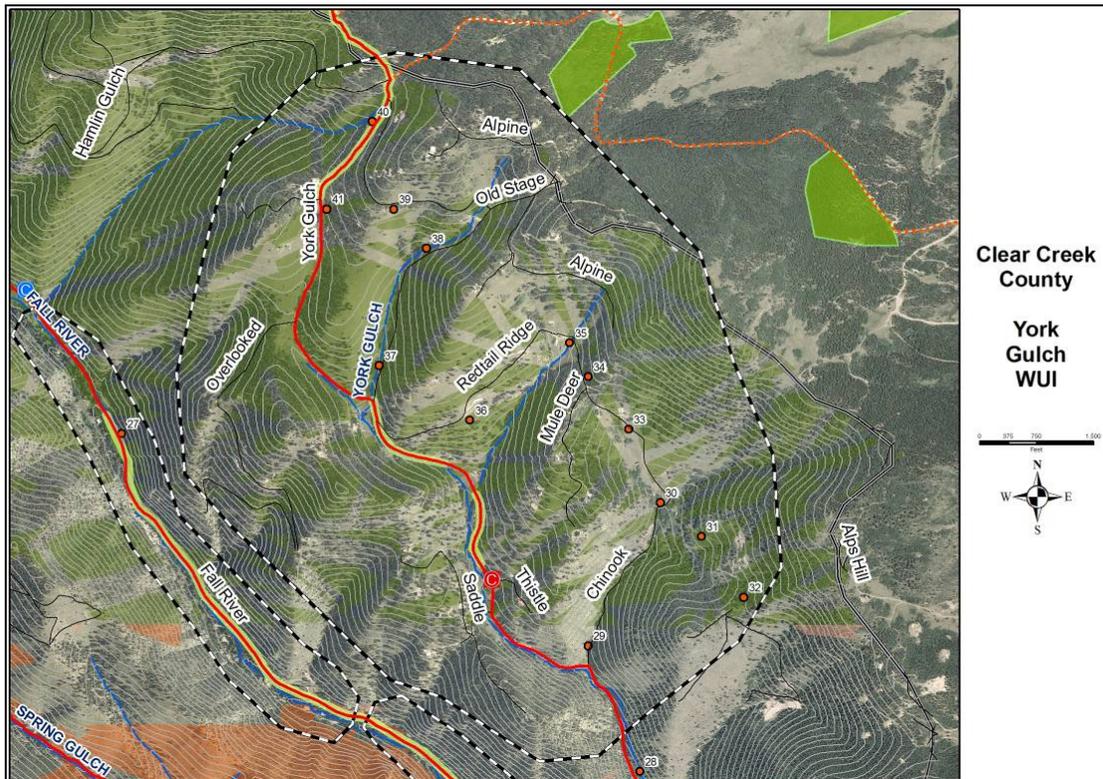
69 Addresses. Primary access is York Gulch Road--a 2 lane gravel road with one turnaround toward the top of the road. Secondary roads are single lane and many are in poor condition. Construction materials primarily flammable. Roofing materials 50% flammable/50% nonflammable. No emergency water source observed.

Fuels

Medium to heavy density in the mixed conifer overstory on slopes and ridges. Some areas of mountain mahogany shrubs and patches of aspens among the mixed conifer. Short grass understory along roads. FBFM 2, 4, 5, 8.

Mitigation Recommendations

Improve defensible space where needed and reduce structural ignitability through phased building improvements or new construction. Develop and maintain shaded fuelbreaks along all forested sections of primary county evacuation route and any forested secondary neighborhood access. Emergency water supply/cistern noted on York Gulch Road. Recommend investigating, developing, and maintaining potential secondary emergency access routes into Gilpin County from Upper York Gulch Road/Pisgah Road.



E

**CWPP Questionnaire and
Community Response**



Clear Creek County
County-Wide Community Wildfire Protection Plan (CWPP)
QUESTIONNAIRE • NOVEMBER 2007

Your input on this very important topic will help to create an effective plan. Please provide the following information:

1. What community do you live in or closest to?

2. How great of a risk do you think wildfire poses to your community?
 Extreme Risk Moderate Risk Low Risk No Risk
3. Do you think your community is currently protected against potential wildfire?
 Yes. If so, how: _____
 No. If not, why: _____
4. Do you think your community is currently prepared to deal with a wildfire?
 Yes. If so, how: _____
 No. If not, why: _____
5. Rank the types of areas in your community that you think pose a fire risk to homes or property (1 being the highest risk, 4 the lowest).
 Forests Meadows and Grasses Shrubs and Bushes Other _____
6. Do you think any areas in the county are an extreme fire hazard?
 No. Yes, this (these) area(s): _____
7. Rank what you consider to be the best ways to mitigate or reduce wildfire risks (1 providing the highest benefit and 10 the lowest).

<input type="checkbox"/> Reduce vegetation (grasses, trees, etc.) on public land by mechanical treatments (tree thinning, etc.) <input type="checkbox"/> Reduce vegetation on public land by controlled burns. <input type="checkbox"/> Develop shaded fuel breaks along roads and strategic locations. <input type="checkbox"/> Upgrade firefighting equipment . <input type="checkbox"/> Improve fire department volunteer recruitment efforts.	<input type="checkbox"/> Increase water availability. <input type="checkbox"/> Encourage private landowners to develop defensible spaces around structures. <input type="checkbox"/> Conduct community outreach and education programs. <input type="checkbox"/> Other _____ _____ _____
---	---
8. Have actions been taken to reduce the risk of wildfire in your community?
 Not that I am aware of. Yes. Please explain _____
9. Have fire education programs occurred in your community?
 Not that I am aware of. Yes. Please describe _____

Please provide contact information in case we have further questions. Do you wish to receive future project information? Yes No
 Name _____ Email _____
 Address _____ Phone _____

How did you find out about this project?
 this mailer newspaper insert newspaper ad/article flyer in town County website other _____

THIS FORM MUST BE RECEIVED NO LATER THAN NOVEMBER 30, 2007

<p><u>Please email, fax or mail your response to:</u> Walsh Environmental Clear Creek County CWPP Project Manager EMAIL: cwpp@walshenv.com FAX 303-443-0367 PHONE: 303-443-3282 4888 Pearl E. Circle, Suite 108 • Boulder, CO 80301-2475</p>	<p>For more project information or <u>to reply electronically, go to:</u> www.co.clear-creek.co.us Click on: </p>	<p><u>Drop-off boxes are located at:</u> Safeway - Idaho Springs</p>
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Clear Creek County CWPP Questionnaire Feedback			
1) What community do you live closest to?			
Community	Count	Community	Count
Chicago Creek	2	Hill Creek Park	1
Bailey	1	Howard	1
Bakerville	2	Hyland Hills	2
Beaver Brook	3	Idaho Springs	54
Bendmeer	1	"Jefferson is closest to property"	2
Berthoud Falls	2	Lake Edith Improvement Company	1
Black Hawk	1	Lakewood	1
Blue Valley	10	Lawson	4
Boulder County	1	"Lives in Arvada"	1
California	1	Loch Lomond	2
City of Golden	1	Miners Candle	1
Clear Creek	3	Morrison	1
"Does not reside in area"	4	North Springs Gulch	1
Dumont (Mill Creek Park)	18	Prescott Lakes, Arizona	1
Empire	15	S. Spring Gulch Road	1
Evergreen (Saddleback, Bergen Park, Pine Valley)	20	Saddleback Mountain	2
Fall River Road (Montezuma Cortez Community/York Gulch)	8	Saddleback Ridge Estates	5
Floyd Hill	9	St. Mary's (Glacier, Alice, Silver Lakes, Winterland)	26
Georgetown	12	Silver Plume	3
Heffeman Gulch	1	Squaw Mountain	1
Henderson Mine Site	1	York Gulch	11
2) How great of a risk do you think wildfire poses to your community?			
Extreme	Moderate	Low	None
123	100	16	0

3) Do you think your community is currently protected against potential wildfire?	
Yes	No
47	178
If no, why?	
Residents and Local Community:	
There are a lot of dead trees and brush	
Dead fuels, especially along hillside	
Dead trees and brush	
Forest is too dense and thick (overgrown)	
Too much dry fuel	
Overgrown forest a problem	
Forest is too thick in St Mary's	
Hownowners need to cut trees	
Not many property owners have cleared their properties and many have the "It won't happen to me syndrome." Ugh!	
Many houses do not have a defensible zone	
Not all homes have defensible space	
The excessive amount of brush around homes	
Most vacation homes are built with heavy timber	
Mitigation work needs to be performed	
Not enough fire mitigation, too many trees, too much ladder fuel	
No fire breaks and no clearing has been done	
No fire breaks, dead trees, etc.	
Lodgepole piles are of concern	
Some owners do not live on lots to maintain their land (clearing of standing dead)	
Although our neighbors and HOA have worked to minimize pine beetle and slash, large scale work needs to be done.	
Beetle kill is a major issue	
Clearing of land/beetle kill seems to be a major concern	
Urban wild land interface is a hazard	
Preparation and Evacuation:	
No protection or evacuation plans in place	
Insufficient number of escape routes and number of cisterns	
Egress and access issues are a huge concern	
Some roads are difficult to travel	
One road access routes	
I'm not aware of any evacuation plan for our area	
No evacuation plans, lots of dead fuel, nearby camping areas	
Plans still being developed	
Difficult terrain for emergency vehicles	
We are surrounded by an evergreen forest. If a fire starts, our surrounding forest is very dense and there is nothing to stop the spread of fire.	
There is only one fire hydrant-They don't keep secondary road open-Little Bear Creek Rd.	
Failure to establish rules and regulation and enforcement of same	
Public Officials and Support Outside Community:	
There is not much for fire protection	
No engagement by public officials and low numbers of volunteers	
Communication with communities seems to be a problem	
Not enough training, equipment or resources to help	
Damage to watershed after wildfire is not typically looked at--only property damage	
Fire suppression over the years has increased the relative risk	
Forest Service does not maintain	
No controlled burns or information on mitigation	
No prescribed burns	
Inadequate education	
Unclear which fire authority is responsible for our area	
There are no bans on campfires, shooting, ATV's, etc. when conditions are extremely dry	
Other:	
Not enough water	
No water supply for firefighters	
There are no water reserves or defensible space	
Little moisture in the area	
Drought problems	
Location and small population a problem--too remote or outside city limits	
No fire district in some areas---areas too remote	
Cigarette butts being thrown from cars can cause a problem	
Few communities can really protect against wildfire, example, California	
Not feasible	

4) Do you think your community is currently prepared to deal with a wildfire?	
Yes	No
61	160
If no, why?	
Preparation and Evacuation:	
No evacuation plans	
No plans are in place	
No evacuation plan, no communication to residents about what to do if there is a wildfire	
Very little preparation	
No plan at the grassroots level	
Communities are not properly prepared	
Not enough owners around to detect fires	
Few believe a fire could actually happen	
Need more education and planning	
No alternative exit routes	
Again, the road (Little Bear Creek Rd.) and all along the switchbacks the trees are dead.	
Access/egress issues	
No fire breaks	
Lack of leadership	
The need of more forest management	
Forest Service not doing enough to inform public	
Inadequate training, communication, and experience	
No engagement of local officials	
No one is ever really prepared, however our HOA has established evacuation routes and a notification call-down list.	
Officials have indicated that some regions are low priority	
We don't have a community wildfire plan and we only have one road (Mill Creek Rd.) into and out of our neighborhood.	
There is no fail proof plan	
No, not possible	
Fire Services:	
No active fire department in some areas	
Limited fire fighting resources	
Distance from fire protection	
I am happy to see Clear Creek County take proactive approach to this potential problem. Some of the roads are bad enough to present a challenge for emergency vehicles and evacuation efforts. Some roads may be impassable for fire trucks.	
Fuels Reduction:	
Fuel removal	
Lodgepole pine stands	
Dead trees/brush--need thinning	
No fire breaks/defensible zones around many houses	
The need of mechanical thinning and fire retardant gels	
Forest Service refuses to allow cutting of dead timber	
Not enough effort to create defensible space	
Properties that border national forest are of concern because the state does not perform mitigation	
Technology:	
Lacking state of the art technology	
Colorado does not have quick access to aerial apparatus	
Mobile pumps are not adequate	
Other:	
Apathy	
Limited access to water	
No water	
No spraying at passes	
Droughts are of concern	
No funding	
No beetle kill programs	
Major clean up needs to be done	
Lack of manpower	
Housing density	
Location and population an issue	
Failure to acknowledge threat possibility	

5) Rank the types of areas in your community that you think pose a fire risk to homes or property (1 highest, 4 lowest):			
Meadows and Grasses	Forest	Shrubs and Bushes	Other
27 ranked this as #1	190 ranked this as #1	31 ranked this as #1	13 ranked this as #1
If other, describe:			
Steep slopes with dead trees			
Old dead growth			
Hillsides			
Trash and trees			
People			
Arsonists			
Careless recreation uses			
Careless smokers			
No access to escape			
Lack of or limited egress			
Public campgrounds.			
Camping areas.			
Vegetation and high risk properties			
Too many new structures (homes and buildings) being built			
Wood roofs and fences			
Old buildings			
Firewood stored next to houses			
Limited roadside fire breaks			
No mitigation measures			
Mine, trash, and junk piles			
A gas station			
Location			
Careless ATV operators, visitors to National Park (forests)			
Elk Valley Drive there are No escape routes! They are all on the eastern end of the Saddleback area.			
6) Do you think any areas in the county are an extreme fire hazard?			
Yes	No		
181	24		
If yes, what?			
Anywhere the trees haven't been thinned out			
Uncut dead trees			
Our neighboring communities and the National Forest			
National Forest			
National Forest			
The forest areas			
All remote areas, dead trees and vacant houses, dense cover, forest land adjoining properties, irresponsible camping and shooting, and all forested areas.			
Any area with dry timber ofr beetle kill			
Beetle infested are a potential			
Beetle kill areas			
Western due to beetle kill trees			
Jones Pass is showing signs of beetle investation. They're coming.			
Most of the foothills areas, national forest hiking and biking trails, and beetle kill areas.			
Acres with too much new growth.			
The lower elevations, steep canyons and valleys, areas frequently used by general public.			
Old dead standing beetle kill			
The majority of unincorporated Clear Creek County below timberline where houses exist.			
All of Clear Creek County			
The entire county			
The whole county has such thick forest with patches of standing dead			
Most of the county that has dense forest			
Along I-70			
Eastern slope Bakerville to Loveland Pass			
St Mary's/Rainbow Rd.--tourists don't care			
Upper Bear Creek Road (my husband is trained as a firefighter and this area is considered high risk in			
No awareness of condition in County: Alice, St. Mary's, Arapahoe National Forest, Upper Clear Creek,			
Areas with difficult access			
High mt areas			

7) Rank what you consider to be the best ways to mitigate or reduce wildfire risk (1 highest, 10 lowest):	
Reduce vegetation on public land by mechanical treatment	101 ranked this as #1
Reduce vegetation on public land by controlled burn	35 ranked this as #1
Develop shaded fuel breaks along roads and strategic locations	46 ranked this as #1
Upgrade firefighting equipment	36 ranked this as #1
Improve fire dept volunteer recruitment	25 ranked this as #1
Increase water availability	43 ranked this as #1
Encourage private landowners to develop defensible space	85 ranked this as #1
Conduct community outreach	44 ranked this as #1
Other	25 ranked this as #1
If other, describe:	
Residents:	
Encourage homeowners to mitigate properly.	
Enforce landowners responsibility, and encourage to clear/clean areas.	
Enforce mitigation efforts when a resident's property condition threatens other properties.	
Eliminate dead trees, dry grass around homes.	
Replacement of roofs to aluminum roofs.	
Insurance should reflect landowner's defensible space efforts.	
Ban residents from burning trash on proviate property.	
Cannot access my property now--do not live there.	
Free slash dumping (I would take mulch if it wasn't full of nails and crap).	
All of the above	
Local Community:	
Make it easier and less expensive to dispose of slash (county could have pick up days.chipping crew).	
Land owners need an economical way to dispose of slash.	
Special improvement districts to fund mitigation of public and private lands.	
Improve emergency evacuation routes and access by emergency vehicles.	
Develop escape routes if fire starts lower and spreads to St. Mary's or anything else.	
Provide evacuation routes for Floyd Hill.	
Order removal of all abandoned and dilapidated trailers on St. Mary's.	
Have plan in place for regional response quickly.	
Advise on how to achieve defensible spaces--public education.	
Foam and retardant gels for rural homes stockpile on site.	
Map fo available well water and lakes.	
Possibly provide funds for the community by selling wood for firewood at a later date.	
Stop allowing so much new building.	
Quit building subdivisions in fire prone areas.	
Camping and Recreation:	
Ban campfires, shooting and off-road vehicles.	
Strict enforcement of open space fires on public lands.	
Signs for recreation users explaining fire hazards.	
Safe camping procedures, etc.	
Other:	
Defense against pine beetle infestation.	
Beetle kill treatment--removal of old beetle kill and standing dead trees.	
Prosecute people that throw cigarette butts from cars, etc...dirt bike riders...	
Danger of I-70 users throwoing out cigarette butts--signs raising fines for that.	
Develop a market with NREL for the wood chips for ethanol production.	
Revise land use regulations to prevent too much congestion and to create fire breaks.	
Accelerate the Yankee Hill project timeline.	
Have air defense on call.	
Problem too big for just county resources.	

Appendix E – CWPP Questionnaire and Community Response

8) Have actions been taken to reduce the risk of wildfire to your community?	
Yes	Not that I am aware of
129	102
If yes, what?	
Fuels Reduction:	
Cutting down/clearing of dead trees	
People actively removing dead forest debris	
Thinning is taking place	
Private land defensible space requirements	
Defensible space and annual clean up has taken place	
HOA rents chipper for Floyd Hill	
Reduced vegetation	
Reduced slash	
Norsemen have removed trees prone to wind and fire damage	
Mill Creek Park conducts an annual "Slash Day" where residents cut and put their slash on the road and we chip it.	
Defensible spaces on private land	
Several property owners have done some mitigation.	
I have personally worked on making my house safer, but there has not been a community plan up Hwy 103.	
Planning and Other Mitigation:	
Individual and USFS fire mitigation	
Some of us have tried to educate the member of our HOA. All new residents (and current ones) are given an info packet which includes WF info.	
Controlled burns	
Known forest service planning	
County codes and regulations on defensible space	
Telephone fire evacuation list	
Community education in progress	
A CWPP committee has been formed	
Yankee Hill project	
U.S. Forest Service Yankee Hill Fuel Reduction Project	
In the Arapaho National Forest	
This survey indicates action	
Dry hydrants have been placed around county	
Lake pump placed in 2005	
Placed cisterns	
Fire bans	
9) Have fire education programs occurred in your community?	
Yes	Not that I am aware of
141	86
If yes, what?	
Fire assessment surveys and inspections	
Fire assessment and survey inspections	
HOA meetings	
HOA meetings	
HOA meetings have invited fire personnel	
OEM and HOA information meetings	
Educated talks and HOA meetings and info given to residents	
Talks by the fire department	
Several years ago on the Hidden Wilderness area	
The (fire) chief speaks with the HOA.	
State Forestry to advise residents upon request	
CSU sent someone out to evaluate properties upon request	
In the past, counselors advised on which trees to cut around houses	
Meetings at the Evergreen Recreation Center	
EMERGE meetings	
Einar Jensen presentations	
About six years ago, Henrik Jensen evaluated each property in Mill Creek Park for fire risk. We didn't live here then, so don't know what education took place.	
At a community meeting	
Programs at GCS	
School programs	
Fire science course at high school, articles in paper	
Annual fire department classes	
Forest Service programs and articles in the local paper	
Forest Service literature	
Fire hazard guides in County office	
Flyers and mailers	
Although I have seen info in local newspapers.	
Homeowners website	
Website information	
The radio	
EG/IS	
CERT	
10) How did you find out about this project?	
Self mailer	158
Newspaper insert	33
Newspaper article	8
Flyer in town	4
Clear Creek County website	6
Other (e.g. HOA meeting, word of mouth, other website, etc.)	38

F

Community Meeting Summaries

CLEAR CREEK COUNTY COMMUNITY WILDFIRE PROTECTION PLAN
NOVEMBER 1, 2007 COMMUNITY MEETING SUMMARY

DATE: Thursday, November 1, 2007

LOCATION: Clear Creek High School Commons

SIGN-IN SHEET (contact info. on original sheets, not provided here):

AFFILIATION

1. CCC OEM
2. CCC OEM
3. CCWF
4. CCC
5. CCWF
6. Walsh
7. Walsh
8. CCWF
9. CSFS Golden
10. Southern Rockies Conservation Alliance
11. CCC CERT
12. Saddleback HOA
13. Mill Creek
14. NA
15. EMERGE
16. Steven's Gulch
17. Steven's Gulch
18. CCSO
19. Lake Edith
20. Clear Creek Courant
21. St. Mary's
22. Fall River Rd.
23. Fall River Rd.
24. Floyd Hill
25. Floyd Hill
26. Beaver Brook
27. Saddleback
28. Loch Lomand
29. Floyd Hill
30. Beaver Brook
31. Trail Creek
32. Beaver Brook/Barrows
33. Henderson Mine
34. Saddleback Mtn.
35. Saddleback Mtn.
36. Meadow View Dr.
37. Beaver Brook
38. Saddleback & Floyd Hill
39. Beaver Brook
40. Idaho Springs / Aspen
41. Firebreak
42. NA
43. NA

- 44. NA
- 45. NA
- 46. Saddleback

INFORMAL AGENDA:

4pm-5pm—Project Team arrives to set-up, etc.

5pm - 5:15—folks get signed in, get pizza & drinks, get seated

5:15—Meeting begins

- CN: welcome/brief project overview/introduce CCC OEM Director
- KG: brief opening remarks/introduce CCC team & CSFS
- AO: FS role, importance of community input, etc.
- CC: briefly explain community involvement process

5:30—CN: introduce GG

5:30—GG: PowerPoint presentation to include overview of CWPP process, fieldwork to date, what Walsh needs from community, how Walsh will utilize community information, etc.

6pm—GG/CN: open meeting up for group questions & answers

6:30pm—CN: move into "workshop" portion where folks get up and look at the maps, fill out questionnaires, etc.

7pm—CN: wrap up meeting, thanks for attending, we will notify you of next set of meetings, spread the word!

7pm-8pm—Team clean-up/pack-up and short de-brief

COMMENTS/QUESTIONS SCRIBED DURING MEETING BY CAROL & CHRIS (comments have been consolidated by topic):

- CN: Current situation in California has heightened awareness. The CWPP is a dynamic & collaborative process.
- KG: Residents need to be involved! FS will take these suggestions into consideration in developing their WPP. Second set of meetings will be to review draft Plan, probably in January 2008. The citizens of CCC "own" this plan, need HO participation and mitigation. Complete and turn in surveys!
- AO: At beginning of strategic plan, to move forward successfully, need community input, buy-in and participation.
- GG: Collaborative process between communities, land managers, forest service. Large-scale mitigation/treatment is important, but also need individual HO and PO treatments, which can actually be more effective. CWPP is a strategic plan to prioritize treatments and funding, makes communities eligible for the limited funding, and increases chances of securing funding. We are taking community responses seriously, now tallying; responses provide important info and helps direct some report efforts and guide the content.
- Is area around Hwy. 103 covered by CCC or Evergreen WPP? CCC CWPP combining efforts with Evergreen's existing CWPP.
- Do CCC building codes conform to defensible space requirements—new build versus existing, etc.? Two forms of defensible space—landscaping and construction. Community defensible space = building fire/fuel breaks, roads on exterior of developments—not running through. Shaded fuel breaks along roads to safely "drop" crown fires to ground, act as community buffers.

Appendix F – Community Meeting Summaries

- Do interior sprinklers help? Internal sprinklers won't help save a house in a wildfire; use non-flammable building materials and install outer sprinklers.
- How wide of road needed for fire break? Road won't stop fire if tall trees on both sides, need to reduce tall trees, thin progressively away from road. In some places all you need is 18" for a working fire break, if vegetation appropriate and fire knocked to ground. Can utilize existing roads to put in fuel breaks.
- I live on steep slope, is it better to cut trees & leave on ground? Balance of reducing fire hazard versus cutter safety. To reduce crown fires, it's always better to cut the trees even if you have to leave them where they fall due to steepness; cutting crown continuity makes it easier to suppress fire. There are also ways to stop vertical migration of fire utilizing existing roadways.
- By thinning steep slopes, what is the effect on erosion? Not a catastrophic erosion problem. By thinning, the undergrowth and healthier trees will be able to re-grow, which leads to a more sustainable, balanced and natural state. Need to return to natural state, now things are overgrown.
- Use downed trees for wood chips? CCC pick up and sell to other counties? DOE looking for chips. Volume of wood, transport costs need to be considered. CCC has chipper for loan—call Tim Vogel, Site Director for CCC. He just obtained two grants, one is for defensible space.
- HOAs can use CWPP to apply for grants. There are lots of funds available to HOAs that have CWPPs.
- With a CWPP, HOA/Fire District/other associations can apply for up to \$10,000 grants to pay for chippers, hauling, etc.; applicant needs to come up with volunteer hour match of 50% and grant will match in dollars. Kathleen already has grant template written, HOAs just need to cut and paste, and make sure you have enough volunteers. Also, entrepreneur grants available from State energy office.
- Floyd Hill area is considered high risk. Floyd Hill HOA has already done chipping and will do again. Chuck cut down ~1000 trees, rented chipper and spread chips around base of healthy trees in forest. Woodchips are not the kind of fuel that will sustain a ground fire and beetles will not stay in chips. Tim Brown, CCC bug and weed expert, is working on similar grants.
- Additional benefit to thinning is a healthier forest—if thin trees to have 10' between trees, more snow makes it to the ground instead of evaporating while up in branches, which results in 10% more water production.
- Spraying for beetle kill? Spraying doesn't kill bugs, it repels them. Works for about one year, it is NOT the most cost-effective solution. If tree is red, no beetles.
- 75% of CCC is forest, who takes care of it? The Colorado State Forest Service; our CWPP will give CSFS their "marching orders" to do proceed and prioritize with proper fire mitigation; they don't have enough people or \$ to do it all now; Per Healthy Forest Restoration Act (HFRA), once a CWPP is in place, that sets their priorities to integrate with community efforts and tailor their mitigation efforts. FS is coming around with Yankee Hill project, fuel breaks up Fall River, Mill Creek, etc.
- FS will fine \$500/tree if homeowners cut trees within the forest, so go to FS first before cutting to make shaded fuel breaks! Wise to incorporate FS input into CWPP. State FS is mandated to assist homeowners; they will mark trees for a \$50 charge. Per Tim V.,

Appendix F – Community Meeting Summaries

there is a scholarship grant fund for tree marking in addition to the fee-based assistance to private land-owners. Go to CSFS website links for more information.

- CDOT as stakeholder? CDOT will be involved with CWPP, people throwing cigarettes out car windows along I-70, etc. Mobility versus life safety; priority with easements and fuels; CWPP may help to revise their priorities/budget.
- A wildfire burning across the existing ore body/mineral belt in this watershed in general would exacerbate an already catastrophic situation. Wildfire at/around Henderson Mine specifically would have serious impacts for employees, downstream water users, etc. Contact Henderson to discuss more.
- Presentation packet available for HOAs, etc.? George has copies of DVD, could send to HOA list.
- Publications are available for download—<http://csfs.colostate.edu/library.htm>

SUGGESTIONS:

- Advertise January meetings in *Canyon Courier*, also.
- Send copies of DVD to HO/PO list?
- List grants and other resources in the CWPP.
- On web page, link HFRA and other publications available for download—<http://csfs.colostate.edu/library.htm>
- Some slides hard to read.
- RE: The Report:
 1. In the purpose/mitigation strategies portion of the CWPP, can it specifically be stated that in addition to listing/prioritizing high fire potential areas, this document is to be used as a community/stakeholder resource that lists grants/application info, processes? Can programs already in place that the community may want info on, i.e. the chipper borrowing program, etc., be listed?
 2. This CWPP is a great opportunity to specifically define the Clear Creek County **community**—perhaps more unique than any other! 75 percent Forest Service land and the other 25 percent = homeowners, property owners, HOAs, POAs, large and small business, recreationists (is that a word?), tourists, historical sites, etc...
- 1. The headwaters of Clear Creek start on the western edge of the county, the snowpack and water reservoirs are storage units, Clear Creek itself is the conveyance mechanism for the water. Wildfire would have very negative impacts on the watery quality. Clear Creek is the drinking water source for 350,000 plus downstream water users (including the Standley Lake Cities of Northglenn, Westminster and Thornton; the City of Golden, and the City of Arvada) and Coors Brewery.
- 2. The Colorado Mineral Belt runs through the county; wildfire would expose these minerals to erosion which would be of major concern to downstream water users.
- 3. Mining continues to be one of the largest industries/employers in the county—Henderson Mine, several tourist mines, experimental/safety training mine, and numerous individually-owned mining claims. All these would experience severe, negative impacts from a major wildfire.

Appendix F – Community Meeting Summaries

4. Tourism is another large county-wide business—hunting, rafting, camping, hiking, biking, fishing, skiing, etc. All these would experience severe, negative impacts from a major wildfire.
5. A major transportation corridor runs through the county—Interstate 70. A major wildfire could have detrimental effects on the transportation of goods and people, plus pose national security issues.

END OF SUMMARY

CLEAR CREEK COUNTY COMMUNITY WILDFIRE PROTECTION PLAN
NOVEMBER 7, 2007 COMMUNITY MEETING SUMMARY

DATE: Thursday, November 7, 2007

LOCATION: Rocky Mt. Village/Easter Seals Handicamp

SIGN-IN SHEET (contact information on original sheets, not provided here):

AFFILIATION/AGENCY/STAKEHOLDER

1. CCC OEM
2. CCC OEM
3. CCC CERT
4. CCC Env. Health
5. CCC
6. CCC
7. CCC Open Space
8. CCC Open Space
9. CCC
10. CCC
11. CCC
12. CCC
13. CCC
14. CCC Site Dev.
15. Walsh
16. CCWF
17. CCWF
18. CCWF/Mill Creek Park
19. CSFS Golden
20. CC Fire Authority
21. City of Golden
22. St. Mary's Glacier
23. Town of Georgetown
24. Town of Empire
25. Mill Creek Park
26. Upper Clear Creek
27. York Gulch
28. Empire
29. Empire
30. Fall River
31. Fall River
32. Dumont
33. Dumont
34. Georgetown
35. Georgetown
36. W. of Empire
37. Twin Tunnels Development
38. Twin Tunnels Development
39. Dumont
40. Blue Valley Homeowner
41. Anderson Custom Homes/Evergreen
42. Anderson Custom Homes/Dumont
43. Georgetown
44. Georgetown

- 45. Wall Street
- 46. Bakerville Exit
- 47. St. Mary's
- 48. Fall River Road
- 49. Fall River Road
- 50. Herman Gulch HOA
- 51. Herman Gulch HOA
- 52. Dumont/LE's Trailer Park
- 53. Firebreak

INFORMAL AGENDA:

4pm-5pm—Project Team arrives to set-up, etc.

5pm - 5:15—folks get signed in, get pizza & drinks, get seated

5:15—Meeting begins

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- KG: brief opening remarks/introduce CCC team/introduce CSFS, FS
- AO: FS role, importance of community input, etc.
- CC: briefly explain community involvement process

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5:30—GG: PowerPoint presentation to include overview of CWPP process, fieldwork to date, what Walsh needs from community, how Walsh will utilize community information, etc.

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7pm—CN: wrap up meeting, thanks for attending, we will notify you of next set of meetings, spread the word!

7pm-8pm—Team clean-up/pack-up and short de-brief

COMMENTS/QUESTIONS

- CN: Three key organizations involved in advancing Clear Creek County's CWPP—Clear Creek County OEM lead agency in this important effort, CCWF coordinating community involvement, and Walsh Environmental conducting technical work and preparing Plan.
- KG: This Plan is based on YOUR input! (Introduced CCC staff.) This Plan will give you the opportunity to move forward with prevention and mitigation activities, you'll be able to create defensible space around your home/work/community. HOA will prioritize mitigation. Areas with CWPP will be considered first for grants; the CWPP is a mechanism for grant funding—makes you eligible and helps put you on top for the limited funding. Without community involvement/input, Forest Service will not approve CWPP = no grant money.
- CC: Brief overview of the interactive community involvement process for this project—1) get preliminary community & stakeholder input, 2) develop DRAFT CWPP, 3) get community & stakeholder comments on DRAFT CWPP, 4) Finalize CWPP, and 5) get funding and implement wildfire prevention & protection activities. Draft Plan should be ready in January; deadline for questionnaires is Nov. 30—please turn them in ASAP! Next set of meetings should take place in January or February, depending on when draft Plan is ready.
- AO: This is your Plan, your input gives validity. 80 statewide CWPPs approved so far, 46 under development, need CWPP to compete for the limited funding. This is a cross-

boundary plan that includes State and private lands. Need representation from individual communities and the county. Need buy-in and participation to make effective, helps prioritize and give voice in the process. (Defined WUI.) For the Plan to work, everyone has to be involved! An approved CWPP helps FS to prioritize mitigation for areas adjacent to WUIs.

- TV.: County slash program will start in 2008, as well as voluntary defensible space program—thanks to FS money.
- GG: This is a great turn-out—diverse group, various interests. The bark beetle kill issue is on everyone’s minds, let’s address.
- AO: Briefly discuss now, Kathleen will add website links, FS has aerial survey maps that show areas of concern. Currently experiencing an unprecedented infestation due to high-growth forests, etc. When a pine beetle “attack” happens, the beetles lay eggs then leave, tree dies from bud worm infestation, needles turn red and fall off, and then it is a big stick that won’t burn that well upright, becomes a fuel issue when it falls. Lodgepole pine are available as fuel red or green, they burn in large patches, and then new growth—nature of tree cycle. Question is how to keep more green and less-flammable trees. We can send information to your email list. You can be proactive for healthy trees, reactive for infested trees. In forest areas, trees need to be thinned out, be aware of crown fires. High-value trees should be sprayed.
- GG: **Community Wildfire Protection Plan (CWPP)** [PowerPoint presentation]
 - Reactive to Proactive—National Fire Plan (2000), Healthy Forest Initiative (200), HFRA (2003), CWPP concept (2004)
 - CWPP concept is to get community access to funding through these assessments
 - Minimum requirements for CWPP HFRA compliance and FS sign-off are: 1) collaborative efforts of various land agencies and owners, etc. 2) prioritized fuel reduction, and 3) treatment of structural ignitability (landscape and construction)
 - Needs to be a flexible process, a strategic plan, and have community ownership
 - This positions the project for funding eligibility priority for state and federal grant money
 - No CWPP = no funding
 - Community ownership—individual and homeowner association action—is the most important factor in reducing wildfire risk. Spread the word and fill out the survey!
 - Wildland-Urban Interface (WUI): 1) urbanization in areas that used to burn naturally, 2) fire-adapted / fire-dependent ecosystems, 3) decades of fire suppression and drought conditions
 - Community Risk Assessment Methodology
 - Standardized approach, use NFPA 1144 survey
 - Check-list of accessibility, road attributes, emergency status, signage, etc.
 - Community Treatment recommendations
 - Flexibility with treatments and priorities
 - Watershed Hazard Assessment
 - Yankee Hill, etc.
 - Hazard and Risk Reduction Tools
 - Fuels Management—defensible space for individual homes and neighborhoods (firewise construction and landscaping), fuel breaks, etc.

- Non-Fuels Related Action—outreach and education, regulatory such as 30' fuel free zone, etc.
- Q: 30' of defensible space for mountain homes? A: depends on topography of land, works for flat land, need more space if on slope, per FS varies from 30' to 70', etc.
- Work with your neighbors to plan defensible space
- Roads around perimeter can be strategically-placed fuel breaks
- Even with proper fire fuel breaks, the extreme heat from fire can cause damage
- Shaded fuel breaks
- Goals and Objectives of Clear Creek County-wide CWPP
 - Increase community awareness and participation through community outreach
 - Comprehensive wildfire hazard and risk assessment of neighborhoods and other valued resources
 - Collaborate with government and public agencies
 - Prioritize action plans
 - Create safe environment
- CWPP Process
 - Dynamic and collaborative
 - The Plan represents a strategic plan for action, the beginning of the implementation process—not the end
 - With CWPP HOAs can access grants for mitigation activities
 - Community ownership is ongoing
 - Implementation is key to success
- Public Questions/Answers/Comments
 - Q: PowerPoint available for HOAs? A: Yes, can make available, and make CDs. Copies of the Forest Health DVD/video are also available.
 - Q: Can satellites be used as early detection? A: Yes, are being utilized, MODUS infrared detection used most, can pick up fire, but not homes. But in populated areas, people typically see fire first.
 - Q: Fire prediction software? A: Fire behavior modeling is common. Firebreak Systems has highly sensitive home sensors. Civil Air Patrol has aerial mapping system—ordered by CCC Sheriff's Office.
 - KG: Lightning strike tracking software in CCC budget; could put on CCC website to monitor positive strike areas. Discussion on minerals attracting lightning, etc.
 - Comment: Need to focus on the front part of the book—how to prevent fires, get more firefighters, etc. A: KG: Right. Lots of information on tables here about joining Clear Creek Fire Authority, Fire Science classes for High School seniors, cadre of structural firefighters, mutual aid from other communities. CWPP is proactive. Make sure you're on the map and then GG can do modeling of fire potential and mitigation actions. Highest objective is life safety. What GG was explaining—individuals and communities creating defensible space—is “front of book.” / If defensible space is done effectively, won't need firefighters; you will evacuate to safety and your house will survive. Don't wait until fire is happening—there will eventually be fire!
 - Q: Why hasn't FS opened up areas for firewood cutting? A: Blanket permitting becomes its own environmental hazard. National FS needs to do an EIS, and that is a huge expense.
 - Q: Does defensible space also mean what house is made of? A: Yes—firewise building materials; need you to take this information out to more people/communities to act on.

Appendix F – Community Meeting Summaries

- Q: Firefighting capabilities/resources? A: There are lots of resources that would be here, mutual community effort, aircraft stage at Jeffco, number of fire trucks would be weather/incident dependent.
- Q: In California fires, they talked about foam/gel technology to spray on homes. More information? A: Firebreak uses clear product, sensor-activated system makes calls and applies product. / Need defensible space also!
- Comment: Local Youth Corps of 18 to 25 people is lined up to work! A: Grants can pay for training, etc.
- Q: How much funding available? A: Different sources—1) mitigation grants require volunteer hour match at \$17.58/hour and can be used to buy equipment, etc., and 2) USDA Rural Development Grants are for small businesses such as biofuels, etc., and 3) FEMA pre-disaster mitigation grants, 4) possibly others. Need CWPP to apply, need to be HOA or POA.
- Comment: Should link Yankee Hills Fuel reduction FS Project to CCC webpage.
- Q: Georgetown, Silver Plume, Idaho Springs and Denver school system lands = hundreds of acres in county, how fit into CWPP? A: Land management and stakeholder projects included in CWPP and they can work on securing their funding, plus open dialogue for cooperative efforts with neighborhoods, etc. for fuels treatment.
- Comment: Up here we are concerned about ingress/egress, defensible space, etc. Downstream water users such as Coors and Standley Lake Cities are afraid of impacts of wildfire on water quality, especially highly mineralized areas. Need to define and prioritize these areas—mineralized zones of cadmium, lead, zinc, copper and other heavy metals; plus the resources of headwaters management. These zones give us a natural resource advantage, headwaters make this area unique.
- Q: Experience dealing with absentee land owners? If those neighbors are willing to help, is it allowed? A: We sent out about 4,000 flyers, 100 out of county, getting calls from all over, some HOAs trying to track down those absentee landowners.
- Q: What about in town? A: Regulatory support from town or county, private property rights and community acceptance issues. Try education first, usually effective. / Asked FS about problem areas, they said no funding. This CWPP identifies areas they own as community hazard/risk and this is a prioritization mechanism, per HFRA, FS needs to prioritize accordingly.

SUGGESTIONS:

- Advertise January/February meetings on the local radio station—KYGT.
- Prepare and send packets, including grant application templates, to HOAs, etc.

END OF SUMMARY

**CLEAR CREEK COUNTY COMMUNITY WILDFIRE PROTECTION PLAN
MARCH 4, 2008 COMMUNITY MEETING SUMMARY**

DATE: Tuesday, March 4, 2008 / 6-8pm

LOCATION: Clear Creek High School Commons

ATTENDEES: (names on original sign-in sheets, not provided here):

AFFILIATION

1. N/A
2. N/A
3. N/A
4. Loch Lomond Heights
5. High Country Fire Mitigation
6. CCC OEM
7. N/A
8. CCC
9. CCC
10. Pine Valley/Beaver Brook Lodge
11. CCC
12. N/A
13. Bear Creek Watershed
14. Mill Creek Park
15. Saddleback
16. Jefferson Conservation District
17. Natural Resources Conservation Service
18. Herman Gulch HOA
19. Herman Gulch HOA
20. Jefferson Conservation District
21. Saddleback
22. Jefferson Conservation District
23. Colorado State Forest Service
24. Mill Creek Park
25. CCC OEM
26. Walsh Environmental
27. Clear Creek Watershed Foundation
28. Clear Creek Watershed Foundation

INFORMAL AGENDA

5pm-6pm—Project Team arrives to set-up, etc.

6pm - 6:15—attendants sign in, get pizza & drinks, get seated

6:15—Meeting begins

1. What We've Done So Far

• Welcome

- tonight's meeting agenda & guidelines
- introductions of key players
- brief overview of process to date

• PowerPoint presentation of main highlights of DRAFT CWPP

2. What's Next?

- Facilitated questions/answers

3. Closing Remarks

7:30pm—Team clean-up/pack-up and short de-brief
COMMENTS/QUESTIONS SCRIBED DURING MEETING

Presentation Notes:

BENEFITS TO THE COMMUNITY

1. Increases public awareness of wildfire issues.
2. Been getting lots of calls since start of project!
3. Comprehensive plan to reduce wildfire risk.
4. National fire plan funding priority for projects identified in CWPP.
5. USFS and BLM can expedite implementation of projects in the CWPP.

COMMUNITY COMMENTS & CONCERNS

Do I have to cut down my trees?

Why isn't more being done regarding beetles?

My neighbor is/is not cutting his trees, what can I do?

What will insurance companies do with this information? It is in the public domain...

- The mitigation techniques, etc. listed in the CWPP are recommendations only.
- Do residents have to comply with local CWPP?
 - No, but it's strongly advised and your insurance company may request it. Range of community
 - sentiment — many are concerned about wildfire threat and want to mitigate, others are not concerned and say “go away, don't cut down my trees.”
- Communities with CWPPs get priority for grant funding, can expedite treatments and funding.
- Clear Creek works closely with US Forest Service, BLM, and HFRA; related Federal mandates.
- CWPP creates a safety in and around community.
- Insurance companies have own rating system (ISO), does not address wildfire issues; instead looks at things like your fire agency's ability to provide water, etc. No precedent of insurance company using CWPP to the detriment of homeowners. Some areas now considered “high risk”/hazard areas = ISO rating by insurance company; partially based on local fire department's ability to address a burning structure.
- CWPPs have not been used to impact insurance rates; they provide suggestions on creating your own defensible space around your home.
- Important to increase your own and your neighbors' awareness, engage HOAs and county, etc.
- Wildfire and Insurance brochures available on back table.

COMMUNITY WILDFIRE RISK ASSESSMENT

Benefits of detailed and standardized Wildfire Hazard Survey

Appendix F – Community Meeting Summaries

- Wildland Urban Interface (WUI) — need to break down into subdivisions and do separate risk assessments; this CWPP includes detailed surveys of these areas, all get the same survey, but results vary.
- Identifies what the county's needs to narrow down and prioritize activities.

NFPA Hazard Ratings

- Range from moderate to high in this area.
- **Fire Behavior Modeling**
- Look at fuel, weather conditions, water supply, potential for crown fires, Chinook conditions, 90% of fire will be surface, etc.

HAZARD REDUCTION TOOLS

Hazardous Fuels Mitigation: defensible space/homes, shaded fuel breaks/roads, area treatments/timber stands

Non-Fuels Mitigation: building improvements, access/egress, water supply, fire department preparedness

- Improvements include changing roads so that fire apparatus can get through, personal mitigation,
- hydrants, removing fuels, thinning trees.
- Saddleback and Floyd Hill = extreme hazard; especially in mores densely populated areas need to look at debris in gutters, house and roof composition.

Public outreach: ongoing involvement is essential

COMMUNITY HAZARD ASSESSMENTS

- A separate page for each community listed
- First-round recommendations for health, welfare and safety; all about human welfare and safety; not about what's best for trees.
- Saddleback and Floyd Hill = Evergreen Fire Protection District.

WHY DEFENSIBLE SPACE?

- Really important!

Firewise Construction: fire-resistant roof and construction, enclosed deck, water source, preparedness, clean gutters

Firewise Landscaping

WATERSHED ASSESSMENT

- Clear Creek Watershed delineated early on in project.
- This treatment outside the primary scope of this project, but any WUI treatments will benefit the entire Clear Creek Watershed.
- After wildfires there will be slope failure and storm-related erosion — soil will slide down the slopes into water bodies; toxins upslope can compromise the watershed downslope.

Questions/Comments/Issues:

- Two areas above Idaho Springs where there are no exits, widen goat paths?

- Saddleback access is a big concern.

- Why is CWPP not a law when it gives the Forest Service its “marching orders?”

Competing for funding all along the Front Range, only way to get money is to have a CWPP. USFS will work with willing partners and communities that have CWPPs to get grants, prioritize areas and release funds. FS can only treat Federal land, but will prioritize work around areas with CWPPs. Have to work within NEPA/EAs.

- What can private landowners with land adjacent to Federal land do?

Section in draft CWPP by Mark Martin regarding land adjacent to USFS land — with or without a CWPP, don't go on Federal land! Cannot go onto Federal land, FS needs to do assessments and would much rather work with cooperative landowners. FS would rather work with willing partners than deal with access issues. Put all problem areas and concerns in CWPP, that way they can be recognized by the USFS; it's a slow process, but these steps can expedite mitigation. The Healthy Forest Restoration Act (HFRA) is to help expedite the bureaucratic process of these situations.

- First work on defensible space — it works!
- Deal with your own land first, then the Feds can target.
- Do not leave facts out of our CWPP, include our concerns over raising red flags; i.e., do not cut down trees on federal land!
- USFS Yankee Hill Project (north of I-70) is similar to area south of I-70; we have a forester willing to work with us! We need to work on our own properties, this gives the FS leverage and time. This is not an insurmountable problem and we have great resources — need elbow grease!
- The CWPP provides good, factual information; but also need to continue policy discussions like tonight.
- Get your concerns documented now, in this CWPP!
- Denver Mountain Parks other absentee landowners in Clear Creek County?
Works the same as getting Federal land mitigation. Denver Mountain Parks has zero money. Use information in CWPP to garner funding and prioritize efforts.
- Be sure to fill out COMMENT FORMS! Especially question #6 regarding a workshop and the topics you'd like covered; county willing to do if enough interest.

- Once CWPP is approved, community can apply for grants to mitigate area. If there is a property outside the HOA, the landowner(s) can apply for a grant.
- Can also get a group together and form a 501 (c) (3) and be a legal entity; takes about \$35 and one hour to complete the paperwork.
- Clear Creek County offers three Wildland Urban Interface (WUI) Fuels Reduction Programs to help:
 1. Slash Disposal at the Transfer Station — tree branches, brush and pine needles must be separated and needles must be removed from their containers; stumps no bigger than 3 feet in circumference and must be cleaned of rocks and dirt; logs no longer than 4 feet in length and 18 inches in circumference; this program operates year-round, but is **free from May 1 through September 30 this year.**
 2. Chipper Rental — discounted rate, year-round.

Appendix F – Community Meeting Summaries

3. Volunteer Defensible Space — monetary compensation for landowners who perform volunteer defensible space actions on their property.

For more information on these programs, contact Tim Vogel, CCC Site Development Inspector at 303- 679-2421.

- Gilpin County has slash program, biomass facility and biofuel buy-back program.
- Website listed good information for Federal funds, but we need state or private funds, need better listing of available resources in this plan.

Funding changes frequently, will research. / Colorado State Forest Service offers a Landowner Assistance Program.

- Biggest hurdle can be convincing your neighbors that there is a problem and to act; there are good resources/calculators/assessment available. Did at Mill Creek and it had a dynamic effect — homeowners compared notes and in five years all metal/tile roofs and defensible space. Can hire Forest Service homeowner assessments/property ratings for about \$30/hour, would take one day to do 30 homes.
- Can't use grant money to hire/pay Federal employees.

**CLEAR CREEK COUNTY COMMUNITY WILDFIRE PROTECTION PLAN
MARCH 6, 2008 COMMUNITY MEETING SUMMARY**

DATE: Thursday, March 6, 2008 / 6-8pm

LOCATION: Easter Seals Handicamp/Rocky Mountain Village

ATTENDANTS: (names on original sign-in sheets, not provided here):

AFFILIATION

1. Town of Georgetown
2. Saddleback
3. UCCHA
4. Clear Creek County
5. Berthoud Falls
6. Self
7. CCC Open Space
8. N/A
9. Clear Creek Courant
10. Colorado State Forest Service
11. Clear Creek Fire Authority
12. Clear Creek Watershed Foundation
13. Mill Creek Park
14. Self
15. US Forest Service
16. High Country Fire
17. Self
18. CCC Office of Emergency Management
19. Clear Creek County
20. Local Homeowner
21. Idaho Springs Homeowner
22. Idaho Springs Homeowner
23. CCC Homeowner
24. CCC Homeowner
25. Walsh Environmental
26. Clear Creek Watershed Foundation
27. Clear Creek Watershed Foundation

INFORMAL AGENDA

- 5pm-6pm—Project Team arrives to set-up, etc.
- 6pm-6:15—attendants sign in, get pizza & drinks, get seated
- 6:15—meeting begins.

What We've Done So Far

- welcome
- tonight's meeting agenda & guidelines
- introductions of key players
- brief overview of process to date
- PowerPoint presentation of main highlights of DRAFT CWPP

What's Next?

- facilitated questions/answers

Closing Remarks

- 7:30pm—Team clean-up/pack-up and short de-brief.

COMMENTS/QUESTIONS SCRIBED DURING MEETING

CN: Intro/Welcome:

- Project started last fall
- Public meetings held in November, great participation at those meetings, about 50 participants at each, received lots of community input.
- Lots of work has taken place since then, now have DRAFT CWPP.
- Ironically there was a small wildfire on Alvarado Road the night of one of the meetings, shows vulnerability of Front Range watershed and community to wildfire.
- Introduction of key project and county staff.

KG:

- Thank you for attending!
- DRAFT Plan can be accessed at County website, at local libraries and at main County offices.
- This is the public's chance to comment and address the questions on the questionnaire.
- Comment Form deadline is March 14.

GG: (PowerPoint Presentation)

- Federal government realized the cost of fire suppression increasing, now being more proactive.
- HFRA opened the doors for CWPPs, National Fire Plan in 2000, HFI in 2002, etc.
- Each year wildfire fuels continue to build up within communities.
- Need community-wide cooperation for plan to work.
- CWPPs give priority to communities that have adopted and implemented the plan.
- Have been getting lots of calls, emails, etc. since this project began!

BENEFITS TO THE COMMUNITY

1. Increases public awareness of wildfire issues.
2. Comprehensive plan to reduce wildfire risk.
 - Not mandatory, these are recommendations.
 - Won't happen without community buy-in.
 - Look at fuels, not boundaries, in creating a CWPP.
3. National fire plan funding priority for projects identified in CWPP.
 - Once official project stakeholders agree to CWPP = certified plan, then can apply for National Fire Plan funding.
 - This plan gives you the information you need.
 - Funding is not guaranteed, but having CWPP increases your chances.
4. USFS and BLM can expedite implementation of projects in the CWPP.

COMMUNITY COMMENTS, QUESTIONS & CONCERNS

Do I have to cut down my trees?

- No — not a mandate, hope to educate public as to benefits of defensible space.
- County only involved with building permitting process.
- See defensible space brochures provided — lot of common sense recommendations!

Why isn't more being done regarding beetles?

- Information available on back tables, discussed in CWPP, not a lot can be done on a large scale, discussion on changing fuel conditions and behavior models (green versus red trees, no needles, on ground, etc.). Fire intensity of a live tree with a crown fire is greater than that of the red needle beetle trees.

Appendix F – Community Meeting Summaries

My neighbor is/is not cutting his trees, what can I do?

- There is a wide range of perspectives on this, you are the community activists, spread the word of the importance of this! If your neighbors are not doing any mitigation, all you can do is try to educate them on the importance. Plan will not work without support at HOA/POA level.

What will insurance companies do with this information?

- Insurance companies can be involved, may ask for information and they have the right since they carry the liability. This information is in the public domain.
- Insurance companies may send out inspectors to examine defensible space, which is 15'-20' around the house.
- Building permits will trigger an inspection.

HOMEOWNER/LANDOWNER SUPPORT

The most important element in community wildfire risk reduction is education.

COLORADO WUI HAZARD ASSESSMENT/DEFINING THE CLEAR CREEK COUNTY WUI

- Approximately 45 WUIs — including Evergreen area — where we did discreet neighborhood surveys.

THE COMMUNITY WILDFIRE HAZARD ASSESSMENT

- Standardized survey to get predominant neighborhood or community characteristics.
- Surveys include accessibility, signage, fire history/weather, water availability, housing materials, etc.
- Every subdivision gets its own rating, ranging from extreme to low. This establishes baseline conditions.
- After mitigation, community can request to have a new rating.

BENEFITS OF A DETAILED AND STANDARDIZED WILDFIRE HAZARD ASSESSMENT

- Wildland Urban Interface (WUI) — need to break down into subdivisions and do separate risk
- assessments; this CWPP includes detailed surveys of these areas, all get the same survey, but results
- vary.
- Identifies what the county needs to narrow down and prioritize activities.

NFPA HAZARD RATINGS (SUMMARY CHART)

- Range from moderate to high in this area.
- ER: This scoring system really works, was done in Mill Creek Park; it can be a real motivator for homeowners. Helps to see progress — new roofing, etc.

NFPA HAZARD RATINGS (MAP)

- GG: All Evergreen Fire Protection District is EXTREME in Clear Creek County.
- GG: Factors that come into play for Clear Creek areas are addressed in Plan.

Appendix F – Community Meeting Summaries

- FY: Actual communities — Silver Plume, Georgetown, Empire — forest comes right down to edges. Why aren't those areas showing up higher on Hazard Ratings? What constitutes inclusion?
- GG: This map is the initial map of Wildland Urban Interface — WUIs.
- KG: Those municipalities not as extreme because have municipal water supply and escape routes; we're not assessing just buildings and trees. WUI not in municipality itself, this scope focuses on clusters of homes, single homes in forest are outside this scope and not requirements of this Plan, but those areas can still use the information in the CWPP.
- FY: If applying for funds, should these areas be higher on ranking?
- KG: Does County CWPP make those pieces eligible for grants?
- ??: Can individual homeowners apply for grants through the CWPP if they aren't a part of a HOA/POA?
- AG: Individual homeowners can apply for certain funds and possibly check this CWPP. Is the home/land included in the CWPP?
- Continued group discussion.
- AG: There is fuzziness on applicability of this CWPP to certain homeowner applications. If recommendation not in CWPP, probably not eligible. However, CWPP is county-wide, this interface issue should be addressed in the CWPP.
- GG: Will locate those maps and review the conditions and discuss/address.
- AG: Clear Creek County is unique, usually municipalities are not in the midst of forest area. Needs to be addressed now!
- GG: Decision on boundaries made early in project with project stakeholders, but need to re-visit.
- FY: At first set of public meetings in November we circled the towns and municipalities we are now discussing on the maps.
- CS: State FS assessed Georgetown as moderate regarding fuels; now understand there are many variables/factors in assessment ranking, but still should be on these maps!
- GG: This is not a Forest Management Plan, but Yankee Hill USFS project is discussed in this CWPP plus some CSFS information listed, agency treatments, etc.
- KG: Fill out the Comment Forms so we can get this information!
- GG: Individual Community Assessments are in the Plan.

FIRE BEHAVIOR MODELING FOR CLEAR CREEK COUNTY

- Some methodology used for actual, tactical fire plan.
- Now land fire data available for Clear Creek County.
- MAP EXAMPLE: Potential crown fire with Chinook conditions.

HAZARD REDUCTION TOOLS

- Hazardous Fuels Mitigation includes:
 - defensible space/homes
 - shaded fuel breaks/roads

- area treatments/timber stands
- Non-Fuels Mitigation includes:
 - building improvements
 - access/egress
 - water supply
 - fire department preparedness
- Public Outreach
 - ongoing involvement is essential
- QUESTION: Is it accurate to say that a crown fire goes through in two minutes?
- GG: Crown fire in Chinook conditions can travel fast and wall of flame, actual speed is wind dependent.
- AG: Lot of variables involved such as how far traveling, rate of spread, flame length, etc.
- GG: Radiant heat can do terrible things to a home. With some fires the home can be gone but the trees remain. Why? Things like needles and leaves in the gutters, etc. Better if have a metal roof and clean out the gutters. Surface fire usually easier to suppress. Discussion on ground fire versus crown fire.
- DL: When see a crown, not much can be done. Only good fire is one that is in control.
- ER: Soapy mixture on exterior helpful?
- GG: “Foaming” — spraying a protectant on the house — is a great way to get water to stick to the house.

COMMUNITY HAZARD ASSESSMENTS

- Based on drive-through survey, existing county emergency data, etc.
- Please review and submit comments.
- Water is important and shaded fuel breaks along roads — not cut all trees, but break the canopy.

WHY DEFENSIBLE SPACE?

- Really important!
- Firewise Construction includes fire-resistant roof and construction, enclosed deck, water source, preparedness, clean gutters.
- Firewise Landscaping

NFPA HAZARD RATINGS

- Watershed area — unique strategic placement with headwaters, water supply, etc.
- I-70 spill/emergency call-down system in place for downstream intake systems.
- After fire, erosion is a HUGE issue for water quality; i.e., Hayman fire and impacts on Cheeseman Reservoir — more was spent on water quality than fire fighting.
- Need massive tree thinning for watershed preservation need; need to prioritize intersection/WUI areas.
- Can’t treat entire county, but focus where human safety/welfare are issues and where treatment benefits the watershed.

MITIGATION REALLY DOES WORK!

- Your CWPP paves the way for a safer community and healthier forest.

Questions/Comments/Issues:

- DL: When USFS looking at potential projects, consider:
 - Protection of human life — residents and firefighters
 - Property

➤ Municipal watersheds

Community CWPP gives us as a Federal agency our marching orders for prioritizing projects. Competitive funding — this year \$28 million for Rocky Mountain Regions; need CWPP to be able to get funds; with CWPP you have opportunity to apply for State funds; partnerships are KEY — FS, County, neighbors. Partnerships increase chances of funding. Willing/cooperative homeowner has higher chance of nearby FS action. Fire knows no property boundaries.

- GG: USFS trying to help!
- AG: State FS role is to work with County to identify needs. We approve the CWPP if it meets needs of community and the standards/purpose. CWPP provides guidance for agency action/mitigation. CWPP provides mechanism to make more eligible for grant funding. The CWPP recommendations spell out actions individuals and communities can take. It is a living document with a phased approach.
- PB: What if not in CWPP?
- AG: Will try to address this issue, but even if an area doesn't meet threshold for priority, there are guidelines in the CWPP that cover you. You will need to apply as an individual; two ways to get money:
 - 1) **Community Level (HOAs, etc.):** Federal WUI grant (August), HB 1139 (July, annual), State FS (June and December), other State and Front Range Fuel Treatment programs, beetle/other forest disease based mitigation grants, and other funds may become available — having a CWPP is critical for application! Best way is to get information to Allen Gallamore, CSFS.
 - 2) **Individual Landowners:** Can still apply for defensible space grants — Clear Creek County/Tim Vogel has funds available NOW for individuals! Also State FS level assistance grants.
- GG: Possibility of emergency grants.
- PB & SGB: Discussion on general county guidelines, buffer zone area, etc.
- KG/GG: We will re-visit this issue, modify maps to address concerns, adjust WUIs to include, but still dealing as an individual homeowner.
- AG: Usually based on concentration of homes, but basic techniques and recommendations apply.
- PB: Are you eligible or not for grants if outside of areas in WUI?
- AG/GG: Yes, but still individual application.
- AG: Only benefit of being in an identified WUI is if a certified HOA.
- SGB: We have a ranch, many acres of trees, some 80'-100' trees.
- AG: Forest management options.
- SGB: Lot of mature trees in this county, costly and hazardous.
- AG: Need to address individual ranches and open space on landscape scale.
- ??: Secondary markets for lots of wood.
- SGB: Have to be cut in certain timeframe is infested.
- ??: Green trees for lumber, if beetle kill they're blue, different markets for different trees.
- KG: Five nearby counties looking at this issue — demand, transport, etc. Right now Clear Creek County offers three Wildland Urban Interface (WUI) Fuels Reduction Programs to help:
 1. Slash Disposal at the Transfer Station — tree branches, brush and pine needles must be separated and needles must be removed from their containers; stumps no bigger than 3 feet in circumference and must be cleaned of rocks and dirt; logs no longer than 4 feet in length and 18 inches in circumference; this program operates year-round, but is **free from May 1 through September 30 this year.**
 2. Chipper Rental — discounted rate, year-round.

3. Volunteer Defensible Space — monetary compensation for landowners who perform volunteer defensible space actions on their property.

For more information on these programs, contact Tim Vogel, CCC Site Development Inspector at 303- 679-2421. Cost-share grants — keep track of your cost/time and get partially reimbursed; no pre- award.

- GG: Will improve the RESOURCES section of the CWPP, list websites, etc.
- KG: Will include a list of grants, but that is a moving target! Let us know on COMMENT FORM if you're interested in a Grant Workshop.
- ER: Stewardship Forest Program/Management Plan is still there and valid.
- AG: Intended to provide 10-year guidance; because forest changes, updates are needed.
- ER: Now four-year old version. How to morph it into current lingo?
- AG: Can take additional steps to make it into a CWPP, or can reference in County CWPP.
- CS: That was done for Georgetown.
- ??: USGS Agriculture Program?
- AG: Forest Agriculture Program is for 40+ acres, 10-year Action Plan with annual requirements, then per County Assessor can change designation and get a tax break.
- CN: Individuals and HOAs/POAs that are going to apply can take their page from their CWPP and attach to their grant applications. If you get 200 similar applications, what does it take to get the funding?
- AG: Based on meeting certain standards and detailed mitigation techniques — what you will do and how. Bottom line is probably cost match — cost effectiveness ratio, benefit/cost analysis, most protection for lowest cost to CSFS.
- KB: If we do have a county fire, the resources for individual houses is virtually zero — need an evacuation plan!
- KG: Fire Authority taking volunteers!
- Discussion on cisterns/dry hydrants; Empire has good hydrant system.
- CN: Yankee Hill?
- ER: Those areas north of I-70 are golden opportunity to get work done immediately.
- DL: On our models, Mill Creek is not that high, but only one way in and out, plus community support, so that's where we put our resources.
- GG: Add Yankee Hill Project Outline into CWPP.
- PB: NEPA challenge in report?
- AG: 9th Circuit ruling.
- DL: Still in mitigation; in past could do up to five acres, HFRA gave us the opportunity to do up to 1000 acres. Three levels of NEPA include categorical exclusion determination; preparation of an environmental assessment/finding of no significant impact (EA/FONSI); and preparation of an environmental impact statement (EIS). Basically hope to get that authority back.
- GG: This halted immediate action.
- DL: We have to do an EA on everything.
- ER: An EA was done for Mill Creek, not challenged. Alice/St. Mary's could get a lot done.
- GG: Agree, those recommendations are in the CWPP.
- KG: They're creating their own plan, the Fall River Watershed CWPP.
- GG: County CWPP accommodates housing those smaller CWPPs.
- KG: John Chapman works with communities to do those plans. This county-wide plan gives recommendations, but the communities need to take the next step.

Appendix F – Community Meeting Summaries

- GG: If in lower WUI ranking, should still do work! Not necessarily a liner process, communities can and should go forward with action. This offers tactical insight.
- CN: Thank you all for participating...be sure to fill out the COMMENT FORMS!
- KG: This is not the end, this will be a long and on-going process. Time line for final CWPP is approximately April.

SUGGESTIONS FOR CWPP:

- 1) Address municipalities.
- 2) Address large tracts outside a municipality.
- 3) Include FS Stewardship Plan.
- 4) Include 40-acre Forest Management Plan/Forestry Agriculture.
- 5) Address large-scale mitigation strategies and costs/contractors.
- 6) Include general guidelines for large tract landscaping.

END OF SUMMARY



Wildfire History – CSFS Golden District Region

Significant Wildfire History within Wildland Urban Interface CSFS Golden District and Immediate Vicinity

(Prepared by Allen Gallamore, Colorado State Forest Service, 3/21/07 – subject to revision/correction)

Fire Name	Location	Size	Dates	Additional Information
Murphy Gulch	Jefferson County: Inter-Canyon FPD and Bancroft FPD; along foothills west of Ken-Caryl Ranch subdivision	Approx 3,300 acres	Sept. 21-24, 1978	First EFF fire in Front Range, several structures lost, subdivisions evacuated, interagency resources ordered to supplement local fire departments' resources. CSFS Type 2 IMT (?) takes over and manages to closeout.
North Table Mountain	Jefferson County: Fairmount FPD. Top, west, and east sides of North Table Mountain.	Approx 1,300 - 2,000 acres	Sept. 7 - 9, 1988	Human caused fire off CO 93 crossed mountain to threaten subdivisions on east side of mountain. Over 250 firefighters from 20 fire departments and National Guard respond as well as a helicopter. Structure protection and evacuations in many areas.
Mt. Falcon	Jefferson County: Indian Hills FPD; primarily on Jefferson County Open Space (Mt. Falcon Park)	Approx 125 acres	April 23 - 24, 1989	Fire within open space property, leading to voluntary fire reimbursement program by county open space agencies to local fire departments to support initial attack.
O'Fallon	Jefferson County: Evergreen FPD; Indian Hills FPD; DMP parkland east of Kittredge	Approx 52 acres	March 24 - 25, 1991	Fire within Denver Mountain Parks' (O'Fallon Park) open space, leading to 100 firefighters from 5 departments responding. Dry winter conditions, gusty winds, and limited access slowed control efforts.
Elk Creek	Jefferson County: Golden Gate FPD. North of Clear Creek Canyon and east of Centennial Cone, in Michigan Creek and Elk Creek drainages.	Approx 102 acres	May 14 - 15, 1991	Fire in steep terrain with limited access, leading to use of handcrews formed from 80+ firefighters representing 15 fire departments from several counties. Fire managed jointly by FPD and Jefferson County Sheriff's Office's newly formed Incident Management Group (IMG).
Carpenter Peak/Chatfield	Douglas County: USFS and West Metro (then Roxborough FPD). Two fires, one uphill from Roxborough State Park and one across South Platte River from Jefferson County	Approx 45 acres and 23 acres	July 9 - 11, 1994	Dry lightning caused fires during larger fire bust throughout Front Range – multiple initial attacks occurring in all locations with limited availability of air resources. Evacuations of Roxborough Park and structure protection occurred using 300 firefighters and 40 engines from throughout Denver metro area, and National Guard helicopters.
Rooney Rd	Jefferson County: West Metro (Lakewood-Bancroft Fire Authority) FPD; along Dakota Hogback between C-470, I-70, and Alameda Pkwy	Approx 185 acres	Dec. 19, 1994	High winds and faulty electrical transformer outside "normal" fire season; rates of spread, flame lengths and limited access had fire threatening to cross several man-made barriers (roads). Fire departments from throughout Denver Metro area responded, and several structures were threatened.
Buffalo Creek	Jefferson County: USFS and North Fork FPD	Approx 10,400 acres	May 18 - 25, 1996	High winds and human cause; extreme fire behavior; 10 mile run in 6 hours; 10 homes or outbuildings lost; first "large" fire in Front Range WUI. Type 1 IMT takes over on day 2 from local IMT3 and manages until closeout.
Beartracks	Clear Creek County:	Approx	June 27,	Heavy fuel loading in roadless area and human

Appendix G – Wildfire History – CSF Golden District Region

Fire Name	Location	Size	Dates	Additional Information
	USFS lands, within Evergreen FPD and Clear Creek Fire Authority boundaries; Arapahoe National Forest/Mount Evans Wilderness immediately southwest of Mt Evans State Wildlife Area	285 acres	1998 - July 5, 1998	caused fire leads to heavy initial attack and extended attack by local fire agencies along with air resources; fire poses threat to Upper Bear Creek drainage and numerous homes; Type 2 IMT takes over from local IMG on day 3 and manages to closeout.
Lininger Mountain	Jefferson County: Genesee FPD and Foothills FPD; immediately southeast of Genesee community	Approx 35 acres	Feb. 26 - 28, 1999	Dry conditions outside “normal” fire season leads to wildfire threatening several subdivisions and utilizing local fire resources for several days.
Green Mountain	Jefferson County: West Metro FPD; Green Mountain Park from C-470 to homes on north and east sides of park	Approx 200 acres	March 8, 1999	Multiple departments responding to human caused fire in grass fuels with high rates of spread, high flame lengths and limited access, outside “normal” fire season; homes, communications sites were threatened.
Hi Meadow	Park County and Jefferson County: Platte Canyon FPD, Elk Creek FPD, North Fork FPD; from Burland Ranchettes on west to CO 126 on east, and south to Buffalo Creek fire and town of Pine	Approx 10,800 acres	June 12 - 25, 2000	Human cause fire under initial attack by local FPD, blows up on same day as 10,000 acre Bobcat fire in Larimer County. 52 homes lost and misc. structures; considered “benchmark” WUI fire for Colorado at the time. Type 1 IMT takes over on day 2 from local IMT3 and manages until closeout.
El Dorado/ Walker Ranch	Boulder County: Cherryvale FPD and Coal Creek FPD; west of El Dorado Canyon State Park, through Walker Ranch park to Gross Reservoir; adjacent to border with Jefferson County.	Approx 1,100 acres	Sept. 16 - 22, 2000	Heavy fuel loading in steep terrain leads to heavy initial attack and extended attack by local fire agencies from Boulder, Gilpin, and Jefferson Counties along with air resources; fire poses threat to Gross Reservoir and numerous homes in Boulder and Jefferson County; Type 2 IMT takes over from zone Type 3 IMT on day 2 and manages to closeout.
Snaking	Park County: USFS and Platte Canyon FPD; north of US 285 from Platte Canyon HS to Crow Hill.	Approx 3,000 acres	April 22 - May 2, 2002	High winds and human cause outside “normal” fire season; heavy initial attack and extended attack by local fire agencies from Jefferson and Park Counties along with air resources; fire poses threat to numerous homes. Type 1 IMT takes over from local Type 3 IMT on day 2 and manages until closeout.
Black Mountain	Park County, Jefferson County, Clear Creek County: USFS, Elk Creek FPD and Evergreen FPD; north of Conifer Mountain and south of Brook Forest	Approx 300 acres	May 5 - 11, 2002	Heavy fuel loading in steep terrain leads to heavy initial attack and extended attack by local fire agencies from Jefferson and Park Counties along with air resources; fire poses threat to multiple subdivisions in Conifer and Evergreen; Type 2 IMT takes over from local Type 3 IMT on day 2 and manages to closeout.

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Fire Name	Location	Size	Dates	Additional Information
Schoonover	Douglas County: USFS and North Fork FPD (Trumbull VFD in 2002); immediately south across S. Platte River from Jefferson County, from west of Deckers to near Moonridge.	Approx 3,000 acres	May 21 - 31, 2002	Lightning cause fire under initial attack by USFS and local FPDs, blows up on 2 nd day, and makes 3,000 acre/4 mile run in steep terrain. Fire threatens homes, camps businesses, watershed, regional powerline; approx. cabins and misc. structures lost. Type 1 IMT takes over on day 3 from local IMT3 and manages until closeout.
Hayman	Park, Douglas, Teller, and Jefferson Counties: USFS, multiple FPDs and county sheriffs (North Fork FPD in Jefferson County); from Lake George in Park County to Deckers/CO 126 in Jefferson County to Schoonover fire area and Manitou Exp. Station in Douglas/Teller Counties.	Approx 138,000+ acres	June 8 - mid-July, 2002	Human cause fire under initial attack and extended attack by USFS and local FPDs under direction of interagency IMT3, blows up on 2 nd day for historic 17 mile run and 70,000 acres. Multiple evacuations over two-week period as fire made several additional “runs”. Over 150 homes and misc. structures lost; large areas of damage to Cheeseman Reservoir and South Platte Watershed areas; fire is considered of nationally significant WUI fire for Colorado and Rocky Mountain region. Type 1 IMT takes over on day 3 from IMT3; fire is eventually managed by series of Type 1 IMTs under an Area Command team, until closeout.
Fountain Gulch	Clear Creek County and Gilpin County: Clear Creek Fire Authority, Central City FD, Clear Creek, and Gilpin County Sheriff’s Offices. Along county line immediately north of I-70 at the Hidden Valley exit.	Approx 200 acres	June 29 - July 5, 2002	Significant fire activity in steep terrain with poor road access leads to heavy initial attack and extended attack by local fire agencies along with air resources; fire poses threat to I-70 and CO 119 travel corridors, businesses, and distant subdivisions. Interagency handcrews are ordered to replace local fire resources; continued use of air resources; fire is managed by local Type 3 IMT to closeout.
Blue Mountain	Jefferson County: Coal Creek FPD. Immediately south of CO 72 at mouth of Coal Creek Canyon.	Approx 35 acres	August 14 - 15, 2002	Railroad caused fire in light fuels spreads rapidly due to continued drought conditions into adjacent timber and subdivision, leading to heavy initial attack and extended attack by local fire agencies along with air resources; fire poses threat to CO 72 and Coal Creek Canyon, businesses, and multiple subdivisions. Fire is managed by local Type 3 IMT to closeout.
Cherokee Ranch	Douglas County: Littleton FPD, South Metro FPD, Louviers FPD. Between US 85 and Daniels Park Road.	Approx 1,200 acres	October 29 - 31, 2003	High winds and downed power line outside “normal” fire season; rates of spread, flame lengths and limited access had fire threatening to cross several man-made barriers (roads). Fire occurs in “open space” area on same day as 3,500 ac Overland fire in Boulder County. Multiple subdivisions on all sides of fire are threatened as fire resources from throughout Denver Metro area respond. Fire is managed by local Type 3 IMT to closeout.

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Fire Name	Location	Size	Dates	Additional Information
North Table Mountain	Jefferson County: Fairmount FPD. Top of, and east, north, west sides of, North Table Mountain outside Golden, CO.	Approx 300 acres	July 22 - 24, 2005	Human cause fire in steep terrain on open space that escapes initial attack. Heavy use of air resources during transition from initial attack to structure protection on day 1. Multiple subdivisions on all sides of fire are threatened as fire resources from throughout Jefferson County respond. Fire is managed by local IMT3 to closeout.
Plainview	Jefferson County: Coal Creek FPD. Immediately north of CO 72 at mouth of Coal Creek Canyon and east to CO 93, north to approximately Boulder County line.	Approx 2,700 acres	Jan. 9 - 10, 2006	High winds and human cause outside “normal” fire season. Rates of spread, flame lengths, and limited access had fire threatening to cross several man-made barriers (roads) – 60 mph winds at midnight cause 2 mile fire run in under 5 minutes. Heavy initial attack and extended attack by local fire agencies from Jefferson and Boulder Counties; fire poses threat to numerous homes and businesses. Fire is managed by local IMT3 to closeout.
Rocky Flats	Jefferson, Boulder, Adams, and Broomfield Counties: multiple FPDs. Immediately north of CO 128 onto Rocky Flats NWR and east to Indiana Street.	Approx 1,200 acres	April 2, 2006	High winds and human cause outside “normal” fire season; fire occurs in “open space” area of Rocky Flats NWR and adjacent lands. Rates of spread, flame lengths and limited access had fire threatening to cross several man-made barriers (roads). Heavy initial attack and extended attack by local fire agencies from Jefferson, Boulder, Gilpin, and Adams Counties. Winds prevent use of air resources; multiple subdivisions, businesses, and Rocky Mountain Airport are threatened. Difficulties with communications and fire management across multiple jurisdictional boundaries noted.
Pine Valley	Jefferson County: Elk Creek FPD. Immediately northwest of Town of Pine.	Approx 100 acres	May 28 - 30, 2006	High winds and human cause near homes; heavy initial attack and extended attack by local fire agencies from Jefferson and Park Counties along with air resources, local USFS resources, and interagency handcrews. Fire poses threat to numerous homes, while winds limit use of air resources during initial attack. Fire is managed by local IMT3 to closeout.
Ralston Creek	Jefferson County: No-man’s lands adjacent to Fairmount FPD and Golden Gate FPD. North end of White Ranch Open Space park and adjacent uranium mine (private).	Approx 26 acres	June 17 - 19, 2006	Fire within open space property under initial attack by local FPD, “blows up” and forces resources to retreat to safety zones. Significant fire activity in steep terrain with poor road access leads to heavy use of air resources; fire poses threat to Ralston Reservoir and numerous subdivisions. Interagency handcrews supplement local fire resources and continued use of air resources on day 2; fire is managed by local IMT3 to closeout.
Centennial Cone	Jefferson County: No-man’s lands adjacent to Golden Gate FPD. Entirely within Centennial Cone Open Space park.	Approx 22 acres	July 21 - 23, 2006	Fire within open space property with significant fire activity in steep terrain with no road access during height of 2006 national fire season leads to limited initial attack; fire poses threat to US 6 in Clear Creek Canyon and distant subdivisions. Limited air resources are utilized to slow fire spread, and an interagency “hotshot” handcrew supplements local fire resources on day 2 for direct attack. Fire is controlled by day 3 as summer monsoons also reduce fire danger.

Other smaller wildfires within the WUI that posed high potential for significant impacts to adjacent communities, and had large initial attack response by local fire departments, include:

- Coal Creek fire, September 1988: 14 separate fires over 42 acres from train in Coal Creek Canyon area, resulting in response from multiple fire agencies and Single Engine Air Tanker, and CO National Guard Huey – dip site Ralston Reservoir.
- Beaver Brook, 7/20/98-7/21/98: 25-acre fire immediately downhill from Mt. Vernon Country Club in Clear Creek Canyon, resulting in air resources and structural protection.
- Red Rocks fire, 3/9/00: 10-acre grass and brush fire with high winds immediately southwest of Red Rocks amphitheatre, resulting in response from multiple fire agencies in Jefferson County.
- Bald Mountain fire, 5/6/00: 5-acre fire in Genesee park, immediately west of Mt. Vernon Country Club.
- Silver Bullet fire, 6/15/00: approximately 20-acre fire on South Table Mountain immediately above Coors Plant in Golden, requiring air tanker use to assist local fire departments. Fire occurred during same time that Hi Meadow fire was making significant run in southern Jefferson County.
- Mt Galbraith fire, 8/11/00: 2 acres in three dry lightning fires on top of Mt. Galbraith above City of Golden, threatening subdivisions in town.
- US 6 fire, 4/6/02: 50-acre grass and brush fire west of US 6 and south of 19th street in City of Golden, threatening multiple subdivisions.
- North Spring Gulch fire, 6/6 - 6/7/02: 20-acre fire northwest of Idaho Springs in Clear Creek County requiring significant air tanker use to assist local fire departments.
- Leyden fire, 1/18/05: 300-acre grass fire northwest of Arvada runs 5 miles in 25-30 mph winds, causing minor damage to numerous homes being protected by 60+ firefighters and multiple engines from Arvada, Evergreen, Rocky Flats, and Golden Fire departments.

Source; Gallamore, CSFS. 2007

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Web References

Resource	Web Site
Clear Creek County	http://www.co.clear-creek.co.us/
Clear Creek County Office of Emergency Management	http://www.co.clear-creek.co.us/Depts/oem/htm
Clear Creek County Emergency Operation Plan	http://www.co.clear-creek.co.us/Depts/oem/cc%20EOP.htm
Clear Creek County CWPP project web site	http://www.co.clear-creek.co.us/Depts/oem/CWPP/Draft%20files/draft-cwpp-project.htm
Clear Creek County Building/Site Development	http://www.co.clear-creek.co.us/Depts/LUG/building_in_clear_creek_county.htm
Colorado State Forest Service	http://csfs.colostate.edu/
Colorado State Forest Service Library	http://csfs.colostate.edu/library.htm
Rocky Mountain Geographic Science Center – Wildfire Support	http://wildfire.cr.usgs.gov
Firewise National Firewise Community Program	http://www.Firewise.org
Searchable Grants Database	http://www.rockymountainwildlandfire.info/
Evergreen FPD	http://www.evergreenfire.org/
Landfire Geospatial Data	http://www.landfire.gov/products_overview.php
National Fire Weather	http://fire.boi.noaa.gov/
RAWS Station index for the Rocky Mountain Geographic Coordinating Area	http://raws.wrh.noaa.gov/cgi-bin/roman/raws_ca_monitor.cgi?state=RMCC&rawsflag=2
Fort Collins Interagency Wildfire Dispatch Center Web Index	http://www.fs.fed.us/r2/arnf/fire/fire.html
Colorado Forest Industries Directory	http://www.colostate.edu/programs/cowood/New_site/Publications/Articles/Colorado%20Forest%20Industry%20Directory.pdf
Current Weather Summary for Rocky Mountain Geographic Coordinating Area	http://raws.wrh.noaa.gov/cgi-bin/roman/raws_ca_monitor.cgi?state=RMCC&rawsflag=2
U.S. Forest Service, Kansas City Fire Access Software	http://famweb.nwcg.gov/kcfast
Fire Regime Condition Class	www.frcc.gov
National Climate Data Center	www.ncdc.noaa.gov



List of Preparers

Preparer	Organization
George Greenwood, Wildland Fire Specialist	Walsh Environmental Scientists and Engineers, LLC
Kelly Close, Fire Behavior Analyst	Independent Contractor
Geoff Butler, Wildland Fire Specialist	Alpenfire, LLC
Kathleen Gaubatz	Director, Clear Creek County Office of Emergency Management

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Community – Based CWPPs