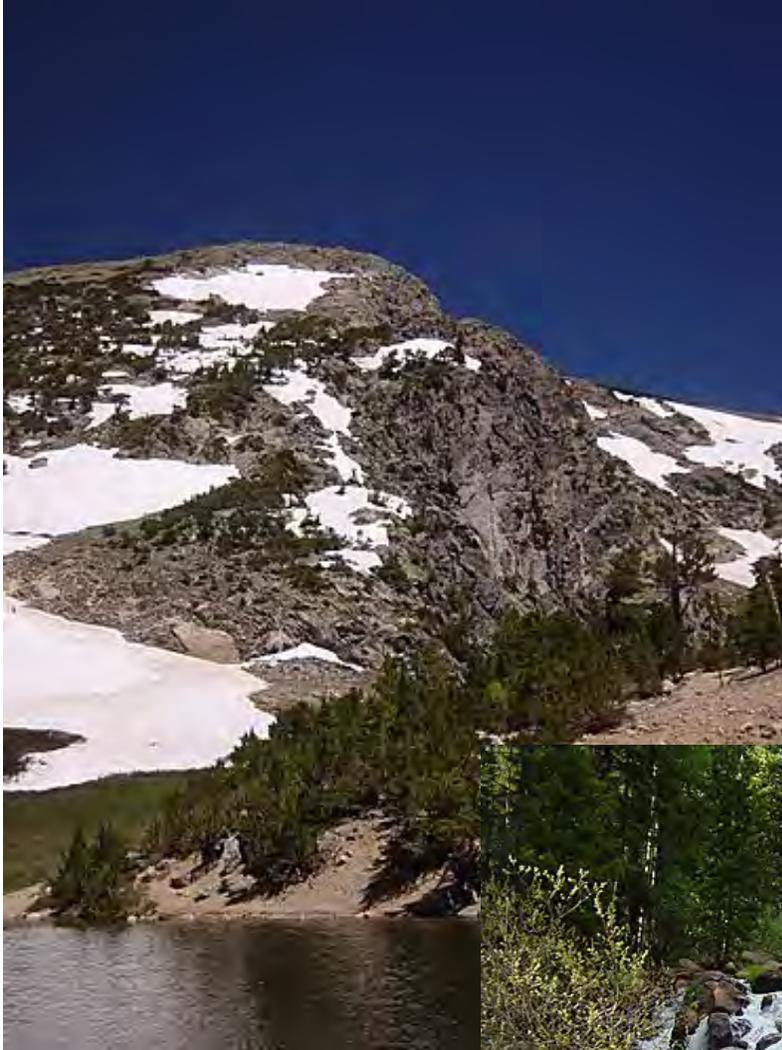


# Fall River Watershed Community Wildfire Protection Plan

June 15, 2009



## Document Revision History

<b>Date</b>	<b>Author</b>	<b>Change Description</b>
8/22/07	Dan Keller	Initial draft
8/24/07		Added edits from 8/23/07 Community Meeting
9/15/07		Incorporated community risk assessment from Einer Jensen.
11/6/07		Edits and updates
4/15/08		Edits and updates
3/31/09		Incorporated Allen Gallamore's comments
6/3/09		Completed appendix material.

FALL RIVER WATERSHED  
COMMUNITY WILDFIRE PROTECTION PLAN

Signature Page

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Fall River Watershed Community Wildfire Protection Plan  
 Table of Contents

DOCUMENT REVISION HISTORY .....	2
<b>1 INTRODUCTION.....</b>	<b>6</b>
1.1 PURPOSE OF THIS PLAN.....	6
1.2 GOALS AND OBJECTIVES OF THE FALL RIVER WATERSHED CWPP .....	7
1.3 OVERVIEW OF THE CWPP PROCESS.....	8
1.4 REGULATORY FRAMEWORK.....	8
<b>2 CWPP COMMITTEE, FEDERAL AGENCY INVOLVEMENT, COMMUNITY INTERESTED PARTIES.....</b>	<b>10</b>
2.1 FALL RIVER WATERSHED CWPP CORE TEAM.....	10
2.2 FEDERAL AGENCY COLLABORATION .....	11
2.3 COMMUNITY STAKEHOLDER INVOLVEMENT.....	12
<b>3 FALL RIVER WATERSHED PROFILE .....</b>	<b>13</b>
3.1 WATERSHED SETTING .....	13
3.1.1 <i>Ecosystems</i> .....	13
3.1.2 <i>Roads and Access</i> .....	13
3.2 ASSESSMENT AREA.....	13
3.3 WILDLAND VEGETATION AND FUELS OF THE ASSESSMENT AREA .....	14
3.4 WATER RESOURCES .....	14
3.5 FIRE PROTECTION AUTHORITY.....	15
3.6 VALUES AT RISK .....	15
3.7 BASE MAPS .....	17
<b>4 RISK ASSESSMENT .....</b>	<b>18</b>
4.1 APPROACH TO THE WILDFIRE RISK ASSESSMENT .....	18
4.2 RISK OF WILD FIRE .....	18
4.2.1 <i>Wildfire History</i> .....	18
4.2.2 <i>Impacts of Pine Beetles on Fire Behavior</i> .....	19
4.2.3 <i>Potential Fire Behavior</i> .....	19
4.3 VALUES AT RISK .....	19
4.4 NEIGHBORHOOD RISK ASSESSMENT .....	20
<b>5 WILDFIRE MITIGATION PLAN .....</b>	<b>24</b>
5.1 APPROACH TO MITIGATION PLANNING .....	24
5.2 SUGGESTED ACTIONS TO ACHIEVE DESIRED RESULTS.....	24
5.2.1 <i>Defending the Watershed</i> .....	25
5.2.2 <i>Access</i> .....	26
5.2.3 <i>Signage</i> .....	26
5.2.4 <i>Evacuation Planning</i> .....	27
5.2.5 <i>Community Mitigation Actions</i> .....	27
5.2.6 <i>Outreach / Public Education</i> .....	29
5.2.7 <i>Defensible Space</i> .....	29
5.3 FUELS TREATMENT OPTIONS .....	35
5.4 SUPPORTING PROJECTS .....	36
<b>6 EMERGENCY OPERATIONS.....</b>	<b>38</b>
6.1 WILDFIRE RESPONSE CAPABILITY AND RECOMMENDATIONS .....	38
6.1.1 <i>Mutual Aid</i> .....	38
6.1.2 <i>Wildland Fire Attack</i> .....	38
6.2 EMERGENCY PROCEDURES AND EVACUATION ROUTES .....	39
<b>7 FALL RIVER WATERSHED CWPP IMPLEMENTATION.....</b>	<b>41</b>

7.1	CWPP PLAN ADOPTION.....	41
7.2	SUSTAINING CWPP EFFORTS.....	41
7.3	NEXT STEPS .....	42
7.4	CWPP OVERSIGHT, MONITORING AND EVALUATION .....	42
<b>APPENDICIES.....</b>		<b>44</b>
A.	FALL RIVER WATERSHED HAZARD RATING ASSESSMENT AND WILDLAND URBAN INTERFACE MITIGATION STRATEGIES (LT. EINAR JENSEN, CLEAR CREEK FIRE AUTHORITY) .....	44
B.	FIRE EVACUATION CHECKLIST.....	44
C.	OWNERSHIP MAPS.....	44
D.	ECOLOGICAL MAPS.....	44
E.	US FOREST SERVICE FALL RIVER FIRE BEHAVIOR ANALYSIS.....	44

**FALL RIVER WATERSHED  
COMMUNITY WILDFIRE PROTECTION PLAN**

## **1 INTRODUCTION**

### **1.1 Purpose of This Plan**

The Community Wildfire Protection Plan (CWPP) is a strategic plan that identifies wildland fire issues facing the community and outlines prioritized mitigation actions. Once the CWPP is adopted, the community is responsible for moving forward and implementing specific projects and actions. Implementation may require acquisition of funds, detailed project planning, or educating and motivating the community to take action on their own property.

Decades of aggressive fire suppression in fire-dependent ecosystems as well as other factors have led to an unprecedented accumulation of naturally occurring forest fuels. Demographic trends have shifted the nation's population into areas known as the Wildland Urban-Interface (WUI). Coupled with years of persistent drought and expanding disease and insect infestation, these factors have converged to create a threat worthy of Congressional attention.

Precipitated by over a decade of increasing fire activity, personal loss, and spiraling suppression costs, The National Fire Plan was developed by the federal government in 2000. The Healthy Forests Restoration Act (HFRA) of 2003 helps implement the core components of the plan and provides the impetus for wildfire risk assessment and planning at the county and community level. HFRA refers to this local level of planning as Community Wildfire Protection Plans (CWPP). Preparing a CWPP empowers the community to take advantage of wildland fire and hazardous fuel management opportunities offered under HFRA legislation. The CWPP also provides a local perspective for the US Forest Service (USFS) and the Bureau of Land Management (BLM) to consider when they prioritize fire mitigation projects.

The Fall River Watershed CWPP will evaluate the current situation with regards to wildfire risk and plan ways to reduce risk for protection of human welfare and other important economic and ecological values. The CWPP will also address issues such as community wildfire risk, structure flammability, hazardous fuels, community preparedness, and emergency procedures.

## 1.2 Goals and Objectives of the Fall River Watershed CWPP

**Table 1. Fall River Watershed Goals and Objectives for Wildfire Management Planning**

Goals	Objectives
Facilitate development of a CWPP in the Fall River Watershed	<ul style="list-style-type: none"> <li>• Provide oversight to all activities related to the CWPP.</li> <li>• Ensure representation and coordination among agencies and interest groups.</li> <li>• Develop a framework for sustaining CWPP efforts.</li> </ul>
Conduct a wildfire risk assessment	<ul style="list-style-type: none"> <li>• Conduct a wildfire risk assessment in the watershed.</li> <li>• Identify areas at risk and contributing factors.</li> <li>• Determine the level of risk to structures that wildfires and contributing factors pose.</li> </ul>
Develop a mitigation plan to Address Risk and Manage Hazardous Fuels	<ul style="list-style-type: none"> <li>• Identify communities at highest risk; identify and prioritize hazard reduction treatments.</li> <li>• Develop initiatives at the homeowner and HOA level.</li> <li>• Secure funding and implement projects. Identify and prioritize non-fuels mitigation needs.</li> </ul>
Facilitate emergency planning	<ul style="list-style-type: none"> <li>• Strengthen emergency management response and evacuation capabilities for wildfire and other incidents.</li> <li>• Build relationships among county government, fire authorities, and communities.</li> </ul>
Facilitate community and public outreach	<ul style="list-style-type: none"> <li>• Increase citizen awareness and action for Firewise practices.</li> <li>• Promote public outreach and cooperation for fuels reduction projects to solicit community involvement and private landowner cooperation.</li> </ul>

### 1.3 Overview of the CWPP Process

The eight steps to developing a CWPP are listed in Table 6. These steps are defined in the handbook, *Preparing a Community Wildfire Protection Plan*.

**Table 2. Eight Steps to Developing a CWPP for the Fall River Watershed**

Step	Task	Description
One	Convene Decision Makers	Form a Core Team made up of representatives from communities, local governments, fire authorities, and the Colorado State Forest Service.
Two	Involve Federal Agencies	Engage local representatives of the US Forest Service and other federal 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 that defines communities at risk, critical infrastructure, and forest/open space at risk.
Five	Develop a Community Risk Assessment	Develop a risk assessment that considers fuel hazards, risk of wildfire occurrence, homes, business, and at risk infrastructure and other values, and preparedness capability. Rate the level of risk and incorporate into the base map.
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 District CWPP and communicate the results to interested parties and stakeholders.

### 1.4 Regulatory Framework

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

- Healthy Forests Restoration Act (HFRA) (2003) – Federal legislation to promote healthy forest and open space management, hazardous fuels reduction on federal land, community wildfire protection planning, and biomass energy production.
- National Fire Plan – Interagency plan that focuses on firefighting coordination, firefighter safety, post-fire rehabilitation, hazardous fuels reduction, community assistance, and accountability.
- Federal Emergency Management Agency (FEMA) Disaster Mitigation Act (2000) – Provides criteria for state and local multiple-hazard and mitigation planning.

## 2 CWPP COMMITTEE, FEDERAL AGENCY INVOLVEMENT, COMMUNITY INTERESTED PARTIES

### 2.1 Fall River Watershed CWPP Core Team

The initial step in developing the Fall River Watershed CWPP is to organize a core, decision-making team. The members of this team have the responsibility for facilitating community involvement and developing the CWPP. The Fall River Watershed team is composed of community members from various Fall River neighborhoods, and representatives from Clear Creek County, the Colorado State Forest Service, US Forest Service, the Clear Creek Fire Authority, and the Southern Rockies Conservation Alliance.

Representatives of organizations, such as homeowners associations, as well as individuals have participated in the process (see Table 3).

**Table 3. Fall River Watershed CWPP Core Team Members**

Core Team Member	Organization	Phone Number
Scott Rightsell	St. Marys HOA	303-567-9600
John Chapman	Southern Rockies Conservation Alliance	303-650-5818 x113 <a href="mailto:john@cecenviro.org">john@cecenviro.org</a>
Lt. Einar Jensen (Fall River resident)	Clear Creek Fire Authority	303-679-4749 <a href="http://www.clearcreekfire.com">www.clearcreekfire.com</a> <a href="mailto:ejensen@evergreenfirerescue.com">ejensen@evergreenfirerescue.com</a>
Kathleen Gaubatz	CCC Office of Emergency Management	303-679-2320 <a href="mailto:kgaubatz@co.clear-creek.co.us">kgaubatz@co.clear-creek.co.us</a>
Matt Taylor (Fall River resident)	CCC Mapping Department	<a href="mailto:mtaylor@co.clear-creek.co.us">mtaylor@co.clear-creek.co.us</a>
Dan Keller	Fall River HOA	303-902-2459
Allan Gallamore	Colorado State Forest Service	303-279-9757 <a href="mailto:alleng@lamar.colostate.edu">alleng@lamar.colostate.edu</a>

## 2.2 Federal Agency Collaboration

The USFS, Araphoe-Roosevelt National Forest, Clear Creek Ranger District is an active participant in the Fall River Watershed CWPP planning process. The USFS provided data and expertise. As part of the Yankee Hill Project, the Forest Service is implementing a thin and pile project in the Fall River Watershed.

USFS Support	Position	Phone Number
Daniel Lovato	District Ranger Clear Creek District	(303) 567-3001
Mark Martin	South Zone Planning Team Leader	(303) 541-2535
Dave Niemi	South Zone Fire Management Officer	(303) 541-2520
Dave Buchannan	Asst. Fire Management Officer Nederland Work Station	(303) 258-9193
Cambria Armstrong	GIS Specialist Canyon Lakes District	(970) 295-6768

### 2.3 Community Stakeholder Involvement

The Fall River Watershed CWPP core team conducted community meetings to:

- Inform local residents about the CWPP process.
- Present information about the watershed that relate to wildfire risk.
- Present the results of the CWPP risk assessment.
- Identify potential wildfire mitigation measures.

Community meetings were conducted with the three home owners associations in the watershed. Additionally, a meeting with the general public was held at the old schoolhouse in Alice.

Organization	Stakeholder Contact	Phone Number
Fall River Road HOA	Marion Anderson, President	303-567-2888
St. Marys POA	Deb Rightsell	303-567-9600
York Gulch HOA	Heather Huntoon, President	303-567-4799

## 3 FALL RIVER WATERSHED PROFILE

### 3.1 Watershed Setting

#### 3.1.1 Ecosystems

The Fall River watershed is a second order watershed within the Clear Creek watershed.

The Fall River Watershed was widely logged for mining operations in the late 1800s and early 1900s. This has created a forest that has a preponderance of older age classes and dense timber stands. Large, contiguous blocks of older timber contribute to the risk of wildland fire.

The watershed encompasses three unique elevation ecosystems: the Montane, the Subalpine, and the Alpine.

The **Montane Ecosystem** occurs at elevations between approximately 5,600 and 9,500 feet. Trees common to the watershed'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. Trees common to the watershed's Subalpine Ecosystem include Subalpine Fir, Engelmann Spruce, and 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. While wildfire is rare at these high elevations, mention of its associated plants types is warranted.

#### 3.1.2 Roads and Access

The Fall River Watershed has one paved road that provides ingress and egress. Fall River Road is classified as a "local road" and is characterized by winding, narrow pavement with narrow or no shoulders, steep grades, dropoffs with no guardrails and switchbacks. This can limit the ability of firefighters to respond safely to wildfire.

### 3.2 Assessment Area

Based on fuels and topography the Fall River Watershed CWPP identifies 10 neighborhoods and the risk assessment and specific mitigation actions for each individual neighborhood.

**Table 4. Neighborhoods in the Community**

Neighborhood	Location
Lower Fall River Road	From I-70 to 2900 Fall River Rd
Middle Fall River Road	2900 to 4000 Fall River Road and Hummingbird Land
Upper Fall River Road	4000 to 7000 Fall River Road. From the lower Fall River Road switchbacks to the upper switchbacks. Includes three homes in Cumberland Gulch.
Rainbow Road & Loch Lomond Highlands	From the intersection of Fall River Road and Rainbow Road to Fall River Reservoir. Includes homes in Loch Lomond Highlands, accessed from Alice Road.
Alice	The St. Mary's Subdivision.
Winterland	The bowl at the top of Fall River Road surrounding Silver Lake. Includes Eclipse Snow Park and the Silver Lake Condominiums.
Hamlin Gulch	Three homes on Hamlin Gulch Road
Overlooked Way	Two miles up York Gulch, second left
York Gulch	All homes that access Fall River Road from York Gulch Road. Includes Overlooked Way.
Pisgah Lake	Along the road that follows ridgeline from York Gulch along the northeastern boundary of Clear Creek County

A map of showing the locations of the communities is included in the appendix.

### 3.3 Wildland Vegetation and Fuels of the Assessment Area

Maps of the vegetation and fuels in the Fall River Watershed are shown in the appendix.

### 3.4 Water Resources

The condition and availability of water resources for fire suppression within the Fall River Watershed are limited. There are only 2 fire hydrants maintained within the watershed. Both of these are located in the St. Mary / Alice area. No hydrants are located below St. Mary.

Additionally, there is a cistern located at the Clear Creek Fire Authority Station 9 in York Gulch.

Despite abundant water flow in Fall River, the river is relatively shallow limiting its use as a water source for fire fighting. Only a few pools exist along Fall River that are deep enough to supply water to a small pump. None of these pools are improved to support fire fighting.

Silver Lake does have a dry hydrant connection that makes the lake suitable for drafting, but ice can limit access to that water.

### **3.5 Fire Protection Authority**

Fire protection and emergency response is provided primarily by Clear Creek Fire Authority. Medical emergencies also draw a response from Clear Creek EMS. Mountain rescues are handled by the Alpine Rescue Team. Responses to wildfires are jointly covered by the Clear Creek Sheriff's Office Marmot Crew and US Forest Service. The CCFA is the only agency with stations in the FRW.

CCFA Station 7, which is at 463 Silver Creek Road in the St. Mary's Metro District Building, has two apparatus: Tanker 7 and Scat 7. Tanker 7, manufactured in 2001 by International, is an 1,800-gallon tender with a 500-gpm pump and equipment for interior structural operations. Scat 7, a 1981 Chevrolet, is a Type VI Engine with 300 gallons of water, foam capabilities and light rescue equipment.

CCFA Station 9, which is approximately 1000 York Gulch Road, also has two apparatus. Tanker 9 is an aging 1,000-gallon tender that should be replaced while Scat 9 is an unrated small engine with 200 gallons of water, a small pump and light rescue equipment.

Any emergency in the Fall River Watershed draws an automatic response from other CCFA resources, generally from Station 2 in Idaho Springs. Larger incidents will be covered by resources from throughout the district.

The CCFA has mutual aid agreements in place with Central City Fire Department, Gilpin County Ambulance, CCSO and Evergreen Fire/Rescue.

### **3.6 Values at Risk**

In any hazard and risk assessment, human life and welfare is the most important valued resource to protect. Homes, businesses, aesthetics, cultural, and ecological resources are all important factors and certainly influence any recommendation, but the safety and welfare of residents and emergency responders remains top priority.

The Fall River Watershed is identified as being in high risk Wildland Urban Interface (WUI).



Homes in the WUI have inherent risks including high fuel loads, limited access, limited emergency resources, homes built of ignitable materials, to name a few. The Fall River Watershed is located entirely within the WUI and neighborhoods within its boundaries are characterized by these hazards and risks.

#### **Community Values at Risk**

- Each of the existing mine, headworks and mill structures identified as valuable (and the sites are hazardous anyway: hazardous materials, shafts, collapsible timber).
- Existing mines (gated and ungated) that provide bat habitat and are part of the water system
- Reservoirs and associated infrastructure human improvements on those sites;
- Historic buildings including, but not limited to:
  - The schoolhouse and post office in Alice;
  - The old canals in the York Gulch area

Other non-residential values at risk in the FRW are the historic St. Mary's lodge/restaurant, St. Mary's Bed & Breakfast, the St. Mary's Metro Building (including CCFA Station 7), CCFA Station 9, the buildings at Eclipse Snow Park, various pump houses and the Alice-St Marys water supply.

Besides the risk to homes, residences, and commercial facilities there are risks to natural resources and ecological values, including;

- Wildlife and aquatic habitat
- Timber
- Watersheds
- Water quality
- Air quality
- Natural vegetation communities
- Cultural and historic sites
- View sheds

Catastrophic wildfire has severe and long term impacts on all these ecological values we often take for granted. While this plan is focused primarily on protection of homes and residences, all values at risk benefit from improved ecosystem health and fire protection.

### **3.7 Base Maps**

The appendix of this CWPP contains base maps showing the location and distribution of:

- Vegetation
- Fuels
- Slope
- Aspect
- Property
- Land Ownership
- Historic Sites
- Eco-values
- Mining Sites
- Fire Behavior

## 4 RISK ASSESSMENT

### 4.1 Approach to the Wildfire Risk Assessment

This risk assessment describes:

- Fire behavior characteristics within the Fall River Watershed
- Vegetation and fuels loading around structures
- Structure Risk Assessment
- Emergency response capability.

The Fall River Watershed does not have a formal municipality or significant commercial center. The risk assessment is focused on neighborhoods and subdivisions that represent unique emergency response areas with a concentration of homes, identifiable characteristics and addressable hazards and risks.

The Clear Creek Fire Authority conducted CWPP surveys for the communities identified in chapter 3. Expert observations and a standardized survey process provide the basis for community risk assessments.

### 4.2 Risk of Wild Fire

#### 4.2.1 Wildfire History

The Fall River Watershed has not had much recent fire activity. In the absence of specific fire history records for Fall River Watershed, records from the nearby Arapaho National Forest, Clear Creek Ranger District are included. June, July, and August are the three busiest months for fire suppression. While the majority of local forest fires were lighting-caused (65 percent), four out of the five largest fires during the last three decades were human caused.

**Table 5. Wildfire History of the USFS Clear Creek Ranger District**

Fire Size Class (Acres)	Number of Fires
	Clear Creek RD USFS 1985 -2005
A (0 - 0.25)	108
B (0.25 - 9.9)	21
C (10 - 99.9)	1
D (100 - 299.9)	0
E (300 - 999.9)	1
F (1,000 - 4,999.9)	0
G (5,000 - 9,999.9)	0

## Recent Wildfires in Clear Creek County

FIRE NAME	LOCATION	SIZE	DATES	ADDN INFO
Beartracks	Clear Creek County: USFS lands, within Evergreen FPD and Clear Creek Fire Authority boundaries; immediately southwest of Mt Evans State Wildlife Area	485 acres	June 27, 1998 – July 5, 1998	Heavy fuel loading in roadless area and human 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. At the time of this incident the costs of \$2,886/acre were the highest recorded in Colorado.
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 IMT to closeout.
North Spring Gulch	Clear Creek County.	20 acres	June 6-7, 2002	Required significant air tanker use to assist local fire departments

### **4.2.2 Impacts of Pine Beetles on Fire Behavior**

Mountain pine beetles are expected to kill 100% of the lodgepole pine in the next 3 years. This will create a large scale change of fuels and fire behavior. Initially, as trees die and the pine needles turn red, the potential for large wildfires will increase. After a few years, as the needles drop and begin to decompose, the fire danger will decrease. Then, after 10-25 years, the dead lodgepole snags will fall over and accumulate on the forest floor. The potential for large wildfire will then increase until the trees completely decompose, which could take long periods of time.

### **4.2.3 Potential Fire Behavior**

Potential fire behavior highlights the impacts to the community should a wildfire occur. Fire behavior is determined from a combination of topography, weather, climate and fuel characteristics. To determine potential fire behavior, fuel characteristics are described in terms of “fuel models”. These fuel characteristics are key input to fire behavior prediction models and computer programs.

## **4.3 Values at Risk**

The idea of a wildland fire anywhere in Clear Creek County is unnerving because our unincorporated neighborhoods in Clear Creek County are prime examples of the Wildland Urban Interface – that zone where undeveloped land mingles with houses and businesses.

Although some residents of the county have improved their property to make it more defensible in times of wildland fires, much work remains to be done. A single homeowner who doesn't create defensible space around their property endangers the property of the entire neighborhood. Only by cooperating can neighbors improve the

community's resistance to wildfire and hope to survive an otherwise catastrophic wildland fire event. A key aspect of property action is action on buildings to reduce structural ignitability.

Clear Creek Fire Authority has conducted neighborhood assessments of subdivisions to prepare its personnel for wildland fires and other emergency responses as well as to teach property owners how they can assist firefighters, law enforcement, ambulance crews and other specially trained personnel when emergencies do occur.

#### **4.4 Neighborhood Risk Assessment**

Community surveys were conducted during the summer of 2007 to determine structure risk. 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 community. (NFPA Form 1144 *Standard for Protection of Life and Property from Wildfire*). These surveys assess predominant characteristics within individual neighborhoods as they relate to structural ignitability, fuels, topography, expected fire behavior, emergency response, and ultimately human safety and welfare. Scores are assigned to each element and then totaled to determine the community's relative level of risk. **Low, moderate, high,** and **extreme** hazard ratings are assigned based on the total score.

##### **Lower Fall River Road (Risk: High)**

The structures in this neighborhood are along the valley floor and include the three homes at the intersection of York Gulch Road and Fall River Road. The riparian ecosystem is densely forested with narrow-leaf cottonwoods, blue spruces, aspens and firs. A majority of homes south and west of Fall River Road are on the other side of the creek and utilize a bridge of some sort. Most bridges lack any weight ratings. However, these homes do have access to Fall River and its water. Homes on the north and east side of Fall River Road tend to have steep and narrow driveways, often without turnarounds or hammerheads. Most homes have propane heat as well as wood stoves. All have electrical lines above ground, usually tightly crowded by branches, which present wind and snow risks in addition to fire risks. With few exceptions the homes in this neighborhood are high hazard relative to the NFPA 1144 form. Ingress and egress are unusually good as long as the incident is up-valley. Structures in the first mile of Fall River Road have two ways out: Fall River Road to I-70 and York Gulch Road to Central City. Homes above the 1000 Block have only one way out: Fall River Road to I-70.

##### **Middle Fall River Road (Risk: Moderate-High) and Hummingbird Lane (Risk: Extreme)**

The fuels and lay of the land change in this neighborhood. The valley widens, dense forest gives way to shrubs and meadows and the structures move away from the creek. Some structures are surrounded by dense deciduous trees. Although aspens and cottonwoods are more fire-resistant than conifers, they will ignite and are prone to collapse. They also shed their leaves which are considered one-hour fuels that also can

ignite. Some ponderosa pines and juniper are present. Driveways are typically wider and less steep, except in the case of Hummingbird Lane. The ratings of bridges are not posted. Access to water is challenging and, in the case of Hummingbird Lane, non-existent. Propane and electrical utilities are above ground. The homes along the valley floor are moderate to high hazard depending on the amount of defensible space that exists around them. The only escape route is down Fall River Road, which could be compromised depending on the incident.

Although Hummingbird Lane is on a south aspect and trees are rare, the steep slope could carry a grass/shrub fire quickly. The homes on Hummingbird Lane are rated extreme because Hummingbird Lane is so narrow and steep.

### **Upper Fall River Road (Risk: High to Extreme)**

This neighborhood starts below the lower Fall River Road switchbacks and continues to the upper switchbacks. The lower end of the neighborhood is heavily forested with a mix of conifers and deciduous species. This dense forest tightly surrounds most homes on both sides of Fall River Road. Fall River itself hugs the slope southwest of the homes, so bridges are not an issue but water access is. Starting in the 5000 Block of Fall River Road, the forest transitions into mature subalpine with dense lodgepoles and Douglas fir. Some aspens are present. Fall River is along the southwest slope; again bridges are not an issue. Although homes are rare between 5500 and 6500 Fall River Road, the area is used for recreation, which introduces additional ignition risks. The home at the base of the upper switchbacks shares characteristic with the rest of the neighborhood in terms of ecosystem, but it is close to a potential water source. The only escape route is down Fall River Road, which could be compromised depending on the incident.

Three homes currently exist on the southern and eastern aspects of Cumberland Gulch, which features fewer pines and more aspens, within a half mile of Fall River Road's pavement. The shared driveway is steep and poorly marked either with address signs or with markings for the Forest Service Road that also starts there. Recreational traffic must be included as a source of ignitions because the roadway is used so heavily.

### **Rainbow Road & Loch Lomond Highlands (Risk: Extreme)**

This neighborhood starts at the intersection of Fall River Road and Rainbow Road, follows Rainbow Road to Fall River Reservoir, and includes the homes in Loch Lomond Highlands, which is accessed from Alice Road. The neighborhood is heavily forested with subalpine species: lodgepole pine, Douglas firs, subalpine firs, Engelmann spruces, blue spruces along Fall River and occasional deciduous species in riparian zones and aspens. Fall River bisects the neighborhood on the valley floor, flowing from the reservoir and other lakes at the headwaters. Some homes have unrated bridges, but the bridges on Rainbow Road should be rated (data should be available from the county or Forest Service). Recreation sites are interspersed with the structures and the road is used by visitors more than residents; the land surrounding Fall River Reservoir hosts dozens of fire-wielding users (campfires, firearms, smokers) on most snowless weekends. These additional ignition sources should be recognized. The only escape route from Rainbow Road is down that road to Fall River Road; however, a safety zone could be developed at

the top of the road as trees give way to alpine flora. The road is generally very rocky which limits the speed of vehicles. Loch Lomond's escape route is to Alice Road into the community of Alice to a safety zone or to Fall River Road.

**Hamlin Gulch (Risk: High)**

This neighborhood consists of three homes, but the roadway is used for access to the Arapaho National Forest. The homes are surrounded by a mix of conifers and deciduous trees along the valley floor. The gulch could form a chimney given proper wind conditions. Hamlin Gulch Road is not an adequate escape route as it has several sections of light duty rock crawling with high-centering hazards and poor traction. The only escape route is down gulch to Fall River Road. Otherwise, sheltering-in-place could be an option.

**Alice (Risk: Moderate to High)**

This community, which also is called the St. Mary's subdivision, surrounds a bowl in the upper subalpine zone of the watershed. Most homes are enveloped by lodgepole pines, subalpine fir and Douglas fir, but some spruce are also present. Aspens are rare except along Little Cub, Aspen Drive and parts of Beaver Road. The middle of the bowl, which historically drained several mines and mills, has few trees but grasses and shrubs have taken a toehold as the ecosystem transitions into its a post-industrial era. A marsh ecosystem exists east of Silver Creek Road. The only escape route sends vehicles to Fall River Road and no official safety zones currently exist. This neighborhood's hazard class is moderate to high.

**Winterland (Risk: High)**

This community is at the top of Fall River Road in a bowl surrounding Silver Lake. It includes Eclipse Snow Park and the Silver Lake Condominiums. It is in the upper subalpine zone of the watershed. Most homes are surrounded by lodgepole pines, subalpine firs and Douglas firs, but some spruces also are present. Aspens are rare. Riparian ecosystems surround Silver Lake and Lake Quivera. Escape routes send vehicles to Fall River Road; Yankee Hill is not an adequate escape route.

**Overlooked Way (Risk: Extreme)**

The homes on Overlooked Way are on a steep west aspect overlooking Fall River Road. The slope is heavily forested largely with conifers but some deciduous species also grow there. There is no direct access to water. The homes are solar powered, and some also have propane. Recreation is not a direct threat because access to the road only accesses homes, but recreation is present in the valleys below the neighborhood. The only escape route is up Overlooked to York Gulch Road.

**York Gulch (Risk: Moderate to High)**

The neighborhood of York Gulch is larger than some of the others in this report, but it features a consistent geography and culture. Most homes are on sun-drenched slopes, a characteristic that limits the growth of conifers in favor of grasses, shrubs, aspens and other deciduous species. Surface water is fleeting under the sunny conditions. Fires could spread rapidly through the light flashy fuels at the surface. Most homes are "off

the grid” and utilize solar and wind energy. Propane tanks also are utilized. The lack of utility lines eliminates the risk of downed lines igniting fires, but the presence of batteries and generators in homes presents challenges for structural suppression. This neighborhood also has existing emergency escape plans utilizing roads that descend the valley to Fall River Road (Old Stage, York Gulch and Chinook) and utilizing routes to Gilpin County to escape eastward. However, Hamlin Gulch is not suitable for westward escape and Chinook is not suitable for eastward escape. Both roads narrow and feature stretches of light-duty rock crawling. A cistern exists at Clear Creek Fire Authority Station 9.

**Pisgah Lake Road (Risk: High)**

This road follows a ridgeline from York Gulch along the northeastern boundary of Clear Creek County. Recreational users create a significant amount of traffic along the road and in the old ball field. Their impact is at least as significant as the residents’. The homes on the western side of the road are surrounded by a thick conifer forest while homes on the east side are within more deciduous ecosystems. Pisgah Lake provides a limited water source for pumping operations, but its value as a dip-site for helicopter operations is not known. Escape routes are limited to Forest Service Roads entering Gilpin County and the link to York Gulch’s “octopus” intersection.

**Table 6. Community Hazard Rating**

Community	Hazard Rating
Lower Fall River Road	High
Middle Fall River Road	Moderate to High
Hummingbird Lane	Extreme
Upper Fall River Road	High to Extreme
Rainbow Rd	Extreme
Hamlin Gulch	High
Alice	Moderate to High
Winterland	High
Overlook Way	Extreme
York Gulch	Moderate to High
Pisgah Lake Rd	High

This comprehensive assessment provides the raw material for effective identification, prioritization and implementation of specific mitigation treatments.

## **5 WILDFIRE MITIGATION PLAN**

### **5.1 Approach to Mitigation Planning**

Wildfire mitigation is defined as the reduction of the probability and negative impacts of wildfire. This can be accomplished through wildland fuels management, non-fuels mitigation measures, and public outreach. Results are often most effective when these three approaches are pursued in concert by governmental entities, citizen groups, and individuals.

Hazardous fuels and non-fuels mitigation projects were identified based on the findings of field surveys, interviews with county fire suppression experts, and through a the community questionnaire. Fuels mitigation projects were identified and prioritized based on proximity to community, efficacy, hazardous fuel load and continuity, terrain, and professional experience.

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

### **5.2 Suggested Actions to Achieve Desired Results**

Recommended action items are divided into a number of fuels mitigation and non-fuels related categories that cover education, engineering, environment and enforcement strategies. Hazardous fuels reductions categories include: defensible space, shaded fuel break construction, and area treatments. Non-fuels related actions include: education and outreach, Firewise building upgrades, fire department preparedness and access/egress improvements. Some of these projects require the support and coordination of the fire department and other governmental entities as well as substantial planning and funds. However, those actions most essential to the preservation of homes during a wildfire rest in the hands of the individual. These will be addressed by category and prioritized in a recommended action plan table.

**Table 7. Recommended Projects by Category**

Project	Actions
<b>Outreach / Public Education</b>	<ul style="list-style-type: none"> <li>• Spring community meetings</li> <li>• Summer community meetings to reach second home owners.</li> <li>• Firewise materials distribution</li> <li>• CWPP meetings</li> <li>• Ongoing, recurrent outreach</li> <li>• Develop demonstration mitigation projects</li> </ul>
<b>Defensible Space</b>	<ul style="list-style-type: none"> <li>• Basic yard clean-up</li> <li>• Understory thinning near residential and commercial structures</li> <li>• Understory thinning near roads</li> <li>• Understory thinning in drainages</li> <li>• Over story thinning where needed</li> <li>• Employ defensible space principals at all cistern locations</li> </ul>
<b>Firewise Building Improvements</b>	<ul style="list-style-type: none"> <li>• Replace shake roofs</li> <li>• Enclose exposed decks and gables</li> <li>• Screen vents and chimneys</li> </ul>
<b>Shaded Fuel Breaks</b>	<ul style="list-style-type: none"> <li>• Thin along primary roadways</li> <li>• Thin along secondary roadways</li> <li>• Create and maintain breaks along neighborhood margins</li> <li>• Improve and expand utility rights-of-way</li> </ul>
<b>Access / Egress Improvements</b>	<ul style="list-style-type: none"> <li>• Create/improve fire apparatus turn-arounds</li> <li>• Create and improve signage.</li> <li>• Create and improve address numbering.</li> <li>• Create secondary access / egress routes</li> <li>• Identify and improve secondary evacuation routes, where available.</li> <li>• Identify or create safety zones</li> </ul>
<b>Area Treatments</b>	<ul style="list-style-type: none"> <li>• Thinning projects on large private holdings</li> <li>• Thinning projects on public lands</li> <li>• Prescribed fire as appropriate</li> </ul>
<b>Supporting Actions</b>	<ul style="list-style-type: none"> <li>• Funding and grants</li> <li>• Study of access / egress improvements</li> </ul>
<b>Fire Department Preparedness</b>	<ul style="list-style-type: none"> <li>• Update run books</li> <li>• Firefighter training</li> <li>• Firefighter equipment</li> <li>• Fire apparatus</li> <li>• Tactical pre-suppression planning</li> </ul>

### 5.2.1 Defending the Watershed

The neighborhoods in the Fall River Drainage exist in several ecosystems, but most share the characteristics of being surrounded by dense forests. Slopes with a south aspect (those facing south) support some ponderosa pines and shrubs while north aspects are densely packed with Douglas firs, subalpine firs and lodgepole pines. Blue spruces and narrow leaf cottonwoods are the dominant riparian species along gulches and creeks. Some aspen groves also exist in the area. Clear Creek County's dominant winds are from the southwest, which could push a crown fire straight through neighborhoods. Crown

fires are an indicator of extreme fire behavior and severe burn intensity and will be associated with multiple watershed impacts. Winds following the I-70 corridor could cause erratic fire behavior in the Fall River Valley and on slopes adjacent to the interstate.

Our forest is densely packed with mature trees. Thinning will reduce the ability of a fire to crown, or burn from tree canopy to tree canopy, and it will reinvigorate the forest's health benefiting flora and fauna as well as the human community. Thinning is important, but it does not prevent fires outright.

Shaded fuelbreaks (a "break in the fuel") can mitigate the impacts of wildfire by reducing the fuel loads in selected areas. Shaded fuelbreaks along roadways and on forested slopes are other recommendations. The community should identify priority locations for shaded fuelbreaks that will be most effective in protecting values at risk.

### **5.2.2 Access**

Motor vehicles have only two routes of ingress and egress from the watershed: Fall River Road to I-70 or York Gulch to Gilpin County. Emergency crews have access to other roads, but those routes, e.g., Upper Chinook Road, easily could be blocked in times of wildland fires.

Within the drainage, most roads consist of packed dirt or gravel. Despite the efforts of public agencies and property owners, the quality of these roads varies throughout the year depending on weather, use (especially by off-highway vehicles) and general deterioration. Road width also varies, which prevents safe passing of oncoming vehicles in several places. Few places exist with enough room for larger fire apparatus to share the road with passenger vehicles, much less recreational vehicles. These roads also are susceptible to blockage from downed trees and utility lines, which will prevent fire apparatus from entering the subdivision and property owners from evacuating in emergencies. Firefighters will abandon homes that could otherwise be saved if roads become threatened. Intersections must be well marked and signage needs to be maintained and cleared of obstructions throughout the year.

### **5.2.3 Signage**

Better signage is also needed on private property. Most homes have visible addresses at the ends of their driveways, but some don't. Firefighters, ambulances and law enforcement respond based on street addresses and last names. Both forms of identification should be easily visible from the road, especially after dark. Visible addresses posted by the house helps firefighters verify they have reached the proper location, especially when a driveway serves multiple homes. Firefighters cannot defend homes they cannot find.

## 5.2.4 Evacuation Planning

Every household should create an evacuation plan in advance of emergency situations. Evacuation plans should include a meeting place outside the watershed, such as the Safeway parking lot in Idaho Springs, and a point of contact outside of the state who you can call with updates on your status. Family members and friends can then contact that person to keep up with family members without overloading the local telephone circuits needed by emergency crews.

Think about the Four Ps: Pets, Pills, Papers and Photos. You may have five hours to evacuate; you may have five minutes.

As we age, we collect more “stuff,” which means that we need to remove more stuff in times of evacuation. Additionally, families have more belongings than single residents. Consider compiling a list of those important documents, photographs and memorabilia that you want to remove in case of evacuation to ease the task if it becomes necessary.

If you do leave, set a ladder in the driveway and connect garden hoses to spigots so that firefighters can supplement their equipment and water with yours to defend your home.

## 5.2.5 Community Mitigation Actions

### Common Action for the Entire Community

<b>Defensible Space</b>	Aggressively develop defensible space plans, regardless of whether the home is on a slope or at the valley bottom. Defensible space zones should be greater on slopes below a structure, and cut banks above structures should be treated to minimize collapse zone hazards.
<b>Clearly Mark Addresses</b>	Clearly post addresses at the ends of all driveways and all homes with numerals of contrasting and reflective colors measuring at least four inches tall.
<b>Chimney Spark Arresters</b>	Add spark arresters to chimneys.
<b>Escape Routes</b>	Assess potential escape routes for usability by type of vehicle. Publish maps of escape routes. Develop an emergency escape route that serves the entire watershed.

**Table 8. Recommended Hazard Reduction Projects**

	<b>Fuel Breaks</b>	<b>Access and escape routes</b>	<b>Safety Zones</b>	<b>Water Access</b>	<b>Other</b>
<b>Lower FRR</b>	Create shaded fuel breaks along Fall River Road on public lands initially and tie into private property defensible space to protect access routes.	Rate and sign each bridge for weight restrictions. - Improve egress by building a bridge from FRR to the access road.		Create eddies or gated pools for water resources.	
<b>Middle Fall River Road</b>	Create shaded fuel breaks along Fall River Road on public lands initially and tie into private property defensible space to protect access routes.	Rate each bridge for weight restrictions.		Develop access to the pond southwest of Hummingbird Lane if possible, for both tanker shuttle operations and helicopter dipping operations.	
<b>Upper Fall River Road</b>	Create shaded fuel breaks along Fall River Road on public lands initially and tie into private property defensible space to protect access routes.  Develop a full fuelbreak on both sides of Fall River Road halfway between the upper house and bulk of the homes below it.	Consider a road descending Cumberland Gulch for emergency egress.  Improve labeling of Forest Service Roads.		Develop a dry hydrant access point at the intersection of Fall River Road and Rainbow Road.	
<b>Rainbow Road &amp; Loch Lomond Highlands</b>	Create shaded fuel breaks along Rainbow Road on public lands initially and tie into private property defensible space to protect access routes.  Develop a full fuelbreak along Rainbow Road on both sides of Fall River Road.	Develop the emergency escape route that could connect Vista Place to Rainbow Road; adding a gate will limit recreational use of the road.		Develop a dry hydrant access point at the intersection of Fall River Road and Rainbow Road.	
<b>Hamlin Gulch</b>		Develop the emergency escape route to Pisgah Road or improve Hamlin Gulch Road (FS 273.1) to York Gulch; adding a gate will limit recreational use of the escape road.			
<b>Alice</b>	Create shaded fuel breaks along Fall River Road between the upper switchback and Alice Road on public lands initially and tie into private property defensible space to protect access routes.	All intersections should be marked with reflective street signs; the wooden signs are showing their age.  Develop a secondary escape route to FRR around the water treatment plant.	Develop a safety zone in the marshes east of Silver Creek Road.  Consider cutting a safety zone at the south end of Silver Creek Road.	Work with the Clear Creek Fire Authority and St. Mary's Glacier Water & Sanitation District to develop the hydrant system in the area and upgrade CCFA Station 7 to have its own cistern.	Good defensible space exists around the water treatment plant and it has access from two sides, but the address is not posted.
<b>Winterland</b>	Create shaded fuel breaks along Fall River Road to enhance the mitigation work provided by Eclipse Snow Park and tie them into private property defensible space to protect access routes.	All intersections should be marked with reflective street signs; the wooden signs are showing their age.  Improve the road to Yankee Hill, installing a gate to limit access, to provide an escape route to a safety zone there.		Work with the Clear Creek Fire Authority and St. Mary's Glacier Water & Sanitation District to develop the hydrant system in the area and upgrade CCFA Station 7 to have its own cistern.  Develop an all-weather dry hydrant connection at Silver Lake.	
<b>Overlooked Way</b>	Defensible space zones should include minimizing tree collapse zones along driveway and roadway cutbanks.	Maintain the road to provide consistent emergency access.  The intersection should be marked with a reflective street sign.			
<b>York Gulch</b>		Thin along lower portion of York Gulch Road.		Add water resources (cisterns) at key intersections.	Encourage residents to join Clear Creek Fire Authority as volunteer firefighter for Station 9, which has only one member currently.  Institute a prescribed burning plan for the larger meadows to nurture healthy ecosystems.
<b>Pisgah Lake Road</b>	Create shaded fuel breaks along Pisgah Lake Road on public lands initially and tie into private property defensible space to protect access routes.	Label roadways better.	Maintain the ballfield as a safety zone capable of holding the residents of York Gulch and emergency personnel as well as Pisgah Lake Road residents.	Develop a cistern at the Octopus.	

### **5.2.6 Outreach / Public Education**

The most effective form of mitigation can be education and outreach. The purpose of a community-wide education program is to: 1) educate the public to the risks of wildfire to property and life; 2) urge property owners to take responsibility in reducing the risk of wildfire and to create defensible space around their structures; 3) teach the benefits of different types of fire resistant building materials in lessening structural ignitability; and 4) increase awareness of the natural role of low-intensity fire in grassland and woodland ecosystems and make known the benefits from thinning fuel loaded areas. Education makes other mitigation programs possible.

Many lots are undeveloped and owned by absentee owners. A lack of fuels management on these lots can impact the entire community. An effort should be made to contact these owners and determine how to address hazard fuel mitigation on these properties.

Annual community meetings in the spring and summer 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 “clean-up” efforts within the community. Firewise materials and postings should be made available to the public at the fire station, post office, and elementary school every year. A disposal method for yard waste should be coordinated every spring. This may be coordinated with any Home Owner Association spring clean-up activities and may include the coordination of a central disposal site, mobile chipping services, or a hauling service. Grant monies may be available for these efforts.

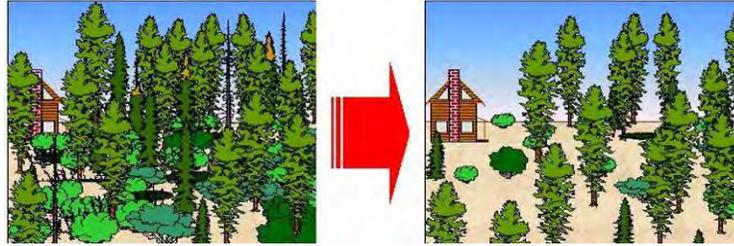
### **5.2.7 Defensible Space**

An action that can be taken immediately to reduce the hazard ratings is the development of defensible space around homes and other structures. Research suggests that homes with fire resistive roofs and defensible space have an 85 percent chance of surviving a wildfire while homes with neither of these characteristics have a 15 percent survival rate.

A functional defensible space consists of non-flammable vegetation no closer than 30 feet to the structure, the use of low flammability landscaping plants, mowed grass, lack of firewood stacks, and absence of fuel tanks immediately adjacent to structures (see Appendix D for complete instructions or visit <http://csfs.colostate.edu/library.htm>). The defensible space should be larger for structures built on slopes.

It should be emphasized that defensible space can be created in an esthetically pleasing manner that maintains privacy and the natural character of the community.

These efforts can be encouraged and coordinated annually through a community meeting, and most of this work can be done by the homeowner with little more than hand tools. A phased approach may make this effort less daunting. Defensible space should also be created around out buildings.



**Figure 1. Larimer County, CO defensible space primer**  
([www.co.larimers.co.us](http://www.co.larimers.co.us))

Assisting neighbors may be essential in many cases. For example: assisting the elderly, sharing ladders for gutter cleaning, assisting neighbors with large thinning needs such as near roads and in drainages. There are several areas where ground fuels are especially thick in drainages that run through the neighborhoods. These tend to be on individual lots, but their clean up will benefit the neighborhood as a whole.

**Table 9. Defensible Space Projects**

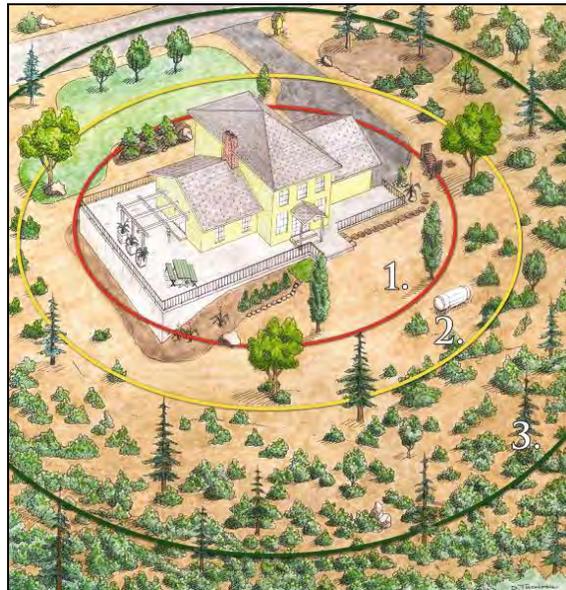
Year	Project	Actions
	<b>Basic yard clean-up (annual)</b>	<ul style="list-style-type: none"> <li>• Dispose of clutter in the yard</li> <li>• Remove dead branches from yard</li> <li>• Mow and rake</li> <li>• Clean off roofs and gutters</li> <li>• Remove combustible vegetation near structures</li> <li>• Coordinate disposal as a neighborhood or community</li> <li>• Post 4” reflective address numbers visible from road in addition to personalized addressing</li> </ul>
	<b>Understory thinning near structures</b>	<ul style="list-style-type: none"> <li>• Limb trees up to 5-10 feet</li> <li>• Trim branches back 15 feet from chimneys</li> <li>• Trim or cut down brush</li> <li>• Remove young trees that can carry fire into forest canopy</li> <li>• Coordinate disposal as a neighborhood or community</li> </ul>
	<b>Understory thinning on private property near roads and in drainages</b>	<ul style="list-style-type: none"> <li>• Limb trees up to 6-10 feet</li> <li>• Trim branches back 15 feet from chimneys</li> <li>• Trim or cut down brush</li> <li>• Remove young trees that can carry fire into forest canopy</li> <li>• Coordinate disposal as a neighborhood or</li> </ul>

Year	Project	Actions
		community
	<b>Overstory treatments on private property</b>	<ul style="list-style-type: none"> <li>• Evaluate the need to thin mature or diseased trees</li> <li>• Prioritize and coordinate tree removal within neighborhoods to increase cost effectiveness</li> </ul>
	<b>Restart defensible space treatment cycle</b>	<ul style="list-style-type: none"> <li>• Continue the annual Basic yard clean-up</li> <li>• Evaluate need to revisit past efforts or catch those that were by-passed</li> </ul>

**Zone 1 (30 feet from structure):** Within 3 to 5 feet of the structure, decorative rock or mowed, irrigated grass is recommended. Well-spaced and pruned low flammable plants are acceptable if the structure has noncombustible siding. In the remainder of Zone 1, trees' lower branches should be pruned 10 feet above the ground (not to exceed one third of the tree height). Dead wood, tall grass, and ladder fuels (low limbs, small trees, and shrubs that may carry fire into tree crowns) should be removed from this area. Leaves and overhanging branches should be removed from the roof and gutters. The 30-foot area should be irrigated as appropriate. Woodpiles should be removed and stored in Zone 2.

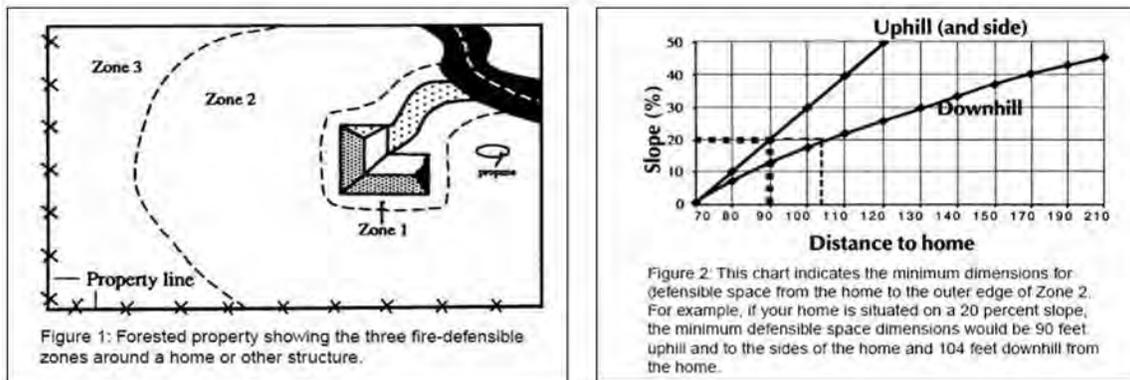
**Zone 2 (greater than 30 feet from structure or to the property line):** The size of this zone is dependent upon slope. Treatment of ground fuels and ladder fuels is generally the same as Zone 1. Trees (or small groups of trees) and shrubs should be thinned to provide 10 feet of clearance among crowns. Grasses should be mowed as they dry in late summer.

**Zone 3 (area of forest management):** This area outside of Zone 2 should be managed for the appropriate land use objectives, such as forest health, aesthetics, recreation, and wildlife habitat.



**Figure 2. Napa, CA Firewise defensible space (www.co.napa.co.us)**

**Figure 3. CSFS Defensible Space Standards**



**Building Improvements:** Improving the Firewise characteristics of structures goes hand-in-hand with the construction of defensible space. Extensive recommendations may 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 replacing wood shake roofs with noncombustible, Class A roofing material. All homeowners, and especially those with wood roofs, should keep roofs and gutters clear of leaves and pine needles. Embers can travel surprising distances (over 1 mile) and ignite receptive pockets of fuel far from the main fire. Screening of gutters and roof vents should be considered.

Though wood shake roofs are an important factor, there are relative few in Fall River Watershed. More common issues involving building characteristics include:

- Combustible decks with exposed undersides
- Lack of clear addressing
- Numerous outbuildings in disrepair
- Improper storage of firewood, surplus constructions materials, ancillary vehicles and machinery
- Combustible fences in disrepair

Enclosing the underside of wood porches can help protect the structure. At minimum, combustible materials such as firewood, vegetations, and pine needles must be removed from under decks. Camping trailers and mobile homes should also have all combustible materials removed from beneath and preferably be skirted. Addresses should be reflective and clearly visible from the road. Other openings such as attic vents should be screened to prevent embers from entering. Each structure needs to be evaluated on its own merits to determine specific actions needed to reduce its susceptibility to wildfire.

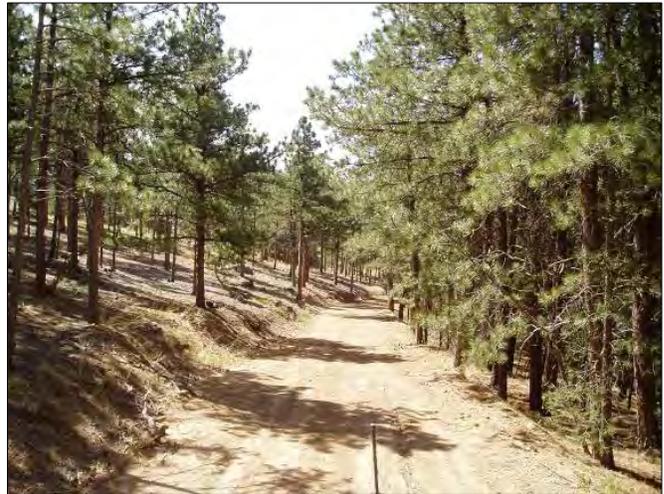


Figure 4. Shaded fuelbreak on left, untreated on right

**Shaded Fuel Breaks:** Shaded fuel breaks can help enhance the effectiveness of defensible space, protect ingress/egress routes, reduce fire intensity near values at risk, and provide tenable areas for fire suppression efforts. Roads provide a good start for a fuel break as well as ready access for machinery and removal of thinned vegetation. Depending on the width of road easements, much of the work along roads must be initiated by the private land owner, which is why it was included as a phase of the defensible space schedule. Thinning within the easement and along roads on public land will require coordination with the associated public entity.

Great benefit will be realized merely by removing dense reproduction, dead and down forest litter, and low branches along roadways. Thinning of the overstory will break the continuity of the forest canopy and interrupt the spread of crown fires. A general recommendation for these fuel breaks is to follow the CSFS fuelbreak guidelines, reducing fuels on both sides of the road similar to defensible space Zone 2 or 3 (see Fuelbreak Guidelines for Forested Subdivisions, <http://csfs.colostate.edu/library.htm>):

- Total width of fuel break should be 200 to 250 feet.
- Reduce surface fuel load to approximately 5 tons per acre.
- Reduce surface fuel bed height to 2 feet or lower.
- Employ mechanically based thinning to reduce basal area to 60 to 90 square feet per acre.
- On remaining trees, raise canopy base height to 5 to 12 feet high.
- Create 15 feet of clearance between crowns of trees or tree groups.



Figure 5. Vegetation regeneration in areas previously treated is common throughout the district

Due to the fragmented nature of land ownership along the roads, individual prescriptions and cooperation must be closely coordinated by the implementation team and the home owners associations. The priority of treatment areas is outlined in the following table based on density of fuels, existing hazards to access/egress routes, ease of coordination, and protection to the community as a whole. Many of these projects may be largely addressed by efforts undertaken on private lots.

**Area Treatments of Hazardous Fuel:** Wildfires frequently burn across jurisdictional boundaries. As such, hazardous fuels management must be coordinated across jurisdictions and ownership boundaries. The objectives of these vegetative treatments are to reduce buildup of hazardous fuels to reduce fire intensity, rates of spread, and crown fire initiation and propagation. These efforts can increase the efficacy of fire suppression efforts as well as return ecosystems to a healthier and less combustible status.

Hazardous fuels need to be managed to restore forest or grassland health and manage vegetation to a more natural condition. This may occur by breaking up fuel continuity and reducing fuel load. This will make wildfires more readily suppressible and may make prescribed fire a realistic treatment in some cases. Invasive and noxious weedy vegetation also contribute to fuel hazards. Weed abatement programs will reduce fuel hazard around and within communities and improve the health of grasslands. The seeding of native grasses and forbs on highly disturbed sites could be beneficial.

Large-scale fuel treatments are subject to a number of hurdles, including: funding, lack of public understanding, environmental impact, and ownership issues. Due to these issues, it can be unrealistic to schedule these projects prematurely. Rather, these projects are prioritized without specific dates. Much of the undeveloped land on which these area treatments are recommended occur on public lands or lands held by a few owners, potentially easing some of the ownership complications. Efforts on private lands will need to be coordinated with owners' stewardship plans.

There are a variety of tools available for hazardous fuel treatments including prescribed fire, mechanical (mastication), hand crews, herbicides, livestock grazing, or a combination of the above. Specific planning is needed for each treatment area to determine the best ecological and economical approach. Treatments will depend on fuel location, terrain, spatial extent, proximity to values at risk, and fuel attributes.

**Biomass:** Hazardous fuels management will potentially result in large amounts of woody plant materials that will need to be disposed. Appropriate disposal practices will depend on the amount of woody material generated and they may include spreading the debris over a large area, burning, chipping and spreading, or burying in a landfill facility. Economical use of the woody debris such as small-diameter wood products or biomass energy production should be explored. Post-treatment management such as the seeding of native grasses and spreading mulch may be necessary to ensure that a productive plant community will establish and not weeds. Monitoring will determine the need for additional management.

**Access:** Access is a critical safety component of a neighborhood's or community's hazard and risk profile. Community access characteristics control the efficiency of emergency evacuation as well as the effectiveness of emergency response. Optimally community design provides for multiple points of ingress/egress, two way traffic flow, and adequate emergency vehicle turnaround radii for terminating roads that conform to a recognized standard such as the International Fire Code or NFPA standards.

Every neighborhood within the district has unique access characteristics. CWPP recommendations are geared to help each area identify access challenges and develop actions to mitigate the situation and achieve an optimal community design. In many cases this involves a road construction or improvement project to provide a secondary means evacuation, turnarounds, or widen an exiting road to better accommodate two-way traffic. Creating shaded fuel breaks along roadways will enhance the tenability of these routes.

As with area fuels treatment, issues of ownership, substantial costs, potential environmental impacts, and engineering needs will necessitate a more thorough study on a project level. Several of these suggested routes will mutually benefit adjacent communities and will require inter-community cooperation. As such, scheduling a specific timeline for these projects is premature at this point.

### **5.3 Fuels Treatment Options**

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. Costs can vary tremendously, but generally run \$300 to \$1,200 depending upon:

- Diameter of materials
- Acreage of project
- Steepness of slope
- Density of fuels
- Proximity to structures
- Fuel costs
- Area accessibility

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 10. Treatment Options**

Treatment	Estimated Cost	Comments
Machine Mowing	\$90 - \$200 / acre	<ul style="list-style-type: none"> <li>• Appropriate for large, flat grassy areas on relatively flat terrain</li> </ul>
Prescribed Fire	\$1500 - \$2000 / project	<ul style="list-style-type: none"> <li>• Can be very cost effective</li> <li>• Ecologically beneficial</li> <li>• Can be used as training opportunities for firefighters</li> <li>• Carries risk of escape which may be unacceptable in some WUI areas</li> <li>• Unreliable scheduling due to weather and smoke management constraints</li> </ul>
Brush Mastication	\$300 - \$500 / acre	<ul style="list-style-type: none"> <li>• Brush species (Gamble oak in particular) tend to resprout vigorously after mechanical treatment</li> <li>• Follow-treatment with herbicides, fire, grazing, or further mechanical treatments are typically necessary</li> <li>• Mastication tends to be less expensive than manual (chain saw) treatment and eliminates disposal issues</li> </ul>
Timber Mastication	\$300 - \$1200 / acre	<ul style="list-style-type: none"> <li>• Materials up to 10" in diameter and slopes up to 30% can be treated</li> <li>• Eliminates disposal issues</li> <li>• Environmental impact of residue being left on-site are still under study</li> </ul>
Manual Treatment with Chipping or Pile Burning	\$300 - \$1200 / acre	<ul style="list-style-type: none"> <li>• Allows for removal of merchantable materials or firewood in timber</li> <li>• Requires chipping, hauling, pile burning of slash</li> </ul>
Feller Buncher	\$750 and up / acre	<ul style="list-style-type: none"> <li>• Mechanical treatment on slopes over 30% or of materials over 10" in diameter may require a feller buncher rather than a masticator</li> <li>• Costs tend to be considerably higher than masticator</li> <li>• May allow for removal of merchantable material</li> </ul>

#### 5.4 Supporting Projects

Several of the recommended actions will require more extensive study and the cooperation of entities outside of the Fall River Watershed Fire FDP. These are important issues that are integral to the CWPP. They should not be foregone merely because of their complexity.

**Funding and Grants:** Grant support may be able to accelerate treatment on larger private holdings and along roads as well as disposal. In addition to close coordination with the Clear Creek County Office of Emergency Management, an excellent resource for finding grants is [www.rockymountainwildlandfire.info](http://www.rockymountainwildlandfire.info).

**Access/Egress Improvements:** The proposed work on roadways will require further study with regards to engineering and environmental issues. These efforts may also be subject to the consent of adjacent land owners. Tenable escape routes are elemental to community wildfire safety. This issue must be examined further.

**Public Land Planning:** Clear Creek County has completed a county-wide CWPP. This plan will address the overall fire risk and major mitigation actions which need to be addressed countywide. Recognition by this plan of relative risks in different areas of the county will help the county select among community CWPPs in terms of grant funding and direct assistance. The core group responsible for carrying the Fall River CWPP into the future must continually network with County officials to present Fall River concerns, annual priorities and assistance needs, and accomplishments.

**Regulatory Actions:** One of the major issues confronting defensible space and hazardous fuels mitigation is the need for maintenance. While county statutes require defensible space for new construction, there is no requirement for maintenance and no retroactive regulation for existing structures. For defensible space to be consistently successful some regulatory impetus is likely necessary. Clear Creek County should examine the options for requiring the maintenance of defensible space. This could be associated with the sale of a home or based on time since initial treatment. Those communities with local statutes or covenants should consider similar regulation as an interim step and to help drive the initiative from the bottom up. This is a public safety issue where failure to maintain one's property can create a hazard for firefighters, adjacent properties, and the community.

## **6 EMERGENCY OPERATIONS**

### **6.1 Wildfire Response Capability and Recommendations**

The Fall River Watershed is protected by a combination of volunteer and paid personnel in a network of public safety agencies staffed including Clear Creek Fire Authority, Clear Creek Sheriff's Office, Clear Creek Emergency Medical Services, Alpine Rescue Team and the US Forest Service. The average response time is 10 minutes, but that period varies with inclement weather and the distance of the emergency from paved roads as the watershed includes a vast backcountry area.”

#### **6.1.1 Mutual Aid**

Standing mutual aid agreements are in-place with the adjacent Central City, Gilpin County EMS, Evergreen Fire/Rescue, Lake Dillon Fire-Rescue and surrounding Sheriff's Offices. These agreements facilitate effective emergency response operations in bordering areas where jurisdiction is not well defined and/or resources are not close. In addition to the operational agreements, the district participates in the Jefferson County Resource Groups. These groups are pre-organized task forces used for structure protection or a squad for a hand crew. All Incident Commanders (IC) and District Chiefs are authorized to request Mutual Aid from any agency. Additional local support for wildfires may be provided by the US Forest Service. When a local incident exceeds the capacity of local resources, the National Interagency Fire Center (NIFC) is notified. NIFC activates and dispatches a, incident management team to assume command from local jurisdiction.

#### **6.1.2 Wildland Fire Attack**

Correlating predicted fire behavior with Wildland Fire Production Rates, any volunteer fire district will have difficulty suppressing fires other than surface fire in timber. It should be remembered that line production capability must be at least twice as great as predicted rate of spread to affect suppression on two flanks of the fire. These numbers are merely predictions made by models, but they illustrate the importance of mutual aid and pre-existing fuel breaks.

- Staffing - Ensure volunteers are notified and their availability tracked on high fire danger days. Increase the number of wildland trained firefighters. Use the CWPP process and spring defensible space drives as a recruiting opportunity. Explore alternatives for additional resources during extend periods of severity, such as having the county, CSFS, or coalition of fire protection districts sponsor a staffed severity engine.
- Equipment/Water Supply – Water availability needs to be enhanced for several critical response areas in the district. Buried cisterns are ideal for supporting remote and isolated structure fires or other small wildfires, but logistics and safety issues for extended attack are significant. Strategically located near primary access routes,

gravity fed single hydrants can easily support an extended water cascade without the need to position resources in remote locations, possibly in harms way, or requiring siphoning to access the supply. A centrally located dip site should also be considered that would be adequate to support extended helicopter operations.

- Training – Wildland training needs should be assessed and classes coordinated with cooperators.

## **6.2 Emergency Procedures and Evacuation Routes**

In the event that the Clear Creek County 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.

Residents should take defensible space actions on their property to reduce the chance of structure loss in advance of the fire season. Human safety is the number one concern in an evacuation. Defensible space fuels mitigation and home safety actions can protect not only life, but also defend against ignition of the structures.

Most properties have other hazardous materials that pose additional threats to firefighters beyond that of the fire. Consider where you are storing your grill (propane tank), recreational vehicle or boat (fuel tanks), lawnmowers (fuel tanks), hot tub supplies (chlorine), fertilizers, pesticides and paint. Leave a note for firefighters on your front door or mailbox noting where hazardous materials are stored to help them safely defend your home.

Leech fields are problematic because firefighters don't want to drive their fire apparatus over them. Mark their boundaries.

Many residents have pets guarding their properties. If you aren't home when an evacuation occurs, is your dog (or llama) of a disposition to maul or eat firefighters? Firefighters will work with animal control officers to save your pets, but they can only help them if they can get them.

Preparedness actions (before fire threatens) can include:

- Thoroughly irrigate the defensible space
- Remove debris from rain gutters
- Remove all flammable materials (e.g., woodpiles, leaves, debris, and patio furniture) within 30 feet of the house such as

When an evacuation is imminent, residents should:

- Close but don't lock windows and doors
- Cover other openings such as crawl spaces and attic vents in nonflammable material.

- Place a ladder against the house for roof access by firefighters
- Leave a fully charged hose that reaches around the house for firefighter use
- Leave porch lights on to allow firefighters to find homes at night.

Families should prepare a written evacuation plan so that all family members know what to do, what to take, meeting locations and phone numbers to call in case family members are separated.

Example evacuation plans are provided in the appendix.

Upon return, the exterior of the house should be monitored for smoke for several days. Embers may lodge in small cracks and crevices and smolder for several hours or days before flaming.

### **Evacuation Routes**

The only paved road in and out of the Fall River Watershed is Fall River Road. In the event that egress is blocked below your residence, alternate evacuation routes may need to be utilized.

Many of the evacuation routes are rough, dirt roads. Residents should scout out these routes prior to using them to ensure that they can safely navigate the route.

Evacuation procedures vary according to subdivision. Residents should ensure they are familiar with these procedures, including primary and secondary routes, and the location of any designated community safety zone. Pre-plans plans should also outline available evacuation centers and the procedures needed to activate them. Large animal evacuation centers also need to be identified. These procedures should be addressed in public or HOA meetings with information eventually being distributed door to door.

## **7 FALL RIVER WATERSHED CWPP IMPLEMENTATION**

### **7.1 CWPP Plan Adoption**

A meeting was convened on \_\_\_\_\_ to present the Fall River Watershed CWPP to the Core Team, fire authorities, stakeholders, and public. The draft Fall River Watershed CWPP will be posted on \_\_\_\_\_ website to allow public review and response. After a four week public response period, public comments were assessed and the CWPP was finalized and presented to the Core Team.

The Core Team presented the final CWPP to the CCC BOC along with recommended actions that would be CCC responsibilities.

The Fall River Watershed CWPP provides the foundation and resources for understanding wildfire risk and presents opportunities to reduce potential losses from wildfire. Individual communities and private landowners can take action by developing specific fire plans or by participating in district-wide activities for prevention and protection.

The HFRA and the FEMA Disaster Mitigation Act require adoption of this CWPP. With formal adoption of this plan by Clear Creek County and the Colorado State Forest Service, the Fall River Watershed FPD will be able to compete for hazardous fuels and non-fuels mitigation funding to support plan implementation. Adoption of this plan also highlights the partnership between the residents and stakeholders within the Fall River Watershed, CCC, CSFS and the USFS.

### **7.2 Sustaining CWPP Efforts**

A Community Wildfire Protection Plan is the base document for what is, in reality, a long term process. Assessing community and home owner risk levels and establishing priority actions for fuels mitigation and individual homesite actions and improvements will take a period of years. And as forests continue to change and grow it is necessary to keep up with actions and repeat them as necessary as time passes.

Implementing and sustaining the CWPP is key to success. This is the responsibility of the Implementation Team. Maintaining partnerships among community-based organizations, fire protection authorities, local governments, public land management agencies, and private landowners is necessary to implement projects to support this plan.

Individual homeowners, landowners and residents must take an active role in implementing actions on property they own. If one resident performs mitigation on his/her property but no one around them does it still puts that property at risk. These are truly community efforts to protect homes, businesses, historic and recreational sites, watersheds, and the forests we all care about and in which we make our homes. Absentee home and landowners need to take actions to protect their investments.

The CCC Sheriff Department is committed to supporting fire protection efforts within the district as well as surrounding areas. It is important that the district continue to provide support in maintaining risk assessment information and emergency management coordination. An implementation team needs to be established to guide work on implementing this CWPP by working with fire authorities, community organizations, private landowners, and public agencies to coordinate hazardous fuels management and other mitigation projects.

### 7.3 Next Steps

Following adoption of this plan, the following activities will be initiated to support priority tasks:

**Table 11. Next Steps**

Objective	Tasks	Schedule	Responsibility
	•		
	•		
	•		
	•		

### 7.4 CWPP Oversight, Monitoring and Evaluation

The Core Team will be responsible for CWPP monitoring and evaluation through regular meetings, public involvement, and coordination with Fall River Watershed FPD, neighborhood communities, and HOAs. Monitoring is the collection and analysis of information acquired over time to assist with decision-making and accountability, and to provide the basis for change. Evaluation will include analysis of the effectiveness of past fuels reduction and non-fuels mitigation projects, as well as recent wildfire suppression efforts. Monitoring and evaluation measures should progress overtime in a way that will determine if the CWPP goals and objectives are being obtained.

**Table 12. Monitoring and Evaluation Tasks**

Objective	Tasks	Timeline	Oversight
<b>Risk Assessment</b>	• Use reliable data that is compatible among partner agencies	Annual	CCC/CCFA
	• Update the CWPP as new information becomes available	Annual	Implementation Team
	• Continue to assess wildfire risk to communities and private landowners	Biennial	HOA
<b>Fuels Reduction</b>	• Identify and prioritize fuels treatment projects on public land through development of a 5-year plan	Annual	USFS / CCC
	• Track fuels reduction projects and defensible space projects on private land	Biennial	CCC / CCFA

Objective	Tasks	Timeline	Oversight
	<ul style="list-style-type: none"> <li>• Monitor fuels reduction projects on evacuation routes</li> <li>• Track grants and other funding sources and make appropriate application</li> </ul>	<p>Annual</p> <p>On-going</p>	<p>CCC / CCFA</p> <p>CCC / CCFA</p>
<b>Emergency Management</b>	<ul style="list-style-type: none"> <li>• Review suitability and the need for fuels reduction along evacuation routes</li> </ul>	Annual	CCC / CCFA
<b>Public Outreach</b>	<ul style="list-style-type: none"> <li>• Plan and hold Firewise education week</li> <li>• Provide Firewise pamphlets at public events</li> <li>• Evaluate techniques used to motivate and educate private landowners</li> </ul>	<p>Annual</p> <p>Annual</p> <p>Annual</p>	<p>CCC / CCFA</p> <p>CCC / CCFA</p> <p>CCC / CCFA</p>

## **APPENDICES**

**A. Fall River Watershed Hazard Rating Assessment And Wildland Urban Interface Mitigation Strategies (Lt. Einar Jensen, Clear Creek Fire Authority)**

**B. Fire Evacuation Checklist**

**C. Ownership Maps**

**D. Ecological Maps**

**E. US Forest Service Fall River Fire Behavior Analysis**

## APPENDIX A

# **FALL RIVER WATERSHED HAZARD RATING ASSESSMENT** **AND** **WILDLAND URBAN INTERFACE MITIGATION STRATEGIES**

By Lt. Einar Jensen  
Clear Creek Fire Authority

### **Introduction:**

The idea of a wildland fire anywhere in Clear Creek County is unnerving because so many other unincorporated neighborhoods in Clear Creek County are prime examples of the Wildland Urban Interface – that zone where undeveloped land mingles with houses and businesses. Clear Creek Fire Authority has conducted neighborhood assessments of subdivisions to prepare its personnel for wildland fires and other emergency responses as well as to teach property owners how they can assist firefighters, law enforcement, ambulance crews and other specially trained personnel when emergencies do occur.

Although some residents of the county have improved their property to make it more defensible in times of wildland fires and thinning is evident along some roadways, much work remains to be done, especially in the Fall River Watershed. A single homeowner who doesn't create defensible space around his or her property endangers the property of the entire neighborhood. Only by cooperating can neighbors hope to survive an otherwise catastrophic wildland fire event; however, creating defensible space does not guarantee that a property will survive a fire. It only improves the odds of survival as homeowners involved in countless catastrophic wildland fires have learned. This report will address several issues concerning the entire watershed and the following individual neighborhoods:

- Lower Fall River Road (0000 to 2900 Fall River Road)
- Middle Fall River Road (2900 to 4000 FRR) and Hummingbird Lane
- Upper Fall River Road (4000 to 7000 FRR)
- Rainbow Road & Loch Lomond Highlands
- Alice
- Winterland
- Hamlin Gulch
- Overlooked Way
- York Gulch
- Pisgah Lake

### **Lower FRR**

The structures in this neighborhood are along the valley floor and include the three homes at the intersection of York Gulch Road and Fall River Road. The riparian ecosystem is densely forested with narrow-leaf cottonwoods, blue spruces, aspens and firs. A majority of homes south and west of FRR are on the other side of the creek and utilize a bridge of some sort. Most bridges lack any weight ratings. However, these homes do have access to Fall River and its water. Homes on the north and east side of

FRR tend to have steep and narrow driveways, often without turnarounds or hammerheads. Most homes have propane heat as well as wood stoves. All have electrical lines above ground, usually tightly crowded by branches, which present wind and snow risks in addition to fire risks. With few exceptions the homes in this neighborhood are high hazard relative to the NFPA 1144 form. Ingress and egress are unusually good as long as the incident is up-valley. Structures in the first mile of Fall River Road have two ways out: Fall River Road to I-70 and York Gulch Road to Central City. Homes above the 1000 Block have only one way out: Fall River Road to I-70.

Recommendations: Aggressively develop defensible space plans, regardless of whether the home is on a slope or at the valley bottom. Defensible space zones should be greater on slopes below a structure, and cut banks above structures should be treated to minimize collapse zone hazards. Create shaded fuel breaks along Fall River Road on public lands initially and tie into private property defensible space to protect access routes. Develop an emergency escape route that serves the entire watershed. Create eddies or gated pools for water resources. Rate each bridge for weight restrictions. Consistently post addresses at the ends of driveways and on homes with numerals of contrasting and reflective colors measuring at least four inches tall. Add spark arresters to chimneys.

### **Middle Fall River Road (2900 to 4000 FRR) and Hummingbird Lane**

The fuels and lay of the land change in this neighborhood. The valley widens, dense forest gives way to shrubs and meadows and the structures, move away from the creek. Some structures are surrounded by dense deciduous trees. Although aspens and cottonwoods are more fire-resistant than conifers they will ignite and are prone to collapse. They also shed their leaves, one-hour fuels that also can ignite. Some ponderosa pines are present. Driveways are typically wider and less steep, except in the case of Hummingbird Lane. The ratings of bridges are not posted. Access to water is challenging and, in the case of Hummingbird Lane, non-existent. Propane and electrical utilities are above ground. The homes along the valley floor are moderate to high hazard depending on the amount of defensible space that exists around them. The only escape route is down Fall River Road, which could be compromised depending on the incident.

Although Hummingbird Lane is on a south aspect and trees are rare, the steep slope could carry a grass/shrub fire quickly. The homes on Hummingbird Lane are rated extreme because H-Lane is so narrow and steep.

Recommendations: For a fire on the slope of Hummingbird Lane, I recommend utilizing a shelter-in-place plan. Instead of asking residents to descend, emergency vehicles could ascend the one-lane road if necessary. This plan requires aggressive attention to defensible space standards, especially below homes. Structures also must be made less-vulnerable to fire: screening eaves, eliminating fuels below decks, removing lightweight curtains and closing curtains of heavier materials, for example. This plan addresses localized wildfires, but does not address fires burning elsewhere in the watershed or other emergencies that could require emergency vehicle response. Any sort of response on this road must account for the single-lane, weather, erosion, tight curves and lack of water beyond the residents' wells.

On the valley floor, develop defensible space plans around structures and along driveways. Create shaded fuel breaks along Fall River Road on public lands initially and

tie into private property defensible space to protect access routes. Develop access to the pond southwest of Hummingbird Lane if possible, for both tanker shuttle operations and helicopter dipping operations. Develop an emergency escape route that serves the entire watershed. Rate each bridge for weight restrictions. Consistently post addresses at the ends of driveways and on homes with numerals of contrasting and reflective colors measuring at least four inches tall. Add spark arresters to chimneys.

### **Upper Fall River Road (4000 to 7000 FRR)**

This neighborhood starts below the lower FRR switchbacks and continues to the upper switchbacks. The lower end of the neighborhood is heavily forested with a mix of conifers and deciduous species. This dense forest tightly surrounds most homes on both side of FRR. Fall River itself hugs the slope southwest of the homes, so bridges are not an issue but water access is. Starting in the 5000 Block of FRR, the forest transitions into a mature subalpine one with dense lodgepoles, firs and spruces. Some aspens are present. Fall River is along the southwest slope; again bridges are not an issue. Although homes are rare between 5500 and 6500 FRR, the area is used for recreation, which introduces additional ignition risks. The home at the base of the upper switchbacks shares characteristic with the rest of the neighborhood in terms of ecosystem, but it is close to a potential water source. The only escape route is down Fall River Road, which could be compromised depending on the incident. This neighborhood is rated high to extreme.

Three homes currently exist on the southern and eastern aspects of Cumberland Gulch, which features fewer pines and more aspens, within a half mile of Fall River Road's pavement. The shared driveway is steep and poorly marked either with address signs or with markings for the Forest Service Road that also starts there. Recreational traffic must be included as a source of ignitions because the roadway is used so heavily.

Recommendations: Aggressively develop defensible space plans, regardless of whether the home is on a slope or at the valley bottom. Defensible space zones should be greater on slopes below a structure, and cut banks above structures should be treated to minimize collapse zone hazards. Create shaded fuel breaks along Fall River Road on public lands initially and tie into private property defensible space to protect access routes. Develop a full fuelbreak on both sides of Fall River Road halfway between the upper house and bulk of the homes below it. Consider a road descending Cumberland Gulch for emergency egress. Develop an emergency escape route that serves the entire watershed. Develop a dry hydrant access point at the intersection of Fall River Road and Rainbow Road. Consistently post addresses at the ends of driveways and on homes with numerals of contrasting and reflective colors measuring at least four inches tall. Improve labeling of Forest Service Roads. Add spark arresters to chimneys.

### **Rainbow Road & Loch Lomond Highlands**

This neighborhood starts at the intersection of Fall River Road and Rainbow Road, follows Rainbow Road to Fall River Reservoir, and includes the homes in Loch Lomond Highlands, which is accessed from Alice Road. The neighborhood is heavily forested with subalpine species: lodgepole pine, Douglas firs, subalpine firs, Engelmann spruces, blue spruces along Fall River and occasional deciduous species in riparian zones and aspens. Fall River bisects the neighborhood on the valley floor, flowing from the reservoir and other lakes at the headwaters. Some homes have unrated bridges, but the

bridges on Rainbow Road should be rated (data should be available from the county or Forest Service). Recreation sites are interspersed with the structures and the road is used by visitors more than residents; the land surrounding Fall River Reservoir hosts dozens of fire-wielding users (campfires, firearms, smokers) most snowless weekends. These additional ignition sources should be respected. The only escape route from Rainbow Road is down that road to Fall River Road; however, a safety zone could be developed at the top of the road as trees give way to alpine flora. Loch Lomond's escape route is to Alice Road into the community of Alice to a safety zone or to Fall River Road. This neighborhood is rated extreme.

Recommendations: Aggressively develop defensible space plans, regardless of whether the home is on a slope or at the valley bottom. Defensible space zones should be greater on slopes below a structure, and cut banks above structures should be treated to minimize collapse zone hazards. Create shaded fuel breaks along Rainbow Road on public lands initially and tie into private property defensible space to protect access routes. Develop a full fuelbreak along Rainbow Road on both sides of Fall River Road. Develop the emergency escape route that could connect Vista Place to Rainbow Road; adding a gate will limit recreational use of the road. Develop a dry hydrant access point at the intersection of Fall River Road and Rainbow Road. Consistently post addresses at the ends of driveways and on homes with numerals of contrasting and reflective colors measuring at least four inches tall. Add spark arresters to chimneys.

### **Hamlin Gulch**

This neighborhood consists of three homes, but the roadway is used for access to the Arapaho National Forest. The homes are surrounded by a mix of conifers and deciduous trees along the valley floor. The gulch could form a chimney given proper wind conditions. Hamlin Gulch Road is not an adequate escape route as it has several sections of light duty rock crawling with high-centering hazards and poor traction. The only escape route is down gulch to Fall River Road. Otherwise, sheltering-in-place could be an option. This neighborhood is a high hazard.

Recommendations: Develop defensible space plans that also account for tree collapse zones. A single downed tree could block the single-lane road. Develop the emergency escape route to Pisgah Road or improve Hamlin Gulch Road (FS 273.1) to York Gulch; adding a gate will limit recreational use of the escape road. Consistently post addresses at the ends of driveways and on homes with numerals of contrasting and reflective colors measuring at least four inches tall. Add spark arresters to chimneys.

### **Alice**

This community, which also is called the St. Mary's subdivision, surrounds a bowl in the upper subalpine zone of the watershed. Most homes are enveloped by lodgepole pines, subalpine firs and Douglas firs, but some spruces also are present. Aspens are rare except along Little Cub, Aspen Drive and parts of Beaver Road. The middle of the bowl, which historically drained several mines and mills, has few trees but grasses and shrubs have taken a toehold as the ecosystem transitions into its a post-industrial era. A marsh ecosystem exists east of Silver Creek Road. The only escape route sends vehicles to Fall River Road and no official safety zones currently exist. This neighborhood's hazard class is moderate to high.

Recommendations: Aggressively develop defensible space plans. Defensible space zones should be greater on slopes below a structure, and cut banks above structures should be treated to minimize collapse zone hazards. Create shaded fuel breaks along Fall River Road between the upper switchback and Alice Road on public lands initially and tie into private property defensible space to protect access routes. Good defensible space exists around the water treatment plant and it has access from two sides, but the address is not posted. Consistently post addresses at the ends of driveways and on homes with numerals of contrasting and reflective colors measuring at least four inches tall. All intersections should be marked with reflective street signs; the wooden signs are showing their age. Develop a safety zone in the marshes east of Silver Creek Road. Consider cutting a safety zone at the south end of Silver Creek Road. Develop a secondary escape route to FRR around the water treatment plant. Work with the Clear Creek Fire Authority and St. Mary's Glacier Water & Sanitation District to develop the hydrant system in the area and upgrade CCFA Station 7 to have its own cistern. Add spark arresters to chimneys.

### **Winterland**

This community is at the top of Fall River Road in a bowl surrounding Silver Lake. It includes Eclipse Snow Park and the Silver Lake Condominiums. It is in the upper subalpine zone of the watershed. Most homes are surrounded by lodgepole pines, subalpine firs and Douglas firs, but some spruces also are present. Aspens are rare. Riparian ecosystems surround Silver Lake and Lake Quivera. Escape routes send vehicles to Fall River Road; Yankee Hill is not an adequate escape route. The hazard rating of this neighborhood is high.

Recommendations: Aggressively develop defensible space plans. Defensible space zones should include minimizing tree collapse zones along driveway and roadway cutbanks. Create shaded fuel breaks along Fall River Road to enhance the mitigation work provided by Eclipse Snow Park and tie them into private property defensible space to protect access routes. Consistently post addresses at the ends of driveways and on homes with numerals of contrasting and reflective colors measuring at least four inches tall. All intersections should be marked with reflective street signs; the wooden signs are showing their age. Improve the road to Yankee Hill, installing a gate to limit access, to provide an escape route to a safety zone there. Work with the Clear Creek Fire Authority and St. Mary's Glacier Water & Sanitation District to develop the hydrant system in the area and upgrade CCFA Station 7 to have its own cistern. Develop an all-weather dry hydrant connection at Silver Lake. Add spark arresters to chimneys.

### **Overlooked Way**

The homes on Overlooked Way are on a steep west aspect overlooking Fall River Road. The slope is heavily forested largely with conifers but some deciduous species also grow there. There is no direct access to water. The homes are solar powered, and some also have propane. Recreation is not a direct threat because access to the road only accesses homes, but recreation is present in the valleys below the neighborhood. The only escape route is up Overlooked to York Gulch Road. This neighborhood's hazard is rated extreme.

Recommendations: Aggressively develop defensible space plans. Defensible space zones should include minimizing tree collapse zones along driveway and roadway cutbanks. Maintain the road to provide consistent emergency access. Consistently post addresses at the ends of driveways and on homes with numerals of contrasting and reflective colors measuring at least four inches tall. The intersection should be marked with a reflective street sign. Add spark arresters to chimneys.

### **York Gulch**

The neighborhood of York Gulch is larger than some of the others in this report, but it features a consistent geography and culture. Most homes are on sun-drenched slopes, a characteristic that limits the growth of conifers in favor of grasses, shrubs, aspens and other deciduous species. Surface water is fleeting under the sunny conditions. Fires could spread rapidly through the light flashy fuels at the surface. Most homes are “off the grid” and utilize solar and wind energy. Propane tanks also are utilized. The lack of utility lines eliminates the risk of downed lines igniting fires, but the presence of batteries and generators in homes presents challenges for structural suppression. This neighborhood also has existing emergency escape plans utilizing roads that descend the valley to FRR (Old Stage, York Gulch and Chinook) and utilizing routes to Gilpin County to escape eastward. However, Hamlin Gulch is not suitable for westward escape and Chinook is not suitable for eastward escape. Both roads narrow and feature stretches of light-duty rock crawling. A cistern exists at Clear Creek Fire Authority Station 9. The hazard rating is high, but on the moderate end.

Recommendations: Continue developing defensible space around homes, regardless of whether they’re surrounded by standing timber or heavy grasses. Institute a prescribed burning plan for the larger meadows to nurture healthy ecosystems. Add water resources (cisterns) at key intersections. Post addresses at the ends of driveways and on homes with reflective and contrasting materials at least four inches tall. Encourage residents to join Clear Creek Fire Authority as volunteer firefighter for Station 9, which has only one member currently.

### **Pisgah Lake Road**

This road follows a ridgeline from York Gulch along the northeastern boundary of Clear Creek County. Recreational users create a significant amount of traffic along the road and in the old ballfield. Their impact is at least as significant as the residents’. The homes on the western side of the road are surrounded by a thick conifer forest while homes on the east side are within more deciduous ecosystems. Pisgah Lake provides a limited water source for pumping operations, but its value as a dip-site for helicopter operations is not known. Escape routes are limited to Forest Service Roads entering Gilpin County and the link to York Gulch’s “octopus” intersection. The hazard rating is high.

Recommendations: Aggressively develop defensible space plans for homes and the roadway. Defensible space zones should be greater on slopes below a structure, and cut banks above structures should be treated to minimize collapse zone hazards. Create shaded fuel breaks along Pisgah Lake Road on public lands initially and tie into private property defensible space to protect access routes. Develop a cistern at the Octopus. Label roadways better. Maintain the ballfield as a safety zone capable of holding the

residents of York Gulch and emergency personnel as well as Pisgah Lake Road residents. Consistently post addresses at the ends of driveways and on homes with numerals of contrasting and reflective colors measuring at least four inches tall. Add spark arresters to chimneys.

### **Defending the Watershed:**

The neighborhoods in the Fall River Drainage exist in several ecosystems, but most share the characteristics of being surrounded by dense forests. Slopes with a south aspect (those facing south) support some ponderosa pines and shrubs while north aspects are densely packed with Douglas firs, subalpine firs and lodgepole pines. Blue spruces and narrow leaf cottonwoods are the dominant riparian species along gulches and creeks. Some aspen groves also exist in the area. Clear Creek County's dominant winds are from the southwest, which could push a crowning fire straight through the neighborhood, but winds following the I-70 corridor could cause erratic fire behavior in the Fall River Valley and on slopes adjacent to the interstate.

Our forest is densely packed with mature trees. **Thinning will reduce the ability of a fire to crown**, or burn from tree canopy to tree canopy, and it will reinvigorate the forest's health benefiting flora and fauna as well as the human community. Thinning is important, but it does not prevent fires outright. Also recognize that thinning is different from clear-cutting. Removing too many trees at once promotes erosion and threatens the health of the forest and its inhabitants. Adding shaded fuelbreaks along roadways and on forested slopes are other recommendations.

**Access is a major problem.** Motor vehicles have only two routes of ingress and egress from the drainage: Fall River Road to I-70 or York Gulch to Gilpin County. Emergency crews have access to other roads, but those routes -- such as Upper Chinook Road -- easily could be blocked in times of wildland fires. Within the drainage, most roads consist of packed dirt or gravel. Despite the efforts of public agencies and property owners, the quality of these roads varies throughout the year depending on weather, use (especially by off-highway vehicles) and general deterioration. Road width also varies, which prevents safe passing of oncoming vehicles in several places. Few places exist with enough room for larger fire apparatus to share the road with passenger vehicles, much less recreational vehicles. These roads also are susceptible to blockage from downed trees and utility lines, which will prevent fire apparatus from entering the subdivision and property owners from evacuating in emergencies. Firefighters will abandon homes that could otherwise be saved if roads become threatened. Intersections must be well marked and signage needs to be maintained and cleared of obstructions throughout the year.

**Better signage** is also needed on private property. Most homes have visible addresses at the ends of their driveways, but some don't. Firefighters, ambulances and law enforcement respond based on street addresses and last names. Make sure both forms of identification are easily visible from the road, especially after dark, and add your address to the house to help us verify we reached the proper location, especially when a driveway serves multiple homes. We can't help you if we can't find you.

Water is an important resource for any fire, but especially for fires involving structures. The nearest fire stations are in Alice, York Gulch and Idaho Springs. **Water resources are rare beyond wide spots in Fall River.**

Younger individuals and families are moving into this area, but part of the population remains older. As we age, we collect more “stuff,” which means that we need to remove more stuff in times of evacuation. Additionally, families have more belongings than single residents. Consider compiling a list of those important documents, photographs and memorabilia that you want to remove in case of evacuation to ease the task if it becomes necessary. **Think about the Four Ps: Pets, Pills, Papers and Photos.** You may have five hours to evacuate; you may have five minutes.

If you do leave, **set a ladder in the driveway** and **connect garden hoses to spigots** so that we can use your equipment and ours to defend your home. We’ll also use your water to refill our tank and help suppress flames running toward the house.

**Create an evacuation plan for your family in advance** of that stressful moment. Include a meeting place outside the watershed, such as the Safeway parking lot in Idaho Springs), and a point of contact outside of the state who you can call with updates on your status. Family members and friends can call/email that person to learn about your well-being without overloading the local telephone circuits needed by emergency crews.

### **So what do we do?**

Wildfire is part of our ecosystems: they have created the ecosystems we love in Clear Creek County. We humans need to adjust our thinking to accept fire and “welcome” it into our neighborhoods. To achieve that goal, we have to make our homes less vulnerable to wildfires. That’s key. To make homes less vulnerable, we need to understand what fire does and how it behaves.

1. Firefighters on the ground can only battle flames 0-4 feet in length safely. Fires burning in the crowns of trees are impossible to fight. Use the principles of defensible space ([www.firewise.org](http://www.firewise.org)) to drop fire from crowns onto the surface where we can do something about the fire. Thin trees so that the branches don’t touch each other and remove low lying branches, called ladder fuels, that allow a fire to “climb” into aerial fuels. Remove ladder fuels to 8 feet about the ground and thin trees throughout the property.
2. Fire burns faster uphill than downhill or laterally. As fire burns, it preheats fuels above it. Therefore, property owners need to remove more fuels (thinning) on the downhill side of the house than the uphill side.
3. Most structures DON’T ignite from direct flame contact. Wildfires tend to ignite structures via radiant heat (heat that doesn’t warm the intervening air but does warm objects). As a fire is burning, the heat passes through air and windows to objects that warm to the point of ignition then smolder for hours. Firefighters (across the country) are learning to return to burned over neighborhoods to extinguish these smoldering fires before they turn into unwitnessed structure fires. As a homeowner, your role includes making the house less resistant to radiant

heat: use a non-combustible roofing material, non-combustible siding and prevent woody debris from accumulating under decks and in gutters. Also, remove lacey curtains from windows: use heavier fabrics or shingles to protect windows and keep the radiant heat out.

4. Embers or fire brands also ignite house fires. As fires burn, they suck in oxygen and push heated air upward. That column of rising air contains embers and tosses them anywhere, including onto unburned fuels. These “spot fires” are tough to manage. The Hayman fire created spot fires miles downwind -- leading to the partial evacuation of Castle Rock's subdivisions. Embers can get stuck in “traps” on roofing, such as beside chimneys or in gutters. If the roofing material is non-combustible, the risk is minimal. If the roofing is wood shake shingles... disaster. And when those shingles ignite, they can become embers and start dozens of new fires. Wood shake shingles are an awful gamble. Also clean pine needles out of gutters and off roofing, and rake them from the yard. Needles are acidic; raking them will encourage better ground cover around your property and encourage wildlife to visit.
5. Large windows are a threat to homes because they allow radiant heat to enter the structure. Remove lacey and other decorative curtains from windows when a fire approaches to prevent the radiant heat from igniting them through the glass. Large windows, especially single-panes windows, also are vulnerable to breaking from debris blowing in fire-generated winds. A broken window could allow embers to enter the structure.
6. Most properties have other hazardous materials that pose additional threats to firefighters beyond that of the fire. Consider where you are storing your grill (propane tank), recreational vehicle or boat (fuel tanks), lawnmowers (fuel tanks), hot tub supplies (chlorine), fertilizers, pesticides and paint. Leave a note for firefighters on your front door or mailbox in times of evacuation so we can safely defend the neighborhood.
7. Leech fields are problematic because we don't want to drive our fire apparatus over them. Mark their boundaries.
8. Many residents have pets guarding their properties. If you aren't home when an evacuation occurs, is your dog (or llama) of a disposition to maul or eat firefighters? We'll work with animal control officers to save your pets, but we have to get to them to help them.

# Appendix B: Fire Evacuation Checklist

## Guidelines

by Bill Sanders (bsanders@boonieliving.com)

There has been a lot written about our extreme fire danger and precautions we should take – but I haven't seen a usable checklist of steps to take when evacuation is imminent. Under that kind of stress, even knowledgeable folks will forget things. But in addition to helping you remember, this checklist can do two things for the firefighters:

- convince them that your house can be saved
- give them information they need to fight effectively.

## How to Use This Checklist

1. If you're reading this online, print it out. If possible, copy it on to heavy paper.
2. Go over it *before the crisis*, discussing how to accomplish each item *during the crisis*. Make assignments.
3. Fill out the Checklist (pages 2 & 3). The time frames are obviously approximate; no one knows if, much less when, an evacuation will be ordered.
4. When evacuation becomes a possibility, do each step and note results. [Some suggestions below.]
5. Post the Checklist (and any note you think useful for the fire fighters) on your front door as you leave.

Protect it somehow (laminated, clear plastic bag, etc.). *Keep it brief & clear; they will be very busy.*

## Suggestions for Filling Out the Checklist

**Wildfire Mitigation Checklist:** If already completed, check again gutters, vents, Defensible Space Zone 1, access by large vehicles. If you haven't done the list, do as much as you can, starting with items above.

**Leave Doors Unlocked:** Latch any door that tends to blow open (remember: fires create wind). If applicable, leave note for fire fighters concerning latched doors.

**Separate Note to Fire Fighters:** Include fire retardant features that aren't obvious; items not on Checklist; etc. Write several hours prior, so you can rewrite, if necessary. *Major items only: they're busy.*

Remember, this Checklist has three, equally important, goals:

1. Action items for you
2. Information for firefighters
3. Argument that your house is save-able.

So fill it out and post it with items #2 and 3 in mind!

# Fire Evacuation Checklist

(Post on Door)

## Last House Contact

Name: \_\_\_\_\_ Address: \_\_\_\_\_

Info: \_\_\_\_\_

## Key Locations:

Batteries

Water sources

Propane Tank

Tool shed

Ladder(s)

## When (or Before!) Fire First Starts

\_\_\_ If you haven't already done so, make a detailed inventory of personal items. Include purchase date & price, replacement cost, whether covered by insurance, etc. Store one copy off premises.

\_\_\_ Make a list of items to take either for use while gone or for safekeeping: papers (e.g., insurance, birth certificates, passports, & the inventory above), checkbook/credit card, ID, medicines, clothes, water, food, toiletries, pet supplies, etc.

\_\_\_ Review (or begin) the annual Wildfire Mitigation Checklist, particularly gutters, access, and defensible space.

\_\_\_ Fell any trees/limbs that you have been gambling on saving.

\_\_\_ Determine best radio news source on the fire. (Possibly K-Goat, particularly after the Saxon Mtn. upgrade.)

\_\_\_ Take "before" photos of inside and outside. Take the film with you when you leave.

\_\_\_ Make sure you have at least ½ tank of gas in the car(s) you will use to leave. Fill chain saw & pumps.

\_\_\_ Disconnect blockage of unidentified phone calls so that "Reverse-911" can be received.

## 1 Day Before Evacuation (if you have that much notice)

\_\_\_ Go over plans with family and close friend/relative not in fire area. Include rendez-vous point.

\_\_\_ If possible evacuate pets, livestock, and non-essential humans.

\_\_\_ Begin close checks on phone answering machine for reverse-911 notifications.

\_\_\_ If possible, get animals away from fire area.

## 6-12 Hours Before Evacuation (if you have that much notice)

\_\_\_ Fill water holding tank. Top off after significant use.

\_\_\_ Attach hoses to outside faucets. Charge, but keep nozzles shut. If roof is wood, attach one hose to sprinkler and place on roof (but do not turn on).

\_\_\_ Compose note to firefighters to place on front door. (Hand tools, chain saw, holding tank, cistern, etc.)

- \_\_\_ Change into cotton or wool clothing (no nylon or combustible); put on sturdy footwear.
- \_\_\_ Park all vehicles (a) out of way (garage preferable), (b) facing outward, (c) keys in ignition, (d) windows up.
- \_\_\_ Disconnect electronic garage door opener (manual operation).
- \_\_\_ Close exterior vents or cover with fire-retardant material (if none available, do nothing).  
(over)
- \_\_\_ Get combustible lawn furniture well away from structures.
- \_\_\_ Begin loading car with valuables previously identified.
- \_\_\_ Fill sinks, bathtubs, garbage pails, etc., with water. Place large towels, small rugs, burlap bags nearby.
- \_\_\_ If applicable leave fueled portable pump next to cistern stream, or lake. (Make note to firefighters.)
- \_\_\_ Round up all remaining pets (and their supplies) so that they can be evacuated immediately.

## 1-2 Hours Before Evacuation

- \_\_\_ Shut off propane at the tank and at the house. Extinguish pilot lights.
- \_\_\_ Erect ladder to roof (preferably away from fire direction. (Location: \_\_\_\_\_)  
Place second ladder to deck, if applicable: (Location: \_\_\_\_\_)
- \_\_\_ Remove (or at least open) combustible curtains; close fire-resistant curtains or venetian blinds.
- \_\_\_ Move combustible furniture to center of rooms.
- \_\_\_ Turn on light in every room and on porch.
- \_\_\_ Close *every* window; close *every* door you're not actually using. Leave all unlocked.
- \_\_\_ Top off water holding tank.
- \_\_\_ Open fireplace damper, but place screen in front of hearth.

## As You Leave

- \_\_\_ Check doors (closed), windows (closed), lights (one on in every room).
- \_\_\_ Place this checklist and any note in plastic bag and post where firefighters can see it.
- \_\_\_ Drive away with headlights on. Follow evacuation route indicated; your favorite shortcut may have been affected by the fire or efforts to suppress it.

## While You Are Gone

- \_\_\_ Contact insurance agent(s) immediately. Tell them where you're staying.
- \_\_\_ Keep *all* receipts. Don't determine by yourself what is, and isn't, covered.

## When You Return

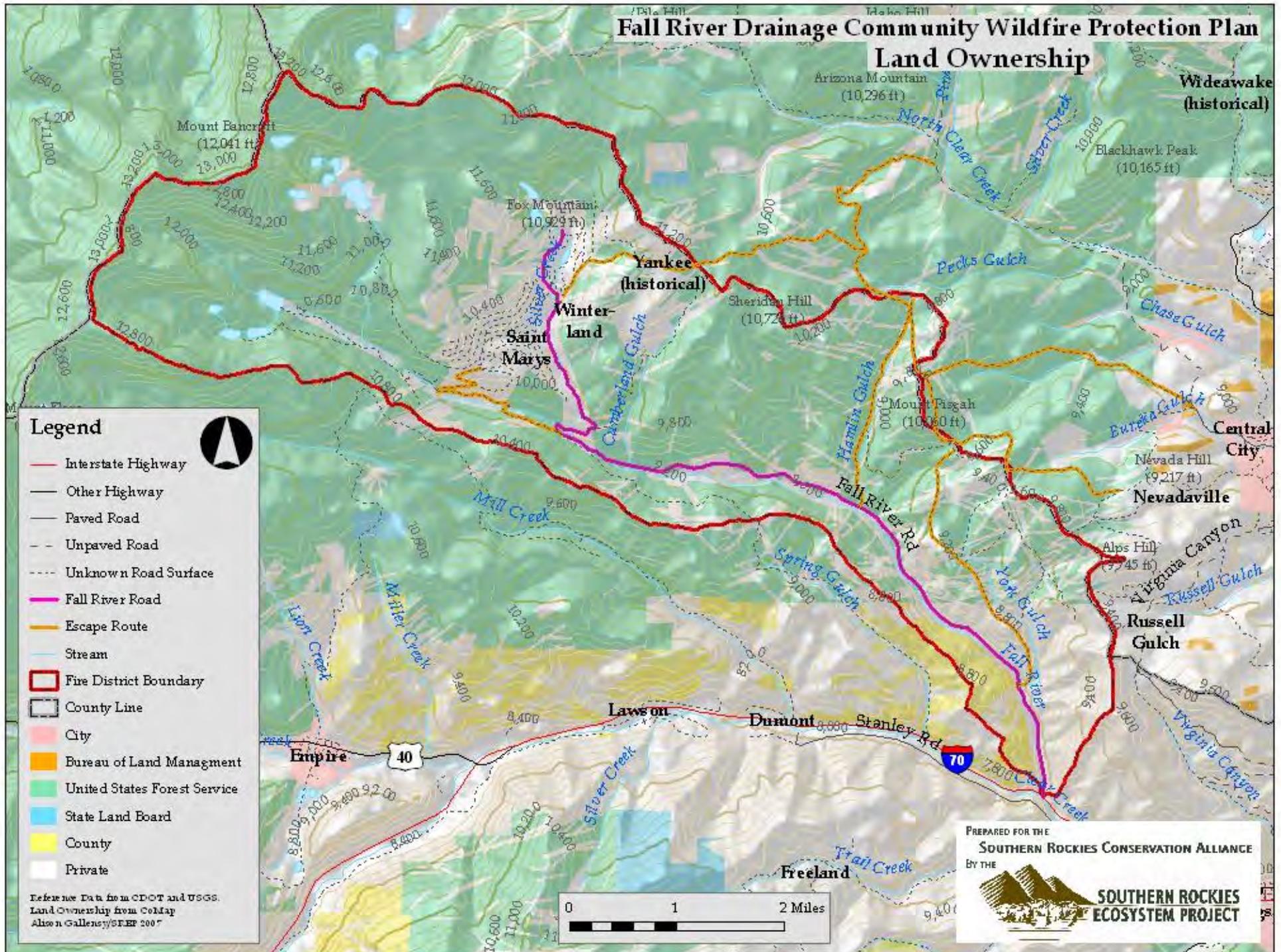
- \_\_\_ Check phone, utilities, etc. Be sure pilot lights are lit before using gas appliances.
- \_\_\_ Ventilate house if smoke in area is not too heavy. Unblock vents. Clean up fire retardant. If fire touched house, check roof and attic carefully.
- \_\_\_ Inventory losses & report immediately. Use the "before" inventory as your starting point.
- \_\_\_ Take "after" photos (before and after cleanup).
- \_\_\_ If fire came close, watch for snags, hot spots, etc. and notify fire department *immediately*.
- \_\_\_ Make any temporary repairs you can, particularly to reseal the outer shell from further damage. Do not wait for reimbursements to do so.
- \_\_\_ Get a detailed estimate of repairs and forward to agent(s)/adjuster(s). One estimate is sufficient at this point.

## **APPENDIX C – Fall River Watershed Ownership Maps**

- Fall River Watershed Land Ownership
- York Gulch Area Property
- Cumberland and Hamlin Gulch Area Property
- St. Mary's Area Property
- US Forest Service Management Areas in Clear Creek County

# Fall River Drainage Community Wildfire Protection Plan

## Land Ownership



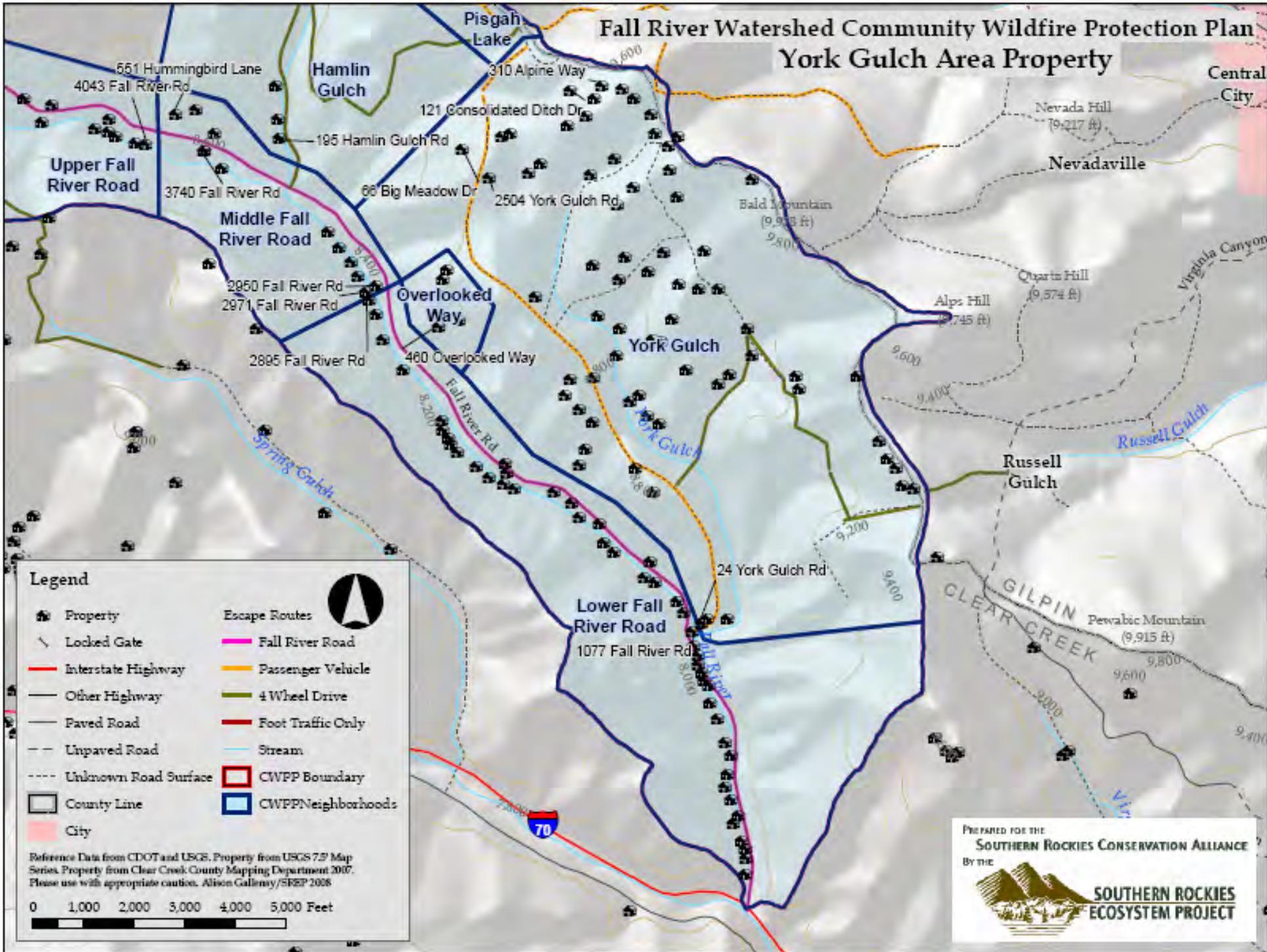
**Legend**

- Interstate Highway
- Other Highway
- Paved Road
- Unpaved Road
- Unknown Road Surface
- Fall River Road
- Escape Route
- Stream
- Fire District Boundary
- County Line
- City
- Bureau of Land Management
- United States Forest Service
- State Land Board
- County
- Private

Reference Data from CDOT and USGS.  
Land Ownership from ColMap  
Alicia Galleney/SREP 2007

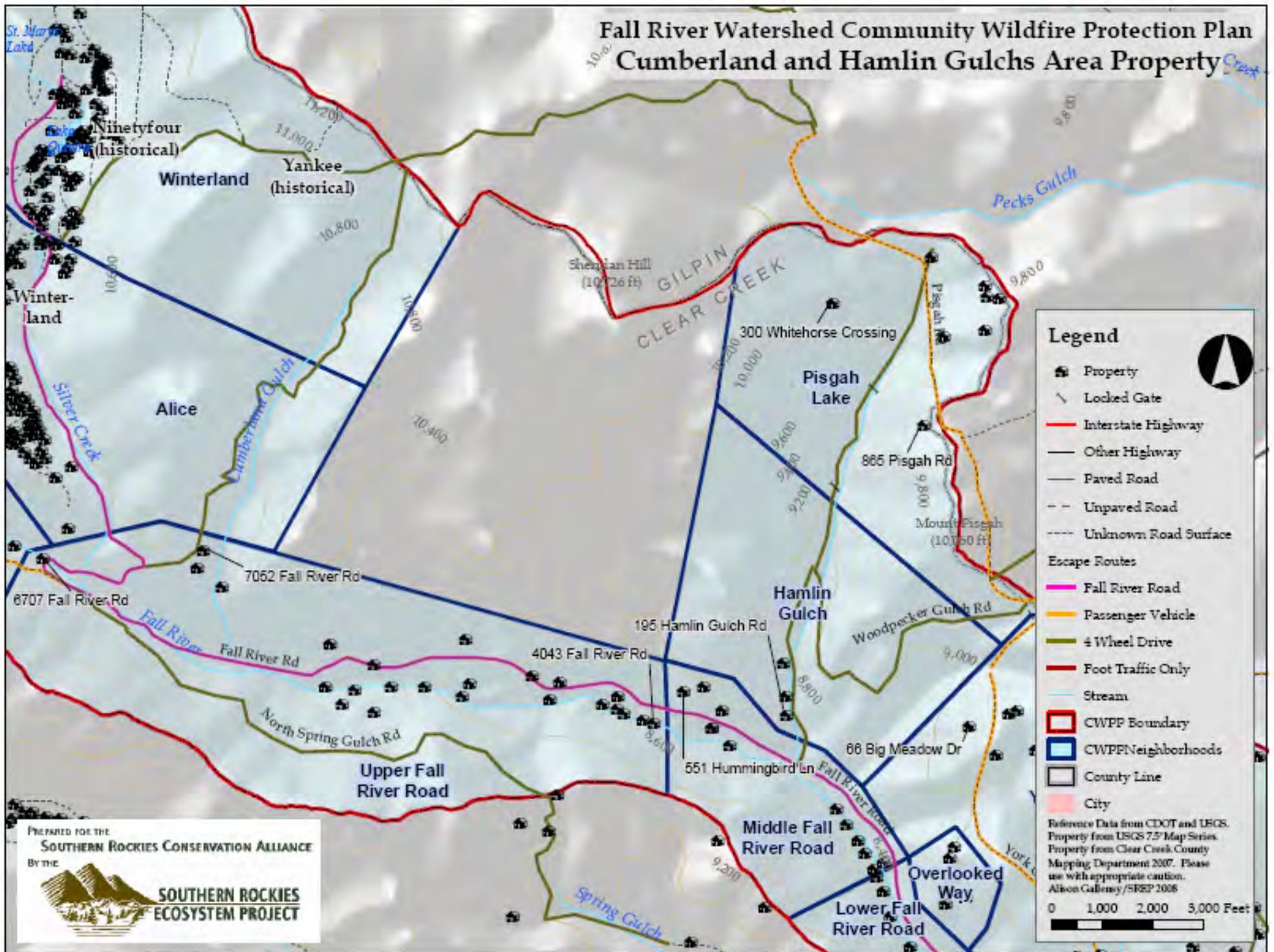
PREPARED FOR THE  
**SOUTHERN ROCKIES CONSERVATION ALLIANCE**  
BY THE  
  
**SOUTHERN ROCKIES  
ECOSYSTEM PROJECT**

# Fall River Watershed Community Wildfire Protection Plan York Gulch Area Property



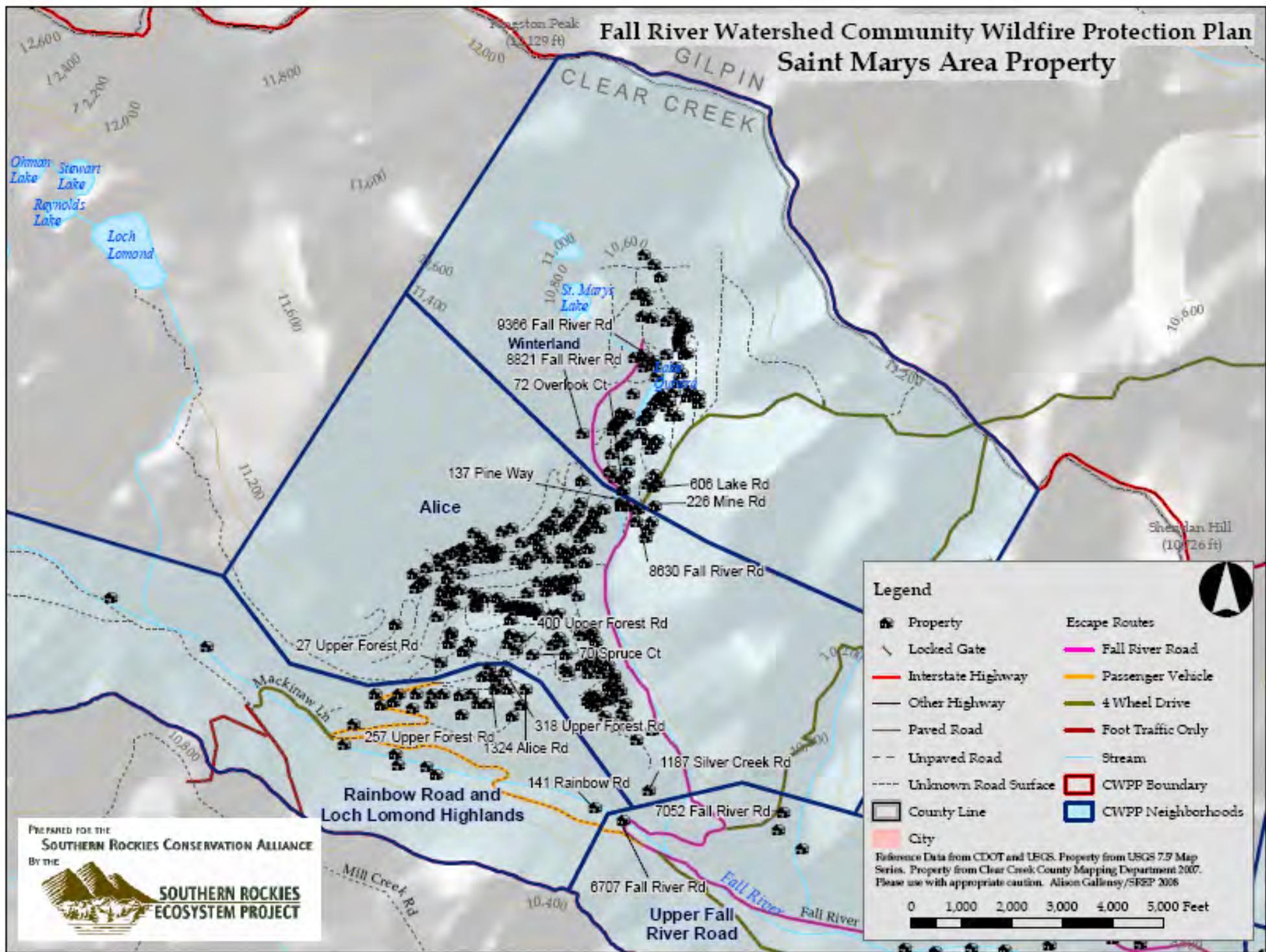
Prepared for the  
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# Fall River Watershed Community Wildfire Protection Plan Cumberland and Hamlin Gulchs Area Property



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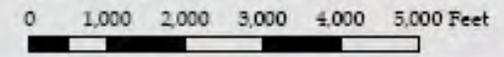
# Fall River Watershed Community Wildfire Protection Plan Saint Marys Area Property



### Legend

- Property
- Locked Gate
- Interstate Highway
- Other Highway
- Paved Road
- Unpaved Road
- Unknown Road Surface
- County Line
- City
- Escape Routes - Fall River Road
- Escape Routes - Passenger Vehicle
- Escape Routes - 4 Wheel Drive
- Escape Routes - Foot Traffic Only
- Stream
- CWPP Boundary
- CWPP Neighborhoods

Reference Data from CDOT and LECS. Property from USGS 7.5 Map Series. Property from Clear Creek County Mapping Department 2007. Please use with appropriate caution. Alison Galleney/SREP 2008

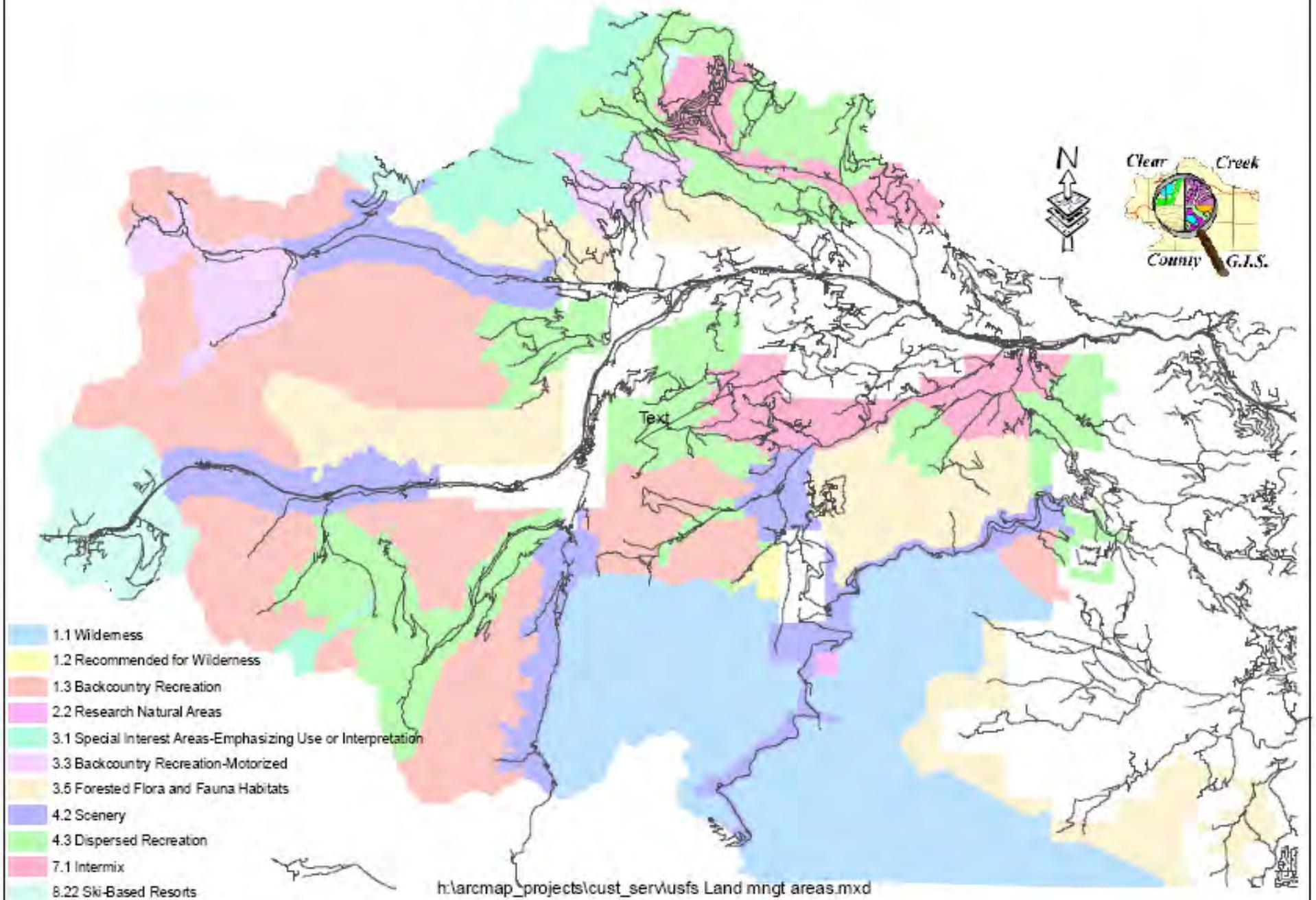


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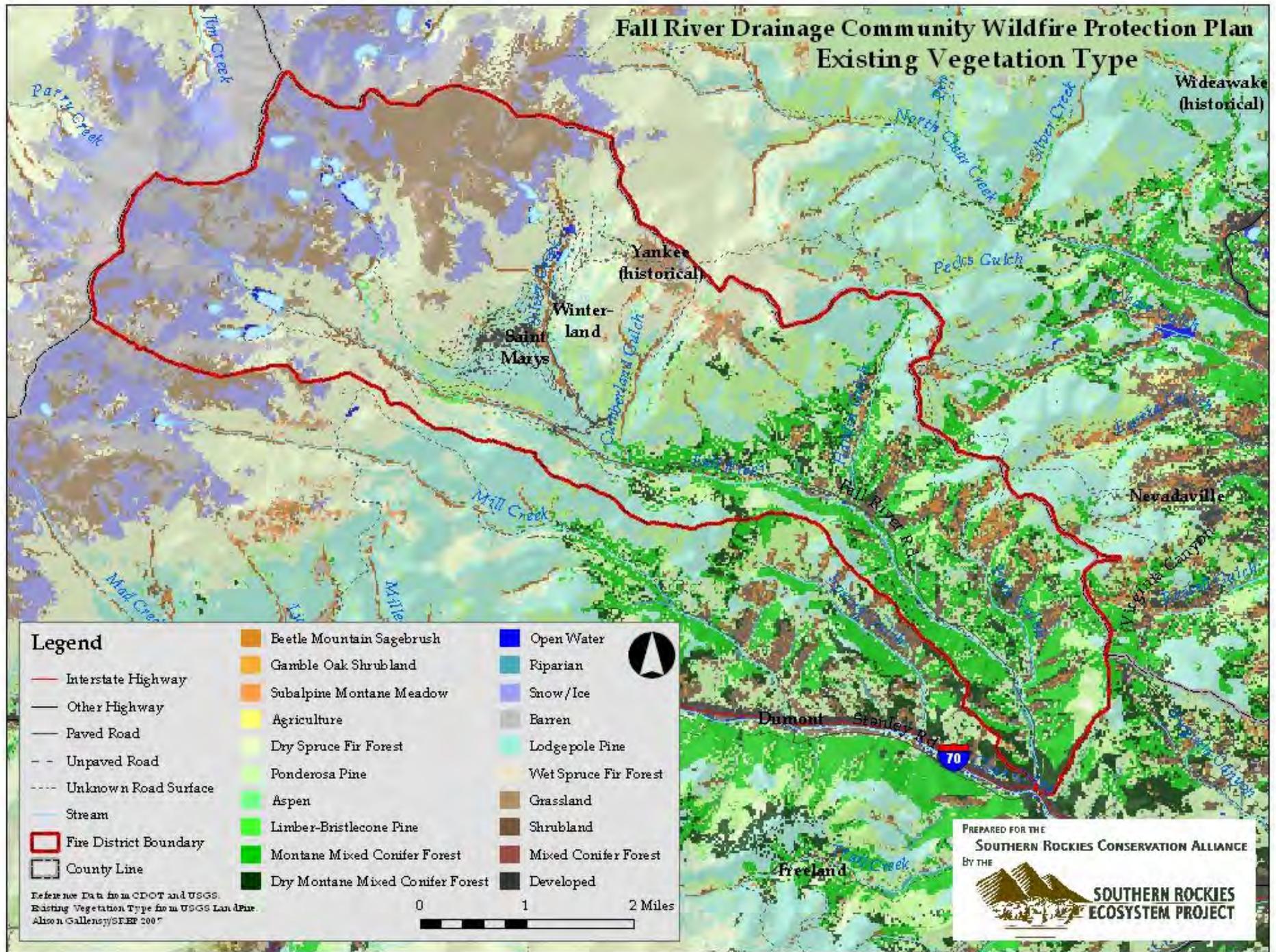
# 1997 U.S.F.S. Land Management Areas in Clear Creek County



**Fall River Road CWPP**  
**Appendix D - Ecological Maps**

- Existing Vegetation Types
- Slope
- Ecological Values
- Historical Sites
- Precipitation

# Fall River Drainage Community Wildfire Protection Plan Existing Vegetation Type



## Legend

- Interstate Highway
- Other Highway
- Paved Road
- Unpaved Road
- Unknown Road Surface
- Stream
- Fire District Boundary
- County Line

- |                                  |                       |
|----------------------------------|-----------------------|
| Beetle Mountain Sagebrush        | Open Water            |
| Gamble Oak Shrubland             | Riparian              |
| Subalpine Montane Meadow         | Snow/Ice              |
| Agriculture                      | Barren                |
| Dry Spruce Fir Forest            | Lodgepole Pine        |
| Ponderosa Pine                   | Wet Spruce Fir Forest |
| Aspen                            | Grassland             |
| Limber-Bristlecone Pine          | Shrubland             |
| Montane Mixed Conifer Forest     | Mixed Conifer Forest  |
| Dry Montane Mixed Conifer Forest | Developed             |

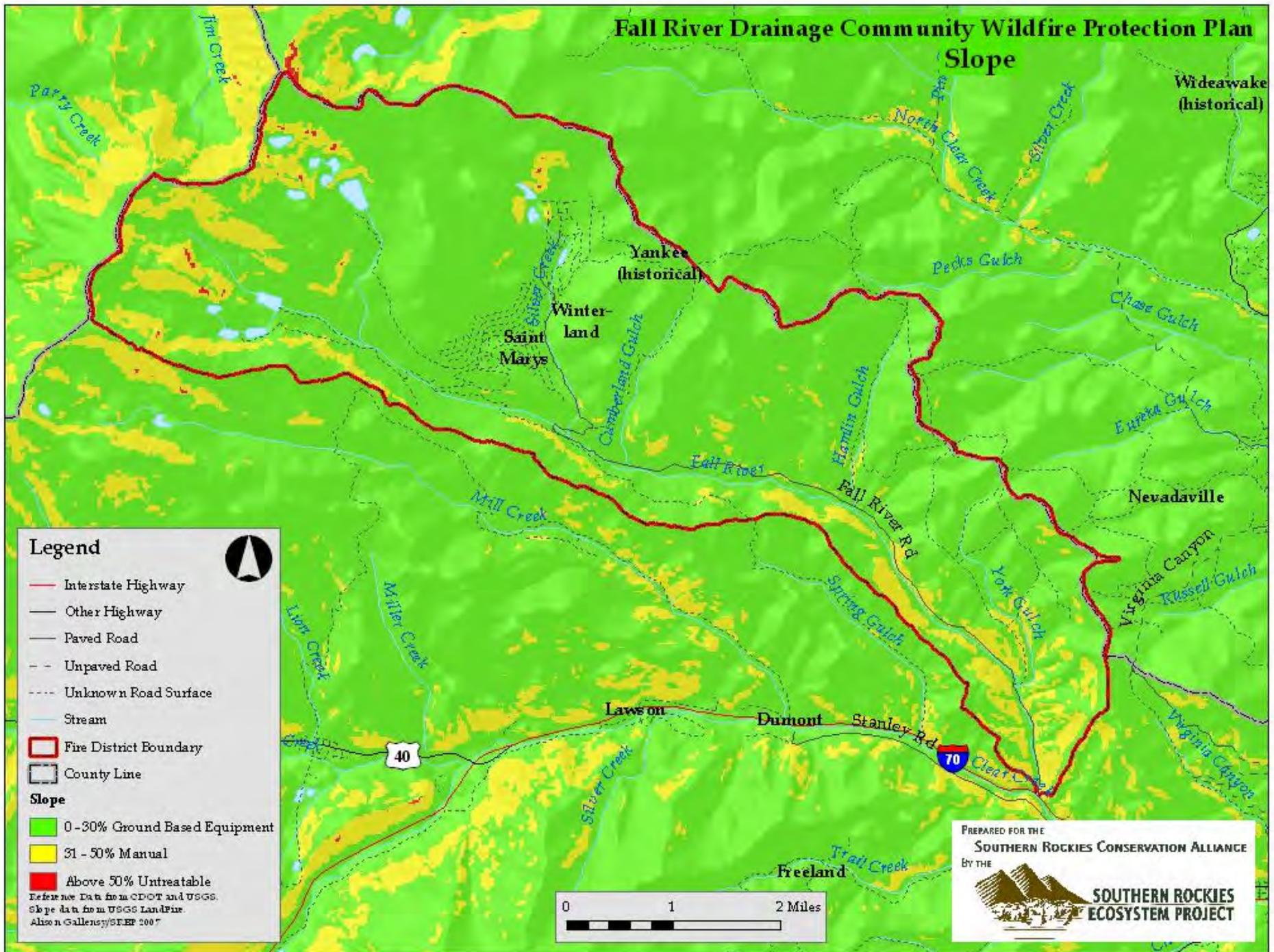


Reference Data from CDOT and USGS.  
Existing Vegetation Type from USGS Land Use.  
Alison Gallensy/SREP 2007

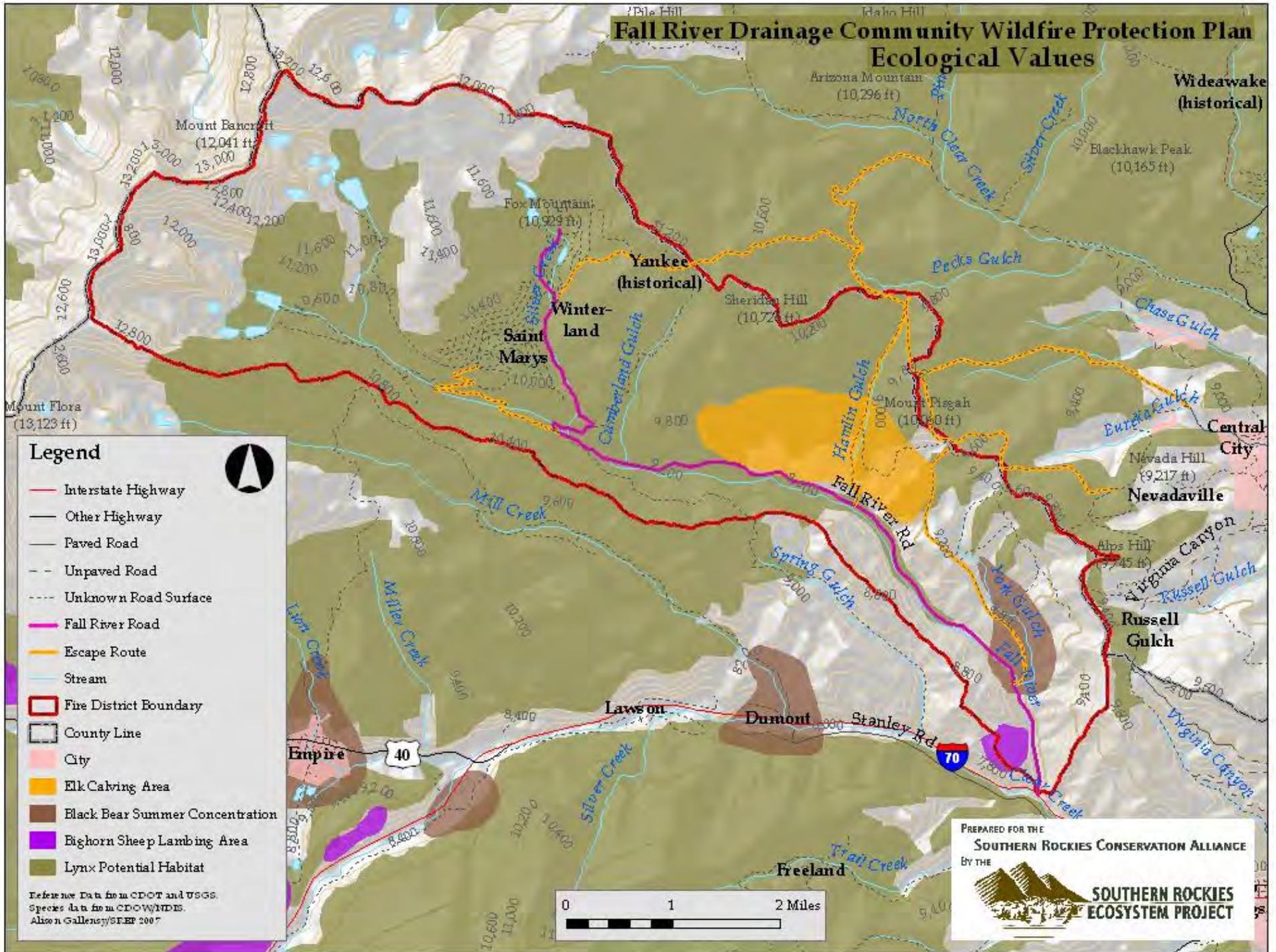


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# Fall River Drainage Community Wildfire Protection Plan Slope



# Fall River Drainage Community Wildfire Protection Plan Ecological Values

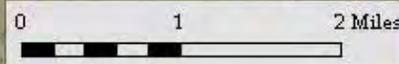


**Legend**

- Interstate Highway
- Other Highway
- Paved Road
- Unpaved Road
- Unknown Road Surface
- Fall River Road
- Escape Route
- Stream
- Fire District Boundary
- County Line
- City
- Elk Calving Area
- Black Bear Summer Concentration
- Bighorn Sheep Lambing Area
- Lynx Potential Habitat

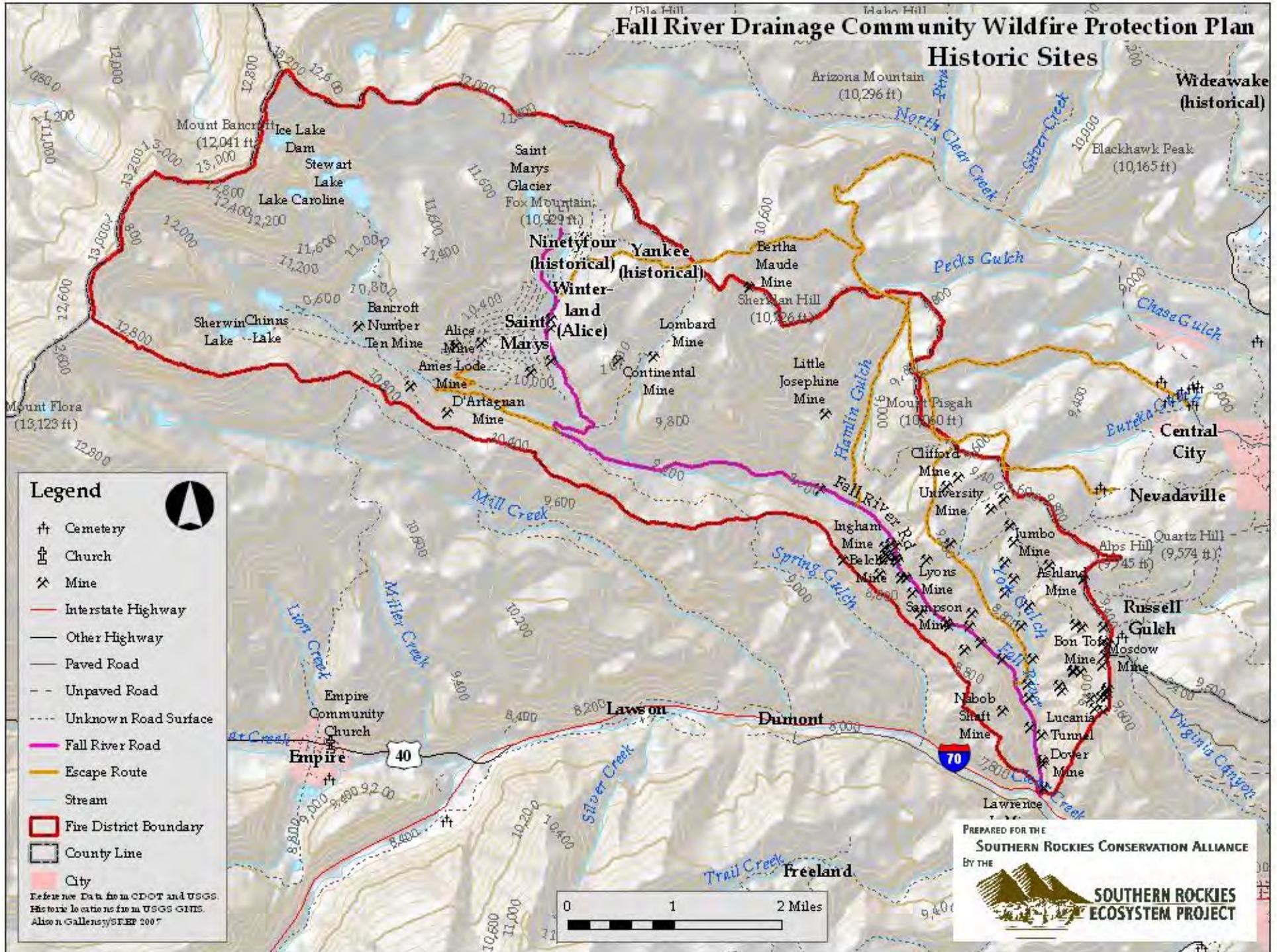
Reference Data from CDOT and USGS.  
Species data from CROWNFIRE.  
Alison Gallenby/SLEP 2007

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# Fall River Drainage Community Wildfire Protection Plan

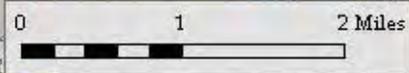
## Historic Sites



**Legend**

- † Cemetery
- ⛪ Church
- ⛏ Mine
- Interstate Highway
- Other Highway
- Paved Road
- - Unpaved Road
- - - Unknown Road Surface
- Fall River Road
- Escape Route
- Stream
- ▭ Fire District Boundary
- ▭ County Line
- ▭ City

Reference Data from CDOT and USGS.  
Historic locations from USGS GIMS.  
Also in Galleney/SLEP 2007



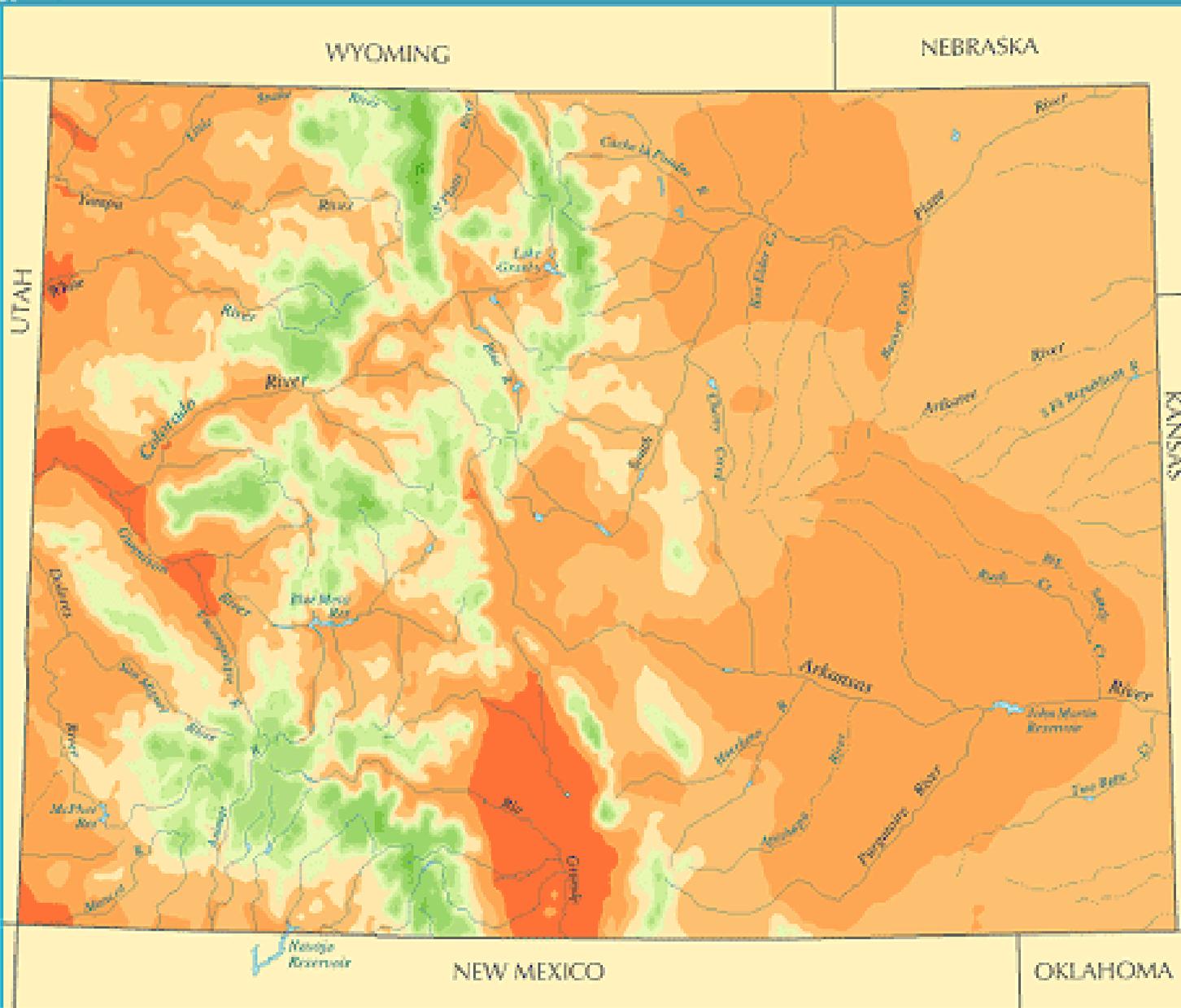
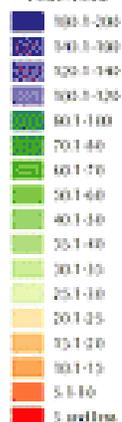
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PRECIPITATION

Precipitation varies widely across the United States, from a low of 2.3 inches per year in California's Death Valley to a high of 460 inches on Hawaii's Mount Waialeale. Nevada ranks as the driest state, with an average annual precipitation of 9.5 inches, and Illinois is the wettest, at 70.3 inches. The average annual precipitation for Colorado is 15.47 inches.

Average Annual Precipitation (in inches)  
1961-1990



**APPENDIX E**  
**Fall River Watershed Community Wildfire Protection Plan**  
**Fire Behavior Modeling**  
**January 9, 2008**

Alison Gallensky – Center for Native Ecosystems

**Overview**

Fire modeling is done for the Community Wildfire Protection Plans for Sunshine, Fall River Canyon and Allenspark. The purpose of the modeling is to provide one source of input when determining fire mitigation projects. The resulting maps show a possible scenario based on specific inputs and does not represent any actual or expected fire activity.

The fire modeling is done using FlamMap Version 3 that was developed by the USDA Forest Service (USFS) Missoula Fire Sciences lab the Systems for Environmental Management. FlamMap is a fire behavior mapping and analysis program that computes potential fire behavior characteristics (spread rate, flame length, fireline intensity, etc.) over an entire landscape for constant weather and fuel moisture conditions.

Data for the modeling comes from LANDFIRE and from RAWS weather stations. LANDFIRE (<http://www.landfire.gov>), the Landscape Fire and Resource Management Planning Tools Project, is a collaboration between the USDA Forest Service, USGS, The Nature Conservancy, and the US Department of the Interior. Data from LANDFIRE consists of landscape topography (elevation, slope, aspect), forest canopy characteristics (cover, height, base height, bulk density), and fire models. Remote Automated Weather Station (RAWS) data was accessed and processed through Fire Family Plus by Cambria Armstrong of the USFS. Fire Family Plus was used to determine the 90th, 95th, and 99th percentile fire weather conditions at each of the locations. 95th percentile weather conditions indicate that fire conditions are worse only 5 percent of the time.

**GIS Notes:** All GIS inputs to FlamMap need to be in the same projection and the outputs will also be in that projection. LANDFIRE data uses the USA Contiguous Albers Equal Area Conic USGS projection (NAD\_1983\_Albers, GCS\_North\_American\_1983; within Arc GIS find this as a projected coordinate system>continental>North America). ASCII grids outputs should be converted to ESRI Raster format before inputting into ArcGIS. ASCII grids can only be dragged into the Arc Catalog conversion tool if their extension is .txt. Files with extension .asc must be accessed through the file icon.

**Fall River Drainage Community Wildfire Protection Plan Area**

Weather information was taken from the Pickle Gulch Regional Automated Weather Station.

The Fall River area with a lot of lodgepole pine does not burn easily. Major fire paths are short, indicating that fire does not spread far. In order to show where fire might spread

under multiple conditions (caused by lighting and/or by humans), a grid of ignition points was created at 1 mile intervals and the maps show how fires would spread from each of those ignition points.

### Fall River Summer Southeast Fire Model 90%

The model used in this scenario represents a summer fire scenario with winds from the southeast and 90<sup>th</sup> percentile fire weather. The following inputs were used to the fire model. Note that inputs in black are from external sources and inputs in red represent the modeler's assumptions.

<b>Input</b>	<b>Value</b>	<b>Source</b>	<b>File</b>
Topography (elevation, slope, aspect)	Varies	Landfire.gov	fallriver.lcp
Canopy Characteristics (cover, height, base height, bulk density)	Varies	Landfire.gov	fallriver.lcp
Fire Models (13 typical surface fuel arrangements – Anderson 1982)	Varies	Landfire.gov	fallriver.lcp
Ignition Points	11 by 8 grid with approx. 1 mile between each ignition	Modeler	IgnitionGrid.shp
Fuel Model	All 50 given the same inputs	Modeler	test190.fms
1 Hour Fuel Moisture	3%	RAWS/FFP	test190.fms
10 Hour Fuel Moisture	4%	RAWS/FFP	test190.fms
100 Hour Fuel Moisture	7%	RAWS/FFP	test190.fms
Live Woody Fuel Moisture	49%	RAWS/FFP	test190.fms
Live Herbaceous Fuel Moisture	3%	RAWS/FFP	test190.fms
Wind Direction	135 degrees	Modeler	Run input
Wind Speed	9 mph	RAWS/FFP	Run input
Foliar Moisture Content	100%	Modeler	Run Input
Weather Month Day	8/14-8/17 (all with identical conditions)	Modeler	test190.wtr
Hour1 (min temperature)	5:00 AM	Modeler	test190.wtr
Hour 2 (max temperature)	3:30 PM	Modeler	test190.wtr
Precipitation	0 100 <sup>ths</sup> of an inch	Modeler	test190.wtr
Temp 1 minimum	47° F	Modeler	test190.wtr
Temp 2 maximum	77° F	RAWS/FFP	test190.wtr
Humid 1 maximum	20%	Modeler	test190.wtr
Humid 2 minimum	10%	RAWS/FFP	test190.wtr

<b>Input</b>	<b>Value</b>	<b>Source</b>	<b>File</b>
Elevation	9500 feet	Modeler	test190.wtr
Precipitation Duration	N/A	Modeler	test190.wtr
Wind Month Day	8/14-8/17 (all with identical conditions)	Modeler	test190.wnd
Hour	3:30 PM	Modeler	test190.wnd
Speed	9 mph	RAWS/FFP	test190.wnd
Direction	135 degrees	Modeler	test190.wnd
Cloud Cover	0 percent	Modeler	test190.wnd
Fuel Moisture Conditioning Period Start	8/15 15:00 PM	Model Default	Run Input
Fuel Moisture Conditioning Period End	8/16 15:00 PM	Model Default	Run Input
Crown Fire Calculation Method	Finney (1998)	Model Default	Run Input

### Fall River Summer Southeast Fire Model 95%

The model used in this scenario represents a summer fire scenario with winds from the southeast and 95<sup>th</sup> percentile fire weather. The following inputs were used to the fire model. Note that inputs in black are from external sources and inputs in red represent the modeler's assumptions.

<b>Input</b>	<b>Value</b>	<b>Source</b>	<b>File</b>
Topography (elevation, slope, aspect)	Varies	Landfire.gov	fallriver.lcp
Canopy Characteristics (cover, height, base height, bulk density)	Varies	Landfire.gov	fallriver.lcp
Fire Models (13 typical surface fuel arrangements – Anderson 1982)	Varies	Landfire.gov	fallriver.lcp
Ignition Points	11 by 8 grid with approx. 1 mile between each ignition	Modeler	IgnitionGrid.shp
Fuel Model	All 50 given the same inputs	Modeler	test195.fms
1 Hour Fuel Moisture	2%	RAWS/FFP	test195.fms
10 Hour Fuel Moisture	3%	RAWS/FFP	test195.fms
100 Hour Fuel Moisture	6%	RAWS/FFP	test195.fms
Live Woody Fuel Moisture	49%	RAWS/FFP	test195.fms
Live Herbaceous Fuel Moisture	2%	RAWS/FFP	test195.fms
Wind Direction	135 degrees	Modeler	Run input

<b>Input</b>	<b>Value</b>	<b>Source</b>	<b>File</b>
Wind Speed	11 mph	RAWS/FFP	Run input
Foliar Moisture Content	100%	Modeler	Run Input
Weather Month Day	8/14-8/17 (all with identical conditions)	Modeler	test195.wtr
Hour1 (min temperature)	5:00 AM	Modeler	test195.wtr
Hour 2 (max temperature)	3:30 PM	Modeler	test195.wtr
Precipitation	0 100 <sup>ths</sup> of an inch	Modeler	test195.wtr
Temp 1 minimum	49° F	Modeler	test195.wtr
Temp 2 maximum	79° F	RAWS/FFP	test195.wtr
Humid 1 maximum	15%	Modeler	test195.wtr
Humid 2 minimum	8%	RAWS/FFP	test195.wtr
Elevation	9500 feet	Modeler	test195.wtr
Precipitation Duration	N/A	Modeler	test195.wtr
Wind Month Day	8/14-8/17 (all with identical conditions)	Modeler	test195.wnd
Hour	3:30 PM	Modeler	test195.wnd
Speed	11 mph	RAWS/FFP	test195.wnd
Direction	135 degrees	Modeler	test195.wnd
Cloud Cover	0 percent	Modeler	test195.wnd
Fuel Moisture Conditioning Period Start	8/15 15:00 PM	Model Default	Run Input
Fuel Moisture Conditioning Period End	8/16 15:00 PM	Model Default	Run Input
Crown Fire Calculation Method	Finney (1998)	Model Default	Run Input

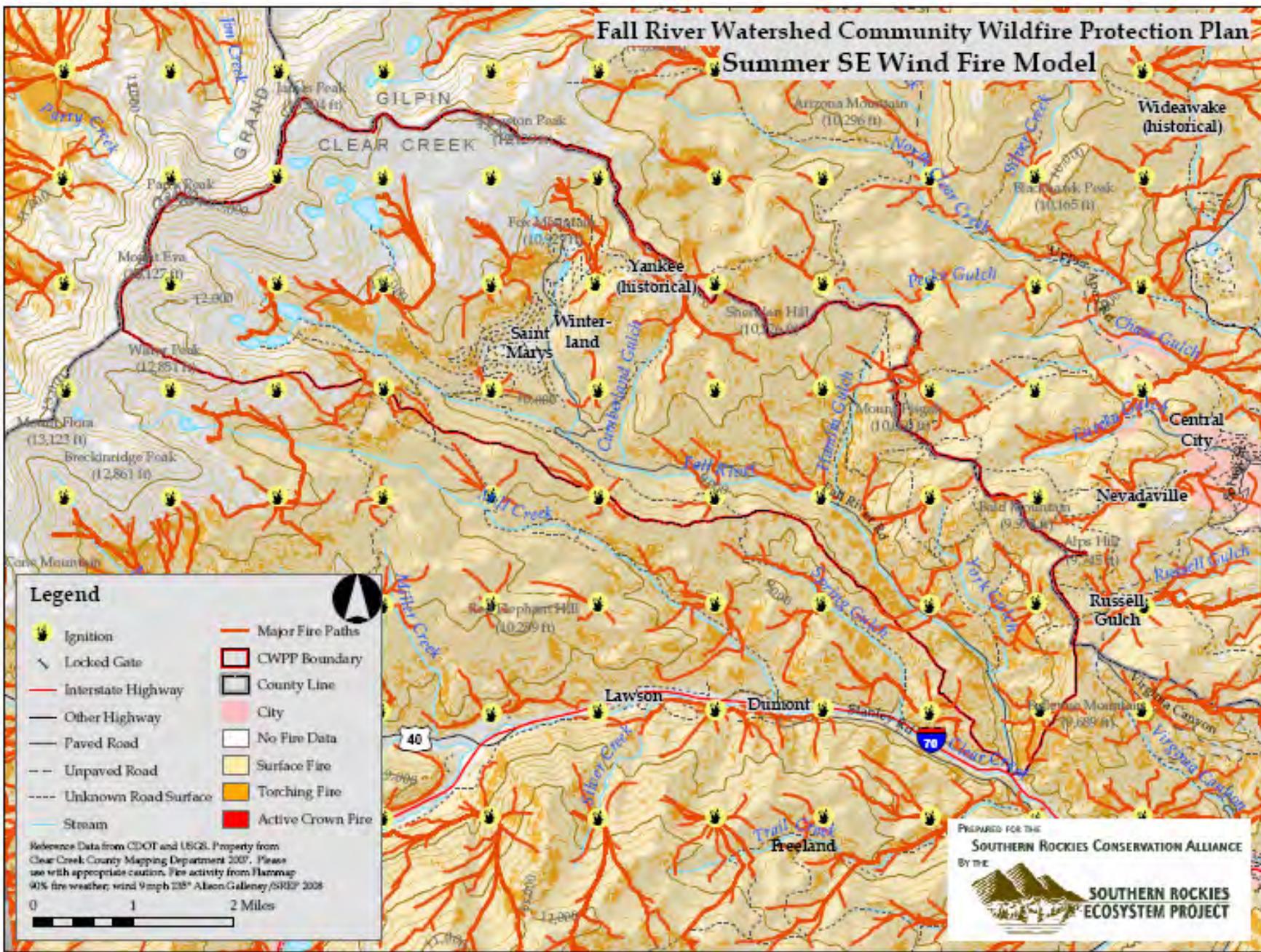
### Fall River Autumn West Fire Model 99%

The model used in this scenario represents an autumn fire scenario with winds from the west and 99<sup>th</sup> percentile fire weather. The following inputs were used to the fire model. Note that inputs in black are from external sources and inputs in red represent the modeler's assumptions.

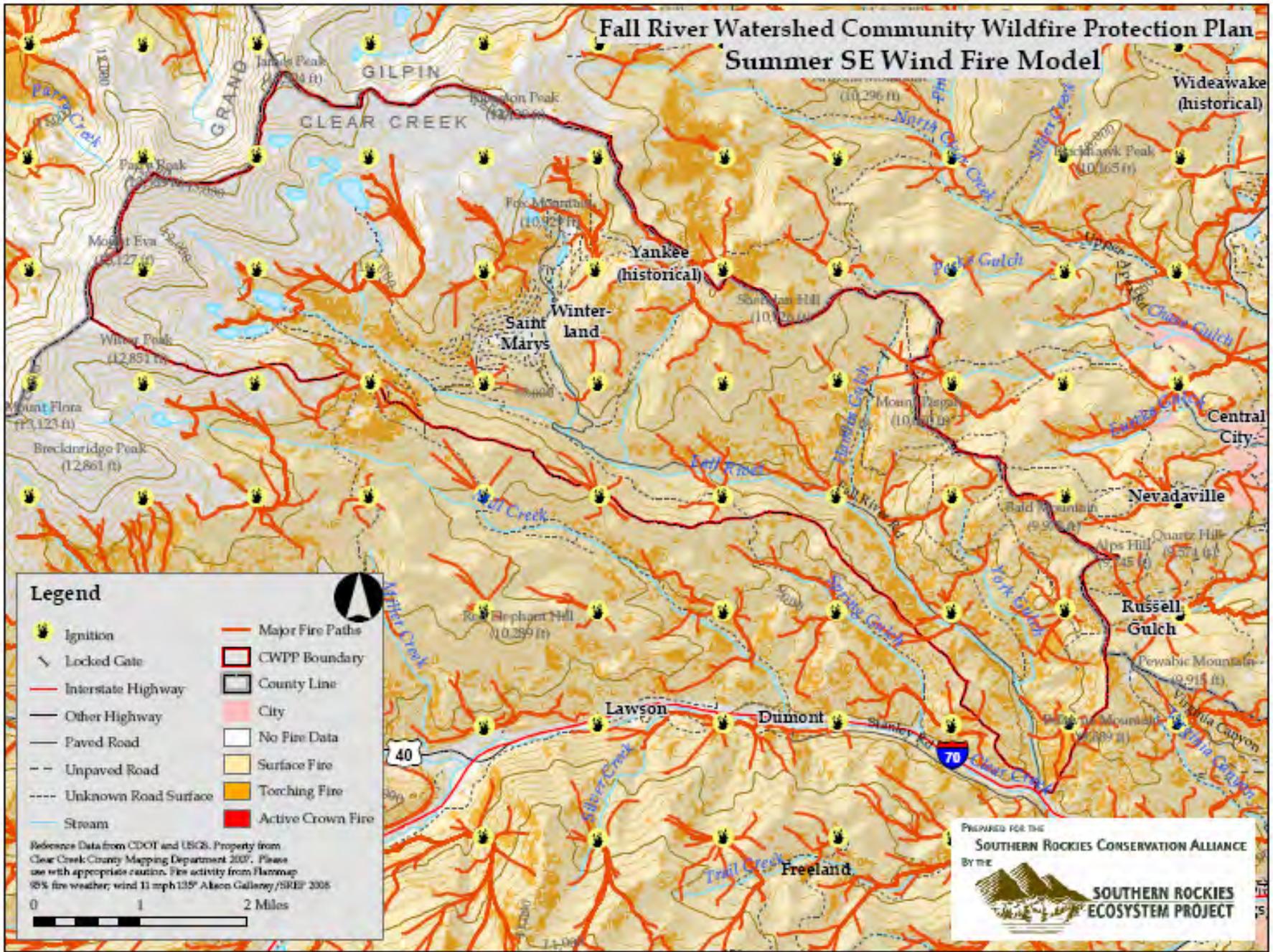
<b>Input</b>	<b>Value</b>	<b>Source</b>	<b>File</b>
Topography (elevation, slope, aspect)	Varies	Landfire.gov	fallriver.lcp
Canopy Characteristics (cover, height, base height, bulk density)	Varies	Landfire.gov	fallriver.lcp

<b>Input</b>	<b>Value</b>	<b>Source</b>	<b>File</b>
Fire Models (13 typical surface fuel arrangements – Anderson 1982)	Varies	Landfire.gov	fallriver.lcp
Ignition Points	11 by 8 grid with approx. 1 mile between each ignition	Modeler	IgnitionGrid.shp
Fuel Model	All 50 given the same inputs	Modeler	test199.fms
1 Hour Fuel Moisture	1%	RAWS/FFP	test195.fms
10 Hour Fuel Moisture	2%	RAWS/FFP	test195.fms
100 Hour Fuel Moisture	5%	RAWS/FFP	test195.fms
Live Woody Fuel Moisture	49%	RAWS/FFP	test195.fms
Live Herbaceous Fuel Moisture	1%	RAWS/FFP	test195.fms
Wind Direction	270 degrees	Gold Hill Plan	Run input
Wind Speed	16 mph	RAWS/FFP	Run input
Foliar Moisture Content	100%	Modeler	Run Input
Weather Month Day	9/29-10/5 (all with identical conditions)	Gold Hill Plan	test295.wtr
Hour1 (min temperature)	5:00 AM	Modeler	test295.wtr
Hour 2 (max temperature)	3:30 PM	Modeler	test295.wtr
Precipitation	0 100 <sup>ths</sup> of an inch	Modeler	test295.wtr
Temp 1 minimum	54° F	Modeler	test295.wtr
Temp 2 maximum	84° F	RAWS/FFP	test295.wtr
Humid 1 maximum	15%	Modeler	test295.wtr
Humid 2 minimum	5%	RAWS/FFP	test295.wtr
Elevation	8500 feet	Modeler	test295.wtr
Precipitation Duration	N/A	Modeler	test295.wtr
Wind Month Day	9/29-10/5 (all with identical conditions)	Gold Hill Plan	test195.wnd
Hour	3:30 PM	Modeler	test195.wnd
Speed	16 mph	RAWS/FFP	test195.wnd
Direction	270 degrees	Gold Hill Plan	test195.wnd
Cloud Cover	0 percent	Modeler	test195.wnd
Fuel Moisture Conditioning Period Start	9/30 15:00 PM	Model Default	Run Input
Fuel Moisture Conditioning Period End	10/2 15:00 PM	Model Default	Run Input
Crown Fire Calculation Method	Finney (1998)	Model Default	Run Input

# Fall River Watershed Community Wildfire Protection Plan Summer SE Wind Fire Model



# Fall River Watershed Community Wildfire Protection Plan Summer SE Wind Fire Model



# Fall River Watershed Community Wildfire Protection Plan Fall West Wind Fire Model

