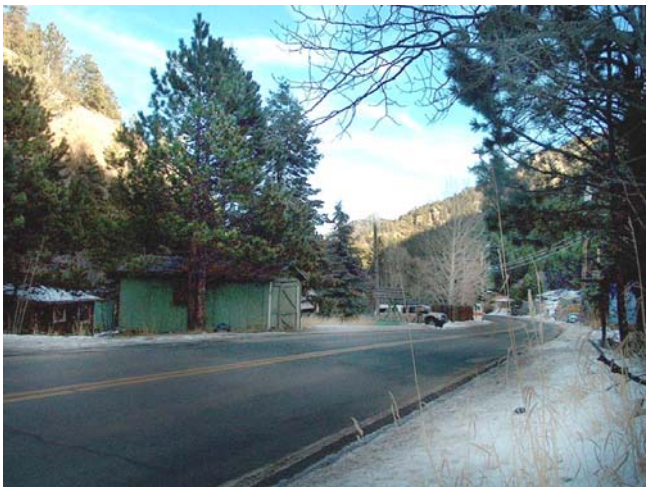
Community Wildfire Protection Plan



Lefthand Canyon through Rowena

Historic cabin in Gold Hill

Fuels (and deer) in Gold Run subdivision

West of Gold Hill

Gold Hill
Fire Protection District
December 2006

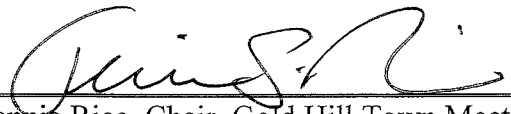
Gold Hill Fire Protection District
Community Wildfire Protection Plan
Stakeholder Signatures

11-16-06

Chris Finn, Fire Chief, Gold Hill Fire Protection District — Date

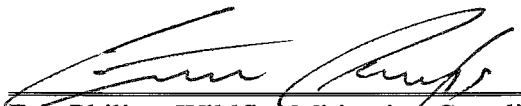
11-16-06

David Steinmann, Board President, Gold Hill Fire Protection District — Date



12-11-06

Jennie Rice, Chair, Gold Hill Town Meeting, Inc. — Date

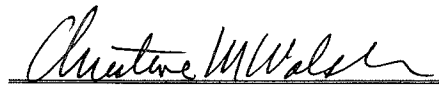


11-27-06

Eric Philips, Wildfire Mitigation Coordinator, Boulder County — Date

11-27-06

Allen Owen, District Forester, Colorado State Forest Service — Date



12-1-06

Christine Walsh, District Ranger, Boulder Ranger District, United States Forest Service — Date

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Acronyms and Abbreviations

ARNF	Arapaho-Roosevelt National Forest
BLM	United States Department of Interior Bureau of Land Management
CAP	Community Assistance Program
CNE	Center for Native Ecosystems
CNHP	Colorado Natural Heritage Program
CSFS	Colorado State Forest Service
CWPP	Community Wildfire Protection Plan
EA	Environmental Assessment
FEPP	Federal Excess Private Property
FWS	United States Fish and Wildlife Service
GHFPD	Gold Hill Fire Protection District
GHTM	Gold Hill Town Meeting, Inc.
GIS	Geographic Information System
HFI	Healthy Forest Initiative
HFRA	Healthy Forest Restoration Act of 2003
IGA	Inter-Governmental Agreement
MAP	Matching Awards Program
MIS	Management Indicator Species
NEPA	National Environmental Policy Act
NFF	National Forest Foundation
NFP	National Fire Plan
SAF	Society of American Foresters
SRCA	Southern Rockies Conservation Alliance
USDA	United States Department of Agriculture
USFS	United States Forest Service
VFA	Volunteer Fire Assistance
WHIMS	Wildfire Hazard Identification and Mitigation System
WUI	Wildland Urban Interface

Figures

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Maps

Executive Summary

Wildland fire in Colorado has been occurring for millennia. It brings nutrients to the soil and diversity to vegetation and wildlife, thereby benefiting the humans who later live in its path. However, wildfire can also destroy homes and communities and cause injury and loss of life. Ironically, the success of Colorado's fire suppression and forest management activities in the 20th century has made fire management more complicated, because many forest stands are denser than ever and present heightened risks. Relatively recent and significant fires such as the Hayman, Big Elk, Black Tiger, and Overland fires highlight the need for a shifting paradigm in fire management from total suppression to an acceptance of wildland fire as a natural and necessary part of the landscape. The Black Tiger fire of 1989 destroyed 44 homes and caused $10 million in property damage. The fire-fighting costs alone from the Overland fire of 2003 were $400,000.

Fire and forest management are also complicated by residential development in or adjacent to forest lands. While prescribed fire may be the optimal management option from a forest health standpoint, it is usually infeasible near populated areas. In addition, many people choose to live in or near the forest for its beauty and are understandably concerned about any plans for change. Much of the forested land in Colorado is not under the control of private landowners but is under the jurisdiction of the United States Forest Service (USFS) or the Bureau of Land Management (BLM). The forest management actions taken by these agencies to improve forest health and reduce wildfire risk are perceived by some to have a negative impact on the appearance and aesthetics of the forest. Clearly, a balanced approach is needed to address wildfire risks, forest health, aesthetics, property values, and other community concerns.

This document describes the Community Wildfire Protection Plan (CWPP) developed for the Gold Hill Fire Protection District (GHFPD) during 2006. The CWPP was developed on a volunteer basis by GHFPD community members with assistance from USFS, Colorado State Forest Service (CSFS), Boulder County, and the Southern Rockies Conservation Alliance (SRCA). The purpose of a CWPP is to assist landowners, the fire district, and local, state, and federal agencies in the identification of lands at risk from wildfire and to formulate strategies for reducing hazardous forest fuels where appropriate, while improving forest health, recognizing diverse public land values, supporting local industry, and improving fire-fighting response capabilities. The GHFPD recognizes that the costs of fuel reduction and planning must be weighed against the likelihood and costs of suppressing severe wildfire and any accompanying direct property and income losses. It has determined that the proactive, collaborative planning involved in a CWPP is the most cost-effective and efficient way to reduce the risk posed by wildland fire while addressing community priorities.

With a CWPP in place, federal matching grants for fuel reduction and related projects become available per the Healthy Forests Restoration Act of 2003 (HFRA). To have access to these funds, GHFPD communities will need to match them through their own expenditures and/or

through volunteer labor valued in kind. Grant monies may be used on federal, state, county, and/or private lands (with landowner permission) within the wildland-urban interface (WUI), that is, where residential development borders wildland areas.

The CWPP requires the approval of local government, the local fire authority, and the state agency responsible for forest management. The CWPP must also be developed in consultation with the applicable federal agency managing the land surrounding the at-risk communities. For the GHFPD, these stakeholders are the Gold Hill Town Meeting (GHTM), GHFPD, CSFS, the Boulder Ranger District of the USFS, and Boulder County Land Use/Wildfire Mitigation. The CWPP has been officially approved by these entities.

Creating a CWPP requires three major activities: 1) Involving stakeholders, 2) Assessing community risks from wildfire, and 3) Preparing mitigation, implementation and monitoring plans that address fuel hazards, home and infrastructure vulnerability, and emergency preparedness.

Stakeholders

In addition to the stakeholders named above, the CWPP process aims for broad community involvement. Involving the community at large was initially addressed by a mailing to voters residing within the GHFPD about the kickoff meeting in December 2005, posting information related to the process at the Gold Hill Store, placing flyers in the mailboxes of Gold Hill residents, and word of mouth. Additional efforts to engage the residents of the GHFPD are ongoing and have included:

- Public monthly meetings with email notification
- Regular updates to the Gold Hill Town Meeting
- Bi-monthly updates through the Gold Hill Town Meeting newsletter
- Phone calls to residents of communities within the GHFPD
- An information booth during Gold Hill's annual 4th of July celebration (2006)
- Construction of a website, www.goldhillfire.org/cwpp
- A second mailing to property owners requesting input on the draft CWPP during the fall of 2006

The initial meeting in December 2005 and the November 2006 meeting presenting the draft CWPP had attendance of upwards of 40 individuals, roughly 15-20 percent of the GHFPD population. Attendance at the monthly CWPP meetings during 2006 averaged between 15 and 20 individuals, including SRCA, county, state, and federal agency personnel. The attendees at these regular meetings make up the CWPP Task Force and represent a broad cross-section of the GHFPD community.

Community Risks from Wildfire

Assessing community risks from wildfire constituted the majority of the work in developing the CWPP. The goal of the community risk assessment is to rank the communities within the GHFPD based on the likelihood of wildfire occurring and the potential magnitude of wildfire damages. These community rankings are used to prioritize locations for fuel treatment projects (e.g., tree thinning) to mitigate the risk from wildfire and to support recommendations for reducing structural vulnerability and improving emergency preparedness
.
The CWPP addresses seven sources of wildfire risk:

- Current vegetative condition and wildfire fuel hazards
- Weather patterns
- Frequency of past fires
- Homes and infrastructure vulnerability to wildfire
- Lack of community-level fire-fighting preparedness
- Historic/cultural/ecological values at risk due to wildfire
- Population size

The CWPP Task Force defined the following eight communities within the GHFPD to be addressed in the risk assessment:

- Town of Gold Hill (the historic town)
- Gold Run Subdivision (on Dixon Road south of town)
- Rowena (the community along Lefthand Canyon Rd)
- Lefthand area (all homes/structures near the intersection of Lickskillet and Lefthand Canyon)
- Sunshine area (the area along Sunshine Canyon Rd east of the Snowbound area and west of the 7 mile marker)
- Snowbound area (the homes/structures in the area of the Snowbound mine)
- Rim Road (the homes along this road southeast of Gold Hill)
- West of Gold Hill (all homes/structures west of the Town of Gold Hill)

Map ES-1 shows the GHFPD with the locations of these eight communities. This map is known as the CWPP "community base map."

The risk assessment process first rates each community as High, Medium, or Low Risk in each of the seven risk categories based on currently available data. Next, a scoring model is used to determine an overall risk score. This score is then translated into a descriptive overall rating of High, Medium, or Low Risk for each community. Table ES-1 shows the final results of the community risk assessment (the data, analysis, and results for each of the seven risk categories are presented in Section 3 of this document).

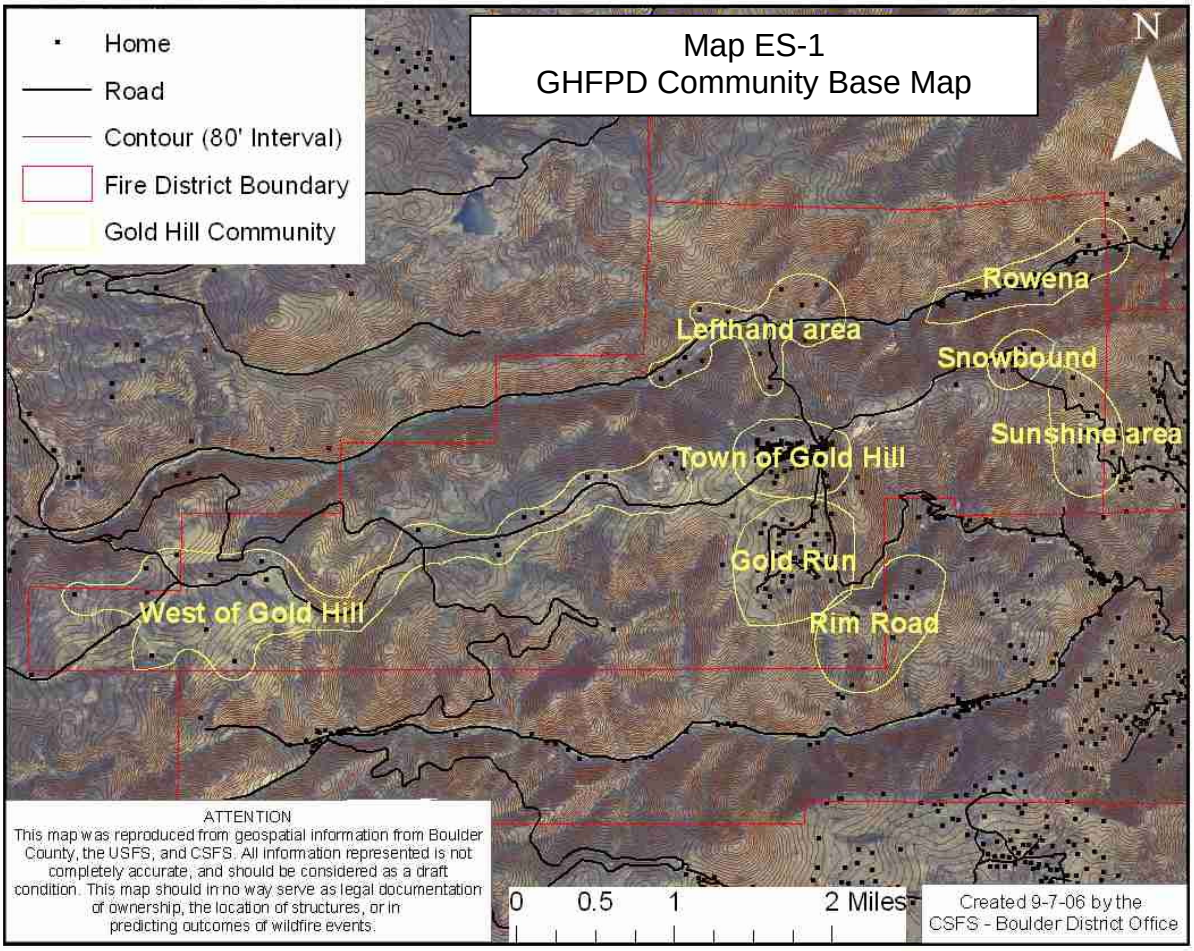


Table ES-1
Community Risk Assessment Results

Community	Overall Risk Rating
Town of Gold Hill	High
Gold Run Subdivision	High
Rowena	High
Lefthand area	Medium
Sunshine area	Low
Snowbound area	High
Rim Road	Medium
West of Gold Hill	Medium

Mitigation, Implementation, and Monitoring Plans

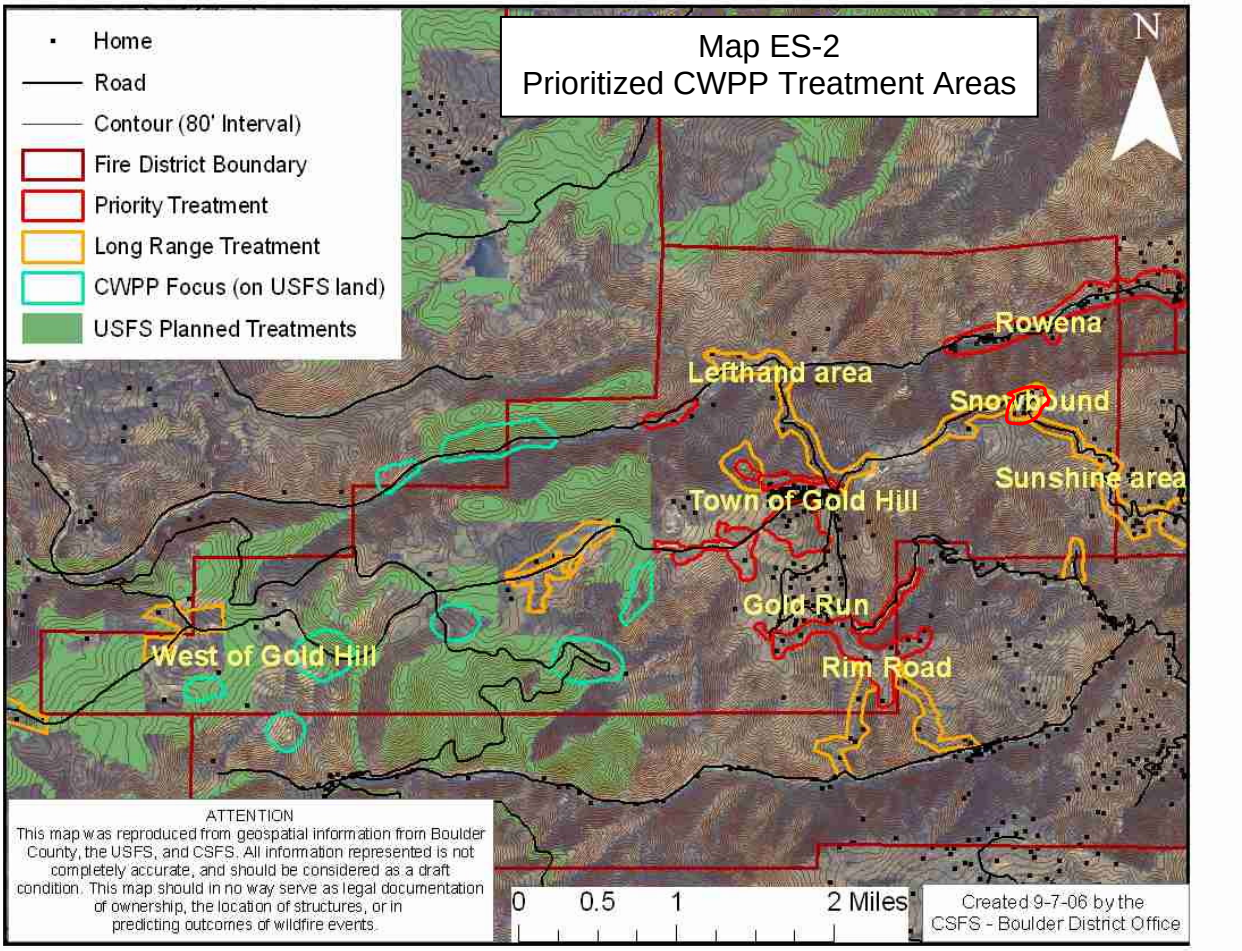
CWPP Mitigation Plan

The CWPP mitigation plan has three components: 1) prioritized fuel treatment projects, 2) recommendations to reduce structural ignitability, and 3) recommendations to improve emergency preparedness.

The identification and prioritization of areas within the GHFPD for fuel reduction projects was the result of a two-stage process. First, wildfire scenarios were modeled by USFS using a software tool called FlamMap to determine potential wildfire behavior: fire pathways, and areas of ground, torching, and crown fires. The fire behavior results indicated areas within GHFPD that could potentially benefit from fuels treatment. The CWPP Task Force reviewed these results and identified specific treatment areas factoring in local knowledge of fire-fighting conditions, terrain, and previously planned treatments. Second, the locations were prioritized according to the community risk assessment results. Map ES-2 shows the results of this process (Section 4 describes the process in detail).

The priority treatment areas are associated with the communities with "High" overall risk ratings: the Town of Gold Hill, the Gold Run Subdivision, Rowena, and the Snowbound area. Due to their proximity to these "High" risk communities, the Lefthand area and Rim Road communities will also benefit from many of the priority treatment areas. Additional, lower priority/long-range treatment areas are also specified to address the lower risk communities, provide contiguous treatment areas where feasible, and to ensure the accessibility of the major roadways. The CWPP Task Force is committed to meeting with private landowners to discuss these projects and refine the treatment areas. If private landowners are not willing to participate, then alternative treatment areas will be proposed.

Note that the USFS has existing plans for fuel reduction activities on its lands in the western part of the GHFPD. These USFS treatment areas generally overlap with the treatments identified as part of the CWPP process. Hence, the priority CWPP treatments focus on the eastern section of the GHFD where the land ownership is primarily private and no other plans are in place. The HFRA gives direction to the Departments of Interior and Agriculture (i.e., the USFS and BLM) to address the priorities identified in a CWPP when making plans for fuel reduction treatments on federal lands within the WUI. In other words, the CWPP will influence the management of these federal lands according to community priorities.



The priority treatment areas represent approximately 446 acres. Assuming an average treatment cost ranging from $750 - $2,000 per acre, the total cost of treating these areas could range from $334,500 to $892,000. If these treatments are spread out over the next 10 years, the annual cost of treatment could average approximately $33,000 to $89,000 per year. If grants are received on the typical 50-50 cost-sharing basis, annual grant levels will need to total $16,500 to $44,750 per year, and the communities within the GHFPD will need to come up with equivalent amounts in cash and/or volunteer labor. Clearly, this is an ambitious goal for the relatively small population of the GHFPD. When compared to the costs and damage of major wildfires as noted earlier, however, these expenditures appear relatively small. (Note that the CWPP does not require these grant levels and local contributions; any size project is encouraged.)

In addition to the prioritized treatment areas, the mitigation plan also includes recommendations to reduce structural vulnerability and improve emergency preparedness. The only community within the GHFPD with a low risk due to structural vulnerability is the Sunshine area. This is primarily due to the fact that the homes in this area all have defensible space (i.e., no vegetation or wood piles within 15 feet of the home; 10 feet or better crown spacing between trees within 100 feet of the home) as well as dedicated fire-fighting cisterns (these are typically 1500-2500

gallons depending on home size and are to be distinguished from community cisterns that are typically at least 12,000 gallons). The other seven communities are rated as either medium or high risk. For example, more than 70 percent of the homes in the other seven communities have wood siding. Almost none have fire-fighting cisterns dedicated to the home, and, excluding the homes in the West of Gold Hill community, at least 50 percent of the homes lack defensible space.

The CWPP strongly recommends that all homeowners take action to reduce structural vulnerability by creating defensible space and installing dedicated fire-fighting cisterns (usually 1500-2500 gallons depending on the size of the home). Guidelines for defensible space have been developed by the Colorado State University Cooperative Extension. The document containing these recommendations is included in its entirety as Appendix B.

In addition to individual homeowner actions to reduce structural vulnerability, GHFPD communities should take community-level steps to improve emergency preparedness. Excluding the Town of Gold Hill with low risk, the other seven communities are rated as either medium or high risk in terms of emergency preparedness, primarily due to the lack of community fire-fighting cisterns, access/egress problems, steep terrain, and distance from the fire barn. Table ES-2 summarizes the CWPP's recommendations to reduce structural vulnerability and improve community-level emergency preparedness (i.e., beyond individual homeowner actions).

Table ES-2
Recommendations to Reduce Structural Vulnerability and Improve Emergency Preparedness

Community	Recommendations
All communities except Sunshine	• Create defensible space around homes (see Appendix B) • Install home-dedicated fire-fighting cisterns (1500-2500 gallons)
Rowena	• Trained person(s) with radio communication skills • Two dry hydrants • Community cistern 30k gallons
Lefthand area	• Community cistern 30k gallons or dry hydrant • Trained person(s) with radio communication skills
Sunshine area	Trained firefighters
Rim Road	• Road turnouts for two way/emergency traffic • Escape route to Four Mile canyon • Mitigation around power lines • Detailed training with Four Mile Fire Dept • Community cistern 30k gallons
West of Gold Hill	Community cistern 30k gallons
Not specific to individual communities	• Officer training classes • Community education in basic aspects of wildland fire • Basic and intermediate wildland classes availability, S190(required)& S130 • Water backpacks • Brush Truck Type II • Community chipper or program • Trained firefighter(s) from each community

CWPP Implementation and Monitoring Plan

The CWPP Task Force will create an Implementation Group (IG) with the responsibility of working with CSFS to identify and apply for appropriate grants. In addition, the IG will be responsible for refining treatment parcel selection and contacting private landowners as needed to discuss possible treatments on their properties and the need for matching funds or in-kind donations of labor. IG members will include at least one member of the GHFPD, one community member who has been on the CWPP Task Force, and one member of the GHTM Forest Management Committee. In addition, participants from each of the eight GHFPD communities will be encouraged to join the IG. The IG will work closely with CSFS and Boulder County staff as appropriate to coordinate grant applications and grant administration.

The CWPP Task Force will also create a Monitoring and Administrative Group (MAG) that will be responsible for tracking the progress toward the nine CWPP objectives listed below and performing annual updates of the CWPP. The MAG will work closely with IG members to document completed fuel treatments and costs. The MAG will also be responsible for general community outreach and education regarding structural vulnerability and defensible space. Table ES-3 lists the CWPP objectives that will be tracked by the MAG and the information it will endeavor to collect in support of the process.

Table ES-3
Monitoring Plan Objectives

CWPP Objectives	Performance Measure
Promote community involvement and education	• Number of educational programs/speakers • Participation in CWPP Task Force, MAG, IG • Participation by private landowners in fuels treatment, chipping programs, etc.
Attract the necessary funding to implement CWPP recommendations	• Grant monies received • Landowner/community funds/labor contributed
Reduce hazardous forest fuels	• Priority areas treated by acre • Federal acres treated • Acres moved between condition classes • Total acres treated
Reduce structural vulnerability	• Number of homes with defensible space • Number of homes with dedicated fire-fighting cisterns
Improve emergency preparedness	Progress implementing Table ES-2 recommendations
Improve forest health	• Acres of fuels treatments that meet restoration guidelines • Status of ecological values at risk (see Table 3-10)
Improve fire prevention and suppression	• Acres burned (unplanned) • Structures lost, including historic/cultural values at risk (see Table 3-7) • Ignitions
Encourage economic development	Track markets for firewood, biomass utilization
Develop and implement multiparty monitoring system	• Pre- and post-treatment surveys of fire rings and other recreational use • Progress made by MAG on all objectives

At the end of each year's fire season, the MAG will produce an annual report detailing the success of CWPP project implementation and overall progress toward meeting CWPP goals. The MAG will review and make recommendations to the signatories to update the CWPP. This information will ensure timely decision making for all levels of government, and provide input necessary for the development of the next year's work plan and for prioritization of project recommendations both annually and for the next 5 years. The MAG will present the annual work plan to the CWPP signatories for their agreement and submission to CSFS and USFS for their concurrence and to have them forward the annual work plan for funding through the HFRA.

1.0 Introduction

This document describes the Community Wildfire Protection Plan (CWPP) developed by the Gold Hill Fire Protection District (GHFPD).[1] The purpose of a CWPP is to assist landowners, the fire district, and local government in the identification of lands at risk from wildfire and to formulate strategies for reducing fuels where appropriate, while improving forest health, recognizing diverse public land values, supporting local industry and economies, and improving firefighting response capabilities. Once a CWPP is in place, federal matching grants for fuel reduction and related projects become available per the Healthy Forests Restoration Act of 2003 (HFRA). Grant monies may be used on federal, state, county, and/or private lands (with landowner permission) within the wildland-urban interface (WUI), that is, where residential development borders wildland areas.[2] Potential project areas within the WUI include those where hazardous forest fuels threaten communities, watersheds, areas of historic, cultural, or recreational value, critical ecological areas, or areas affected by windthrow,[3] insect, or disease epidemics.

A CWPP requires the approval of local government, the local fire authority, and the state agency responsible for forest management. The CWPP must also be developed in consultation with the applicable federal agency managing the land surrounding the at-risk communities, as well as other interested parties. In addition, the HFRA gives direction to the Departments of Interior and Agriculture (i.e., the United States Forest Service (USFS) and Bureau of Land Management (BLM)) to address the priorities identified in a CWPP when making plans for fuel reduction treatments on federal lands within the WUI. In other words, the CWPP will influence the management of federal lands surrounding communities according to community priorities.

The GHFPD CWPP seeks to coordinate the efforts of individuals, the community, county, state, and federal agencies over the long term to achieve the maximum benefit in relation to the ultimate goals of fire management. The GHFPD recognizes that the costs of fuel treatments and planning must be weighed against the costs of suppressing severe wildfire, with the accompanying direct property and income losses, and has determined that proactive, collaborative planning is the most cost-effective and efficient way to reduce the risk posed by wildland fire while addressing community priorities. The GHFPD CWPP was developed on a purely volunteer basis by GHFPD community members and assisted by staff from the USFS, Colorado State Forest Service (CSFS), Boulder County, and the Southern Rockies Conservation Alliance (SRCA).

Creating a CWPP requires three major activities: 1) Involving all affected parties, 2) Assessing and ranking wildfire risks within the relevant communities, and 3) Preparing mitigation,

[1] A volunteer organization with local taxing authority
[2] The Colorado State Forest Service defines the WUI specifically as the land within a 2-mile radius of existing homes.
[3] Trees uprooted by wind. Fuel reduction/tree thinning projects typically increase the exposure to wind of trees within the stand.

implementation and monitoring plans that address fuel hazards, home and infrastructure vulnerability, and emergency preparedness. This document describes the process followed by the GHFPD to achieve these goals and contains six sections:

- Section 1: Introduction
- Section 2: Description of the GHFPD
- Section 3: Community Risk Assessment
- Section 4: Community Mitigation Plan
- Section 5: Implementation and Monitoring Plan
- Section 6: Literature Cited

The remainder of this section provides background on the history of wildfire management in the GHFPD and the planning process followed in the development of the CWPP.

1.1 Background

Wildland fire in Colorado is well documented.[4] It has been occurring for millennia and has shaped the landscape. It brings nutrients to the soil, diversity to vegetation and wildlife, and in doing so, benefits the humans who later live in its path. However, wildfire can also destroy homes and communities and cause injury and loss of life. Ironically, the success of Colorado's fire suppression and forest management activities in the 20th century has actually made fire management situation more difficult, because many forest stands are denser than ever and present heightened risks. Relatively recent and significant fires such as the Hayman, Big Elk, Black Tiger, Sugarloaf, and Overland fires have highlighted the need for a shifting paradigm in fire management from total suppression to an acceptance of wildland fire as a natural and necessary part of the landscape.

Fire and forest management are further complicated by residential development in or adjacent to forest lands. Many people choose to live in or near the forest for its beauty and are understandably concerned about any plans for change. In addition, much of the forested land in Colorado is not under the control of private landowners but is under the jurisdiction of the United States Forest Service (USFS) or the Bureau of Land Management (BLM). The forest management actions taken by these agencies to improve forest health and reduce wildfire risk are perceived by some to have a large impact on the appearance and aesthetics of the forest. Clearly, a balanced approach is needed to address wildfire risks, forest health, aesthetics, and community and private landowner concerns.

The GHFPD has long been aware of the need to address wildfire risks. Following the nearby and severe Sugarloaf fire in 1989 (and recalling the 1974 Gold Hill fire that narrowly missed causing significant property damage), the communities within the GHFPD began a range of fire management and mitigation activities. These communities include the town of Gold Hill, the Gold Run subdivision, and Gold Hill residents to the west of town, the Rim Road area,

[4] See, e.g., csfs.colostate.edu/wildfire.htm#stats; www.cpluhna.nau.edu/Biota/wildfire.htm

landowners along Lefthand Canyon Drive and Lickskillet, the town of Rowena, the Snowbound mine area, and the stretch of Sunshine Canyon within the GHFPD (to the seven-mile marker). The community of Gold Hill obtained a 30-year lease from the BLM in 1999 to conduct mitigation activities on nearby BLM lands. The Gold Hill Town Meeting (GHTM)[5] established a Forest Management Committee that has organized many grass-roots activities in conjunction with the fire department, including forest thinning north of the town of Gold Hill, chipping projects, field trips, and other education efforts. In addition, many individual residents and landowners from the various communities within the GHFPD have removed fuels and constructed defensible space on their properties.

Following the passage of the HFRA in 2003, the impetus to develop a GHFPD CWPP increased. A CWPP is a logical next step for the district to address wildfire risks and community values. At a Boulder County Wildfire Mitigation meeting in 2005, Edie Eilender, a member of the GHTM Forest Management Committee met with Kevin O'Dea of the Southern Rockies Conservation Alliance (SRCA) and discussed the potential value of a CWPP for the GHFPD. They agreed to make a proposal at the December 2005 Gold Hill Town Meeting to begin the CWPP process.

1.2 CWPP Planning Process

The GHFPD CWPP planning process follows the guidance provided in the Society of American Foresters (SAF) Handbook, *Preparing a Community Wildfire Protection Plan* (SAF, 2004). This document lists 8 steps for developing a CWPP. In the development of the GHFPD CWPP, a ninth step is added to facilitate timely and effective implementation of recommendations.

1. Convene decision makers
2. Involve federal agencies
3. Engage interested parties
4. Establish a community base map
5. Develop a community risk assessment
6. Establish community priorities and recommendations
7. Develop an action plan and assessment strategy
8. Finalize the CWPP
9. Implement recommendations, monitor progress, and update the plan.

Special thanks is due for the additional guidance and analysis provided by Bob Bundy of the Colorado State Forest Service (CSFS), Mark Martin, Lara Duran, and Kevin Zimlinghaus of the United States Forest Service (USFS), Eric Phillips of Boulder County Wildfire Mitigation, and Kevin O'Dea and John Chapman of the Southern Rockies Conservation Alliance (SRCA).

Steps 1, 2 and 3 in the development of the GHFPD CWPP began on 12/12/05, at the bi-monthly Gold Hill Town Meeting. The decision makers required to approve a CWPP are the local government, the local fire department, the state forest service, and the United States Forest

[5] The GHTM is a quasi-governmental entity that manages local affairs for the Town of Gold Hill

Service (USFS). For the GHFPD CWPP, these organizations are the Gold Hill Town Meeting (GHTM), the Gold Hill Fire Protection District (GHFPD), the Colorado State Forest Service (CSFS), the Boulder Ranger District of the USFS, Boulder County Land Use/Wildfire Mitigation, and Boulder County Parks and Open Space. Representatives of each were in attendance at this kickoff meeting.

During this initial meeting, the parties agreed that developing a CWPP was the best way to coordinate efforts at the local, county, state, and federal levels, and to pursue funding to carry out local priorities for wildfire protection. This completed steps 1 and 2 of the process. In addition, the attendees agreed to undertake this process on a volunteer basis and as an open, community-based effort utilizing publicly available information.

Step 3, Engage Interested Parties, was initially addressed by a mailing to voters residing within the GHFPD about the kickoff meeting, posting information related to the process at the Gold Hill Store, placing flyers in the mailboxes of Gold Hill residents, and word of mouth. Additional efforts to engage the residents of the GHFPD are ongoing and have included:

- Public monthly meetings with email notification
- Regular updates to the Gold Hill Town Meeting
- Bi-monthly updates through the Gold Hill Town Meeting newsletter
- Phone calls to residents of communities within the GHFPD
- An information booth during Gold Hill's annual 4th of July celebration
- Construction of a website, www.goldhillfire.org/cwpp
- A second mailing to property owners requesting input on the draft CWPP during the fall of 2006

Attendance at the monthly CWPP meetings averaged between 15 and 20 individuals, including SRCA, county, state, and federal agency personnel. The attendees at these regular meetings are identified in Table 1-1 below and make up the CWPP Task Force. Individuals are listed along with their relevant organizational affiliation (if any) and their community within the GHFPD (if appropriate). The Task Force includes members from each of the eight separate communities defined within the GHFPD (see Section 2.0). The CWPP Task Force gathered all information needed for the CWPP and performed the necessary analyses.

Table 1-1
CWPP Task Force

Category	Organization	Last Name	First Name	Title, Affiliation/Community
Local Government	Gold Hill Town Meeting, Inc.	Rice	Jennie	Chair, GHTM; Co-Chair CWPP Task Force/Gold Run Subdivision
		Diefenderfer	Gretchen	Secretary, GHTM; Member Forest Management Committee/Town of Gold Hill
		Eilender	Edie	Chair, Forest Management Committee /Town of Gold Hill
		Knapp	Martha	Member at Large, GHTM/Town of Gold Hill
Local Fire Authority	Gold Hill Fire Protection District	Finn	Chris	GHFPD Fire Chief/Town of Gold Hill
		Gibson	Kris	GHFPD Volunteer, Member, Forest Management Committee, Co-Chair CWPP Task Force /Town of Gold Hill
		Maloney	Donal	GHFPD Assistant Fire Chief/Town of Gold Hill
		McConnell	Darrell	GHFPD Board Member/Gold Run Subdivision
		Rankin	John	GHFPD Officer/Town of Gold Hill
State Agency	Colorado State Forest Service	Bundy	Bob	Colorado State Forest Service
County Agency	Boulder County	Philips	Eric	Boulder County Wildfire Mitigation Coordinator
Federal Agency	United States Forest Service	Martin	Mark	South Zone Planning Team Leader
		Duran	Lara	Fuels Specialist
		Zimlinghaus	Kevin	Silviculturist
Other Organizations	Southern Rockies Conservation Alliance	Chapman	John	Fire Outreach Coordinator
		O'Dea	Kevin	Fire Outreach Coordinator
	Center for Native Ecosystems	Robertson	Erin	Staff Biologist
	Sunshine Fire Department	Stratton	Steve	Fire Chief
	High Country FPD	Van Wie	Don	Board Member/Former GHFPD Fire Chief
Other GHFPD Community Members		Arney	Steve	Lefthand area
		Arnold	Dirk	West of Gold Hill
		Bertin	Ira	Lefthand Alliance
		Bertin	Rebekah	Lefthand Alliance
		Brooks	Charlotte	Town of Gold Hill
		Carlson	Bear	Town of Gold Hill
		Copeland	Poppy	Town of Gold Hill
		Daspit	John	Rowena
		Eaton	Jan	Gold Run Subdivision
		Fosmo	Vaughn	West of Gold Hill
		Frey	Mark	Chicken Hill Homeowners' Association/Rim Road
		Kessler	Heidi	West of Gold Hill
		Meeker	John	Snowbound area
		Parker	Brandt	West of Gold Hill
		Reames	Jerry	West of Gold Hill

Category	Organization	Last Name	First Name	Title, Affiliation/Community
		Riciputi	Paul	Town of Gold Hill
		Roth	Richard	West of Gold Hill
		Sand	Cherry	Town of Gold Hill
		Sand	John	Town of Gold Hill
		Simmons	Karen	Snowbound area
		Smith	Jim	Cash Mine
		Stepanek	Joe	West of Gold Hill
		Strand	Stephen	Rowena

The CWPP Task Force identified the following nine goals that should influence plan development:

- Promote community involvement and education
- Attract the necessary funding to implement CWPP recommendations
- Reduce hazardous forest fuels
- Reduce structural vulnerability
- Improve emergency preparedness
- Improve forest health
- Improve fire prevention and suppression
- Encourage economic development
- Develop and implement multiparty monitoring system

Each of these goals is addressed at some level by this CWPP during the planning process steps. An overview of the remaining steps 4 through 9 is presented below. The detailed information, analysis, and results for each step are described in the remaining sections of this document.

Step 4, Create A Community Base Map, is covered in Section 2.0, Gold Hill Fire Protection District Description. The community base map defines the WUI addressed by the CWPP as well as the communities at risk.

Step 5, Develop A Community Risk Assessment, is described in Section 3.0, Community Risk Assessment. The goal of the community risk assessment is to rank the communities within the GHFPD in terms of their wildfire risk, that is, which communities would be most harmed by wildfire. The CWPP addresses seven sources of risk:

- Current vegetative condition and wildfire fuel hazards
- Weather patterns
- Frequency of past fires
- Homes and infrastructure vulnerability to wildfire
- Lack of community-level fire-fighting preparedness
- Historic/cultural/ecological values at risk due to wildfire
- Population size

Step 6, Establish Community Priorities And Recommendations, is described in Section 4.0, Community Mitigation Plan. In this step, fire behavior modeling is performed to identify potential areas for fuel reduction projects throughout the GHFPD. These projects are then prioritized according to the community risk assessment results so that fuel treatments protecting the highest risk communities will be undertaken first. This step also includes estimates of funding needs and recommendations to reduce structural vulnerability and improve emergency preparedness.

Step 7, Develop An Action Plan And Assessment Strategy, is described in Section 5.0, Implementation and Monitoring Plan. This includes defining implementation goals and monitoring plan objectives consistent with the stated goals of the CWPP.

Steps 8 and 9, Finalize The CWPP And Implement Recommendations, Monitor Progress, And Update The Plan, represent the current status of the GHFPD CWPP process. This document is the final version of the CWPP for 2006. It represents the input received on a draft that was extensively reviewed by the CWPP Task Force and the community at-large during the fall of 2006. The GHFPD CWPP meets all criteria of the HFRA. It has been collaboratively developed and agreed to by the applicable local and county government agencies, fire department, and state agency responsible for forest management, along with other interested parties and the primary, relevant federal entity. The GHFPD CWPP establishes a coordinated and collaborative, performance-based framework of recommendations to meet its outlined goals. Annual updates will appear in Appendix C.

2.0 Gold Hill Fire Protection District Description

The Gold Hill Fire Protection District (GHFPD) is located in the Boulder Ranger District of the Arapaho Roosevelt National Forest (ARNF), managed by the US Department of Agriculture (USDA)/United States Forest Service (USFS). Encompassed by the ARNF, the GHFPD is located in the western portion of Boulder County (see Map 2-1). The following subsections describe the history of the area and the GHFPD, land ownership, and the "community base map" showing the wildland-urban interface (WUI) for the CWPP.

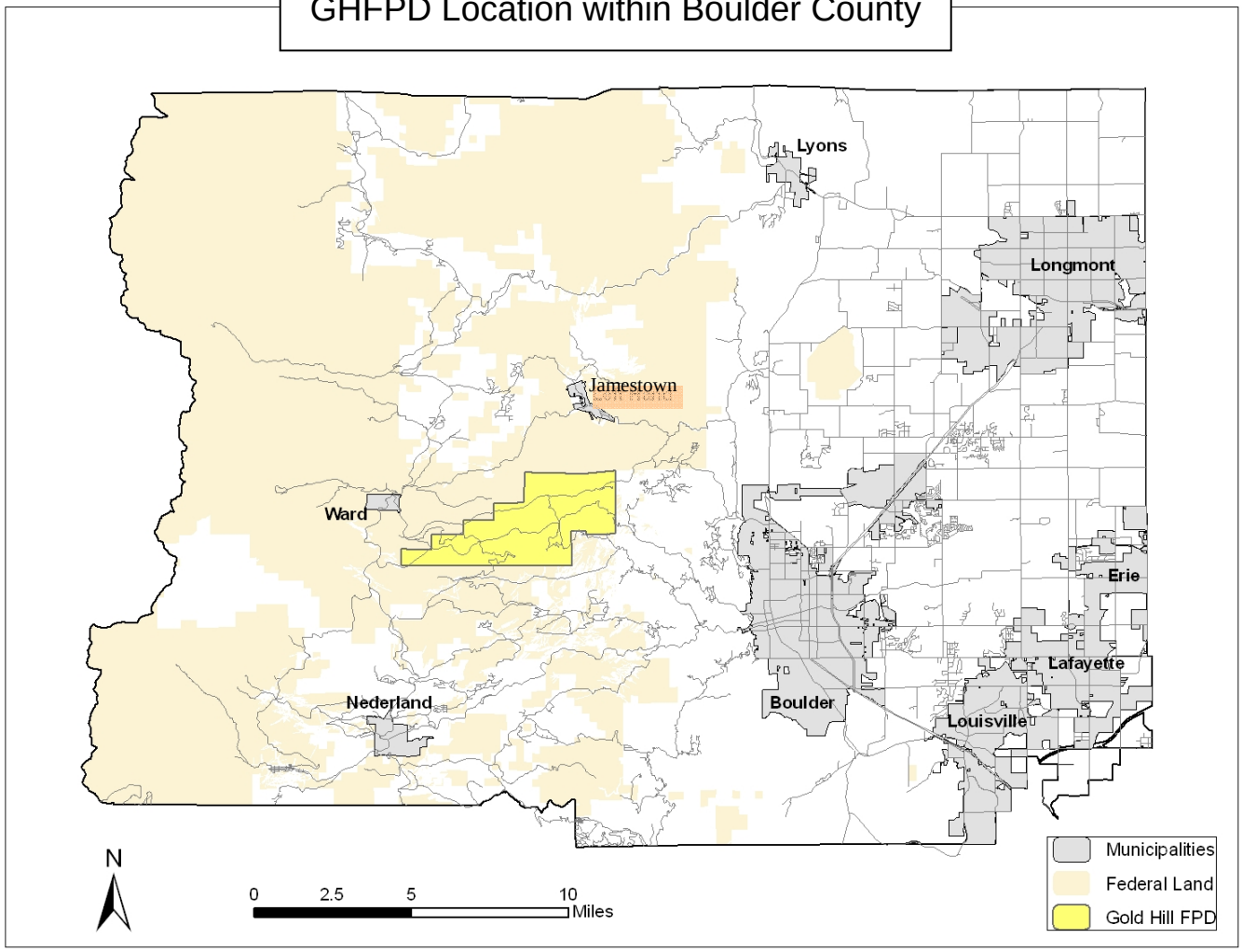
2.1 History[6]

The first lode discovery of gold in Colorado was staked in 1859, and the mining camp that was established above it became the town of Gold Hill—the first permanent mining camp in Colorado, known as Mining District No. 1 of the Nebraska Territory. Within a year there were over 1,500 prospectors in the area. The best high-grade lode in the area was the Horsfal lode, discovered by William Blore, M.L. McCaslin and David Horsfal on June 13, 1859. It yielded $100,000 in its first year – that is the equivalent of $3 million today. A fire in 1860 destroyed the original town, which was then rebuilt to the west (its present location).

After 1860, mining activities began to decline, but the discovery of gold-telluride ore at the Red Cloud mine in 1872 spurred a new wave of activity. The completion of a railroad from Boulder to Ward (the Switzerland Trail) in 1898 just 3 miles to the west of Gold Hill contributed to sustained mining activities. Mining declined in the early part of the twentieth century until the fall of 1933 when a sharp increase in the price of gold stimulated significant new activity. In 1934, the Slide, Ingram, Klondike, Interocean, Emancipation, Wood Mountain, Poorman, Grand Republic, and many other mines were reopened. Mining activities continued until 1942 when most gold mining ended due to World War II, although the Cash Mine southeast of town (discovered 1872) remained active in the 1950s and 60s. As of 2006, mining activities are underway at the Cash Mine due to the current high price of gold.

[6] The historical information in this section is compiled from the following sources: "Geology and Ore Deposits of the Front Range of Colorado," T.S. Lovering and E.N. Goddard, Geologic Survey Professional Paper 223, US Govt Printing Office, Washington: 1950 p. 236; "Boulder County Miners," Delores S. Bailey, compilation of mining documents, Boulder Public Library; www.fs.fed.us/r2/arnf/about/history/Boulder/index.shtml.

Map 2-1
GHFPD Location within Boulder County



Currently, Gold Hill is a small community of about 210 people (US Census Bureau, 2000). The dirt road through town is lined with old buildings and houses, some dating to the town's beginnings. The majority of the town is on the National Register of Historic Places (see www.nationalregisterofhistoricplaces.com/co/Boulder/districts.html). The town includes the Gold Hill School, founded in 1873--the oldest continuously operating public school in Colorado. Gold Hill is not an incorporated community and there are no incorporated communities within the GHFPD. However, the Gold Hill Town Meeting is an incorporated entity and provides the local government approval of the GHFPD CWPP as required by the HFRA.

Other established communities within the GHFPD include Rowena (major lode discovered in 1899 by Frank Pound) and Snowbound (lode discovered in 1877 by Henry N. Coffey), also on the National Register of Historic Places. Although today its population is about 40 people, in 1896 Rowena was a "flourishing mining camp" of 200 people, and included a general store, two hotels, three stamp mills, a post office, and telephone (Boulder County Directory, 1896).

The Gold Hill Fire Protection District (GHFPD) is an all-volunteer organization established in 1978 with local taxing authority. It encompasses twelve square miles and 7,668 acres and extends approximately seven miles from its western to eastern edge. The area is characterized by a fractured land ownership pattern, increasing recreational use, diverse and dense vegetation, and increasing residential development. The GHFPD provides the primary fire protection for the area and has mutual aid agreements with surrounding fire departments and the USFS. Domestic water is provided through wells or purchased water that is trucked in. Electrical service is provided by Xcel Energy, primarily on overhead power lines. Pipeline natural gas service is not available and most residences have propane tanks. In addition to electricity and propane, many residents choose to heat their homes with wood, while a few homes make use of the extensive solar and wind energy available.

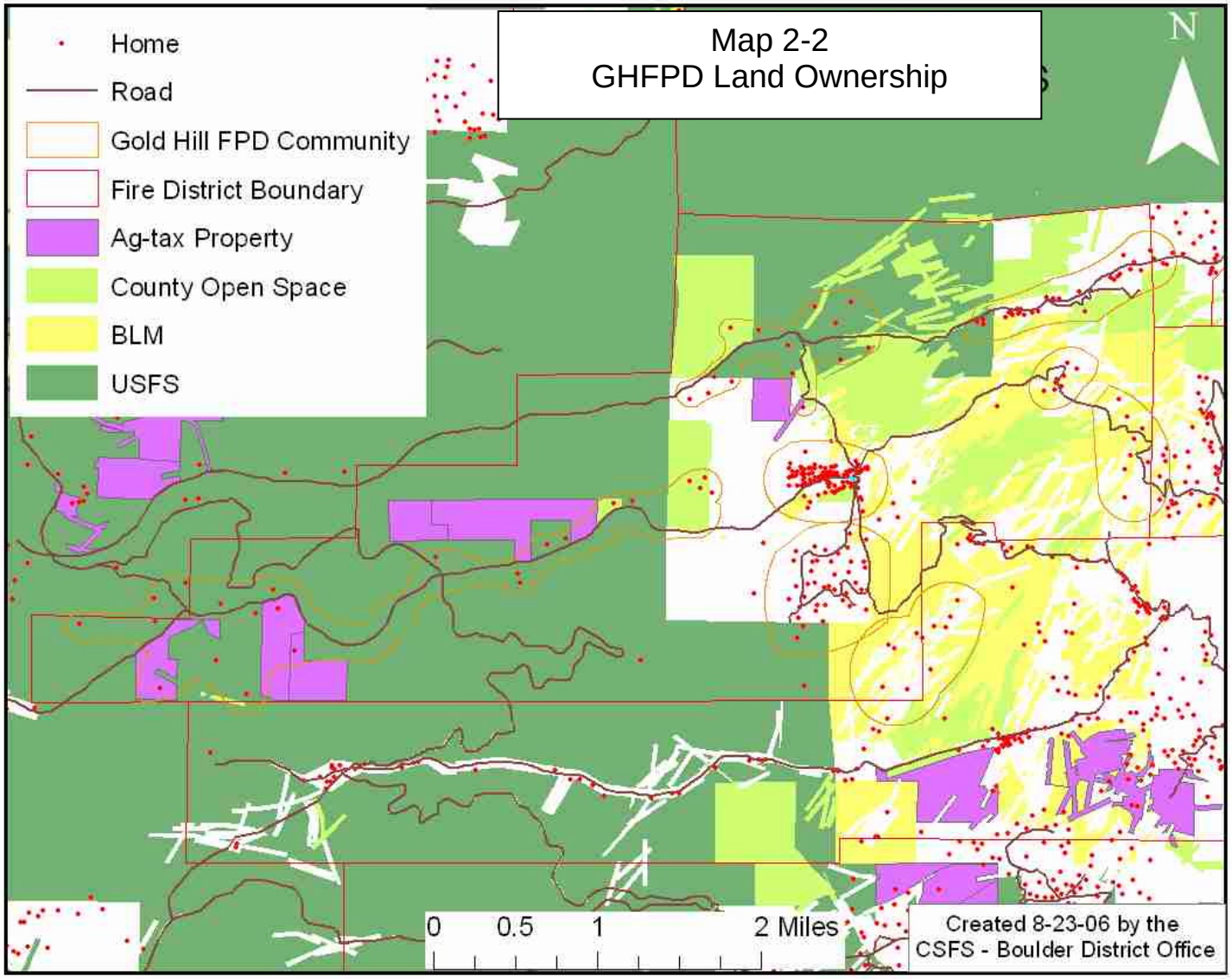
2.2 Land Ownership

Land ownership in the GHFPD is highly diverse, as shown in Map 2-2. In the western half of the district, the lands are primarily National Forest (under the jurisdiction of ARNF) with some privately owned parcels as well. The "Ag-Tax" properties are those landowners with at least 40 acres that have created forest management plans allowing them to qualify for agricultural property tax status (see Section 4.0 for more information). The eastern half of the district has private, town, BLM, and county-owned land. Currently the BLM and Boulder County Parks and Open Space are negotiating the transfer of BLM lands within the planning area to the County. The timetable for finalizing this process is currently unknown, but the BLM is not anticipated to play a role in fire mitigation and land management activities in the planning area over the long term. Table 2-1 summarizes the land area in each ownership class.

Table 2-1
Land Area by Ownership Class

Owner	Acres	Square Miles	%
Federal	3893	6.05	52
State	0	0	0
Boulder County	619	0.96	8
Private	3049	4.76	40
Total	7561[7]	11.77	100

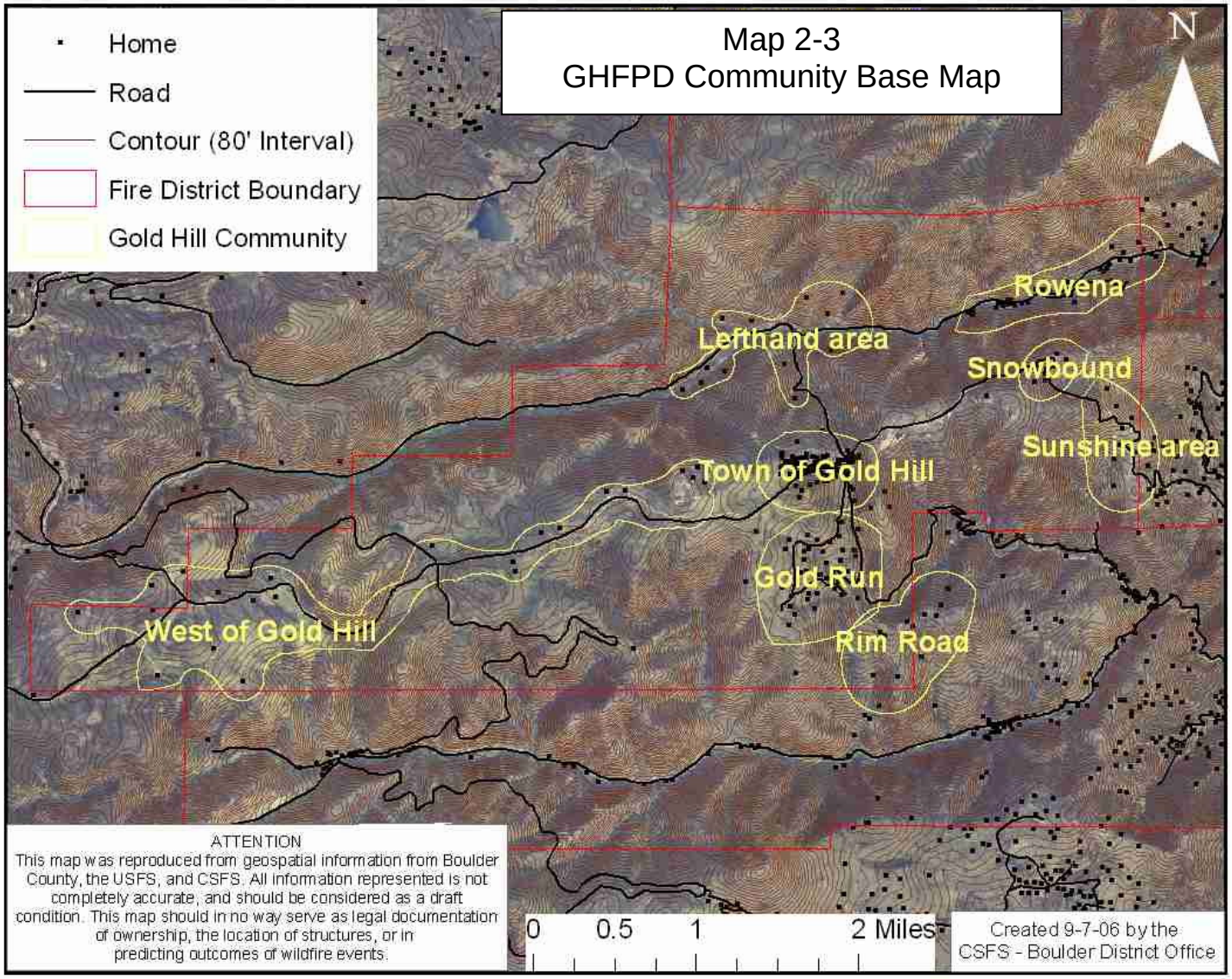
[7] The discrepancy between this figure and the 7,688 acres mentioned earlier is likely due to BLM lands transitioning ownership to Boulder County.


Map 2-2
GHFPD Land Ownership
Home
Road
Gold Hill FPD Community
Fire District Boundary
Ag-tax Property
County Open Space
BLM
USFS
N
0
0.5
1
2 Miles
Created 8-23-06 by the
CSFS - Boulder District Office

2.3 Wildland-Urban Interface and Community Base Map

According to the National Fire Plan (NFP), the definition of the wildland-urban interface (WUI) is "the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels. Communities and residents within the WUI face substantial risk to life, property, and infrastructure. Wildland fire within the WUI is one of the most dangerous and complicated situations firefighters face. The Colorado State Forest Service specifically defines the WUI as a radius of two miles around existing homes. Given the residential development that exists throughout the GHFPD, CSFS considers the entire area of the GHFPD to be WUI. The WUI defines the community base map needed for the CWPP, and therefore is simply the map of the GHFPD. Map 2-3 shows an aerial map of the GHFPD. This map also shows the eight residential communities identified within the GHFPD for the purposes of the CWPP risk assessment:

- Town of Gold Hill (the historic town)
- Gold Run Subdivision (on Dixon Road south of town)
- Rowena (a community along Lefthand Canyon Rd)
- Lefthand area (all homes/structures near the intersection of Lickskillet and Lefthand Canyon)
- Sunshine area (the area along Sunshine Canyon Rd east of the Snowbound area and west of the 7 mile marker)
- Snowbound area (the homes/structures in the area of the Snowbound mine)
- Rim Road (the homes along this road southeast of Gold Hill)
- West of Gold Hill (all homes/structures west of the Town of Gold Hill)


Map 2-3
GHFPD Community Base Map
Home
Road
Contour (80' Interval)
Fire District Boundary
Gold Hill Community
N
Rowena
Lefthand area
Snowbound
Sunshine area
Town of Gold Hill
Gold Run
Rim Road
West of Gold Hill
ATTENTION
This map was reproduced from geospatial information from Boulder County, the USFS, and CSFS. All information represented is not completely accurate, and should be considered as a draft condition. This map should in no way serve as legal documentation of ownership, the location of structures, or in predicting outcomes of wildfire events.
0 0.5 1 2 Miles
Created 9-7-06 by the CSFS - Boulder District Office

3.0 Community Risk Assessment

The community risk assessment is an analysis and ranking[8] of the eight GHFPD communities according to the risk due to wildfire. Risk means the possibility of loss or harm due to an uncertainty—in this case, wildfire. The loss or harm could be to people, buildings, personal property, and/or to historic, cultural, or ecological resources. Risk is typically characterized by its probability and severity, or magnitude, and is also often presented as the product of the two components, also termed *expected risk*.[9] Two communities could have the same probability, or likelihood, of wildfire, but have different potential magnitudes of damage, and hence one community would have a higher expected risk than the other. Although beyond the scope of this CWPP, a formal risk assessment would address in a quantitative fashion: a) the source of risk b) the exposure and c) the effects. For example, a health risk assessment might produce the individual lifetime risk (i.e., probability) of suffering an adverse health effect due to a particular air pollutant. An earthquake risk assessment might produce the annual probability and magnitude of earthquakes and associated damages.

The risk assessment performed for this CWPP is necessarily more qualitative, due to insufficient site-specific data and wildfire forecasting and damage assessment models, and the lack of resources to develop such. The analysis rates each community as having High, Medium, or Low overall risk (i.e., expected risk) based on ratings in various risk "categories" that address the probability and magnitude of wildfire risk. For example, since calculating specific probabilities of wildfire starts for the different communities is infeasible at this time, the risk assessment assigns High, Medium, or Low ratings to each community for each of the following three underlying causes of wildfire:

- Current vegetative condition and wildfire fuel hazards (also includes topography, i.e., slope, aspect, and elevation)
- Weather patterns
- Frequency of past fires.

Similarly, rather than estimating the specific scope and costs of damages due to wildfire for each community, the magnitude of the possible harm due to wildfire for each community is rated as High, Medium, or Low based on the following four community characteristics:

- Homes and infrastructure vulnerability to wildfire (e.g., prevalence of wood siding),
- Community-level fire-fighting preparedness (e.g., availability of water for community fire-fighting such as large capacity cisterns)
- Historic/cultural/ecological values at risk due to wildfire
- Population size.

[8] The terms "ranking" and "rating" are used interchangeably throughout this document.
[9] For example, a financial risk could be presented as a 5 percent chance of a $10,000 loss and/or as an expected risk of 0.05 x $10,000 = $500.

The overall risk to each community, that is, the probability and magnitude, is determined through the use of a simple scoring model that translates the descriptive ratings in the seven risk categories above into a total risk score. The total risk scores for each community are then translated into overall risk ratings of High, Medium, and Low based on the range of the scores. These risk ratings are used to guide the prioritization of fuel treatments as well as the information and educational efforts regarding structural vulnerability and emergency preparedness described in Section 4.0.

The remainder of this section describes the scoring model approach in more detail, presents the data gathered and risk ratings for each of the above risk categories, and concludes with the overall risk ratings by community.

3.1 Scoring Model for Risk Assessment

The risk assessment uses a scoring model to determine overall ratings of High, Medium, or Low risk due to wildfire for each community. The first step is to gather the available data and develop High, Medium, or Low ratings for each community in each of the seven risk categories:

- Current vegetative condition and wildfire fuel hazards
- Weather patterns
- Frequency of past fires
- Homes and infrastructure vulnerability to wildfire
- Lack of community-level fire-fighting preparedness
- Historic/cultural/ecological values at risk due to wildfire
- Population size.

As described earlier, the first three categories, vegetative fuel hazards, weather patterns, and previous fire frequency all address the probability of a wildfire start. The remaining four categories address the potential magnitude of the impacts of a wildfire (i.e., structures, people, land, and other resources and values at risk). Together, these categories provide an indication of the overall, or expected, risk posed by wildfire to each GHFPD community.

The scoring model translates the qualitative ratings in the individual risk categories into an overall risk score. High, Medium, and Low ratings are scored as 3, 2, and 1, respectively.[10] A community's risk category scores are then added to produce its overall risk score. Each

[10] For two of the risk categories, structural vulnerability and fire-fighting preparedness, sub-categories are developed to more accurately represent the differences between the communities. For example, fire-fighting preparedness includes sub-categories such as the availability of water for community fire fighting, and lack of access/egress (e.g., the presence of a dead-end road in the community). In these cases, the risk category score is calculated based on the ratings and scores in each sub-category.

calculated overall risk score is then translated into a corresponding qualitative rating of High, Medium, or Low based on the range of the scores. The range of the calculated overall scores is used to determine the descriptive ratings, rather than the absolute range of the worst and best possible scores. In this way, the risk assessment determines the relative risk represented by each community within the GHFPD so that potential fuels treatment areas can be prioritized.

Adding the risk category scores to create the overall risk score has two important implications. First, it means that the assessment is not attempting to calculate expected risk in the classic sense described earlier (i.e., probability multiplied by magnitude). Due to the informal, qualitative basis for many of the ratings, any mathematical manipulation of the scores beyond simple addition is unjustified and would only make the results less transparent. Moreover, as will be seen in the material presented in remainder of this section, it turns out that the ratings relating to the probability of a wildfire start are almost entirely uniform across the communities. In other words, the probability of a wildfire start is assessed to be more or less the same for each community. This means the categories relating to the magnitude of impacts, not the probability, are the critical factors in determining the relative risk faced by each community. In this situation, adding the scores is completely appropriate, with the caveat described next.

The second implication of adding the individual scores is that each category is given equal importance for assessing risk. In reality, certain categories may be regarded as more important than others for determining risk (e.g., population size may be considered more important than cultural resources). Refining the scoring model to address such preferences in a consistent manner, however, is beyond the scope of the current CWPP. Fortunately, inspection of the final scoring model results (see Section 3.9) shows that a change in the overall ratings would be unlikely even with such a refinement, because the community ratings within the categories are similar to the overall ratings in most cases.

Table 3-1 illustrates the overall structure of the risk assessment process. The remainder of this section presents the data collected and the ratings assessed for each of the seven risk categories and concludes with the overall community risk assessment results.

Table 3-1
Overall Structure of Risk Assessment Process

Community	Risk Categories--Ratings							Overall Risk Score	Overall Risk Rating
	Vegetative Fuel Hazards	Weather Patterns	Previous Fires	Structural Vulnerability	Lack of Fire Fighting Preparedness	Historic, Cultural, Ecological Values	Pop'n Size		
Town of Gold Hill									
Gold Run Subdivision									
Rowena									
Lefthand area									
Sunshine area									
Snowbound area									
Rim Road									
West of Gold Hill									

3.2 Vegetative Fuel Hazards

The type, density, and condition (e.g., dryness, beetle damage) of the vegetative fuels surrounding a community, as well as the topography, slope, and aspect (e.g., south vs. north-facing slope), are critical determinants of the likelihood of a wildfire start. This sub-section will present the following:

1. Research describing the current condition of high elevation Front Range forests and the role of nature vs. human activities in creating the current situation
2. Previous and currently planned fuel reduction activities in the GHFPD
3. Data on current vegetative type, slope, aspect, and overall vegetative fuel hazards within the GHFPD
4. Relative ratings for the vegetative fuel hazards for each community.

3.2.1 Research Results

Dr. Thomas Veblen, a professor of geography at the University of Colorado, is the leading researcher into influences on the type and condition of vegetative fuels in the Front Range of Colorado (Veblen, et al, 2000). His work shows that, prior to European settlement of North America, fire played a natural role on the landscape, shaping the composition, density, and overall characteristics of Colorado's forests. The fire regime in the higher elevation forests of the Front Range (above 7872 ft) was characterized by relatively low fire frequency (compared to lower elevations), but typically involved extensive stand-replacing fires. European colonization of the GHFPD/CWPP planning area that began in earnest with the gold rush of 1859, in addition to increased climatic variability, contributed to increased fire frequency in the second half of the 19th century. In addition, mining demand for framing timbers created many of the cleared areas that still exist today.

The combined effect of these widespread fires in the latter half of the 19th century with largely successful fire suppression since the early 20th century has created today's situation of dense stands of ponderosa pine, Douglas fir, and/or lodgepole pine (sometimes referred to as mixed-conifer). These stands are largely homogeneous in age and structure and cover large areas of the Front Range. These conditions "may have increased the current hazard of more catastrophic fire as well as the extent and severity of forest insect outbreaks in the northern Front Range" (Veblen et al, 2000).

Veblen also reports that, within the montane zone (5740-9348 ft) of the Arapaho-Roosevelt National Forest, north versus south-facing slopes have very different vegetative conditions. The dry, south-facing slopes typically have relatively open stands dominated by ponderosa pine, whereas on the north slopes the stands are much denser and include a higher proportion of Douglas fir. In addition, in the upper montane zone (above 8036 ft), Douglas fir, lodgepole pine, and aspen become more prevalent throughout the landscape (Kaufmann et al, 2006). The GHFPD is largely in the upper montane zone.

The applicability of Veblen's research results to the GHFPD are confirmed by the following description of the "Gold Hill Area" in a BLM Environmental Assessment (US DOI, 1986, p.15):

> The north slopes are primarily occupied by dense stands of Douglas fir. The south slopes are primarily grass and shrub with scattered ponderosa pine and Douglas fir. Many of the ponderosa pine were killed during the early 1980s[11] from an epidemic of mountain pine beetle. Many of the Douglas fir on both slopes are dying from the spruce budworm epidemic occurring in the past several years. The area has not been grazed in recent memory so the ground is covered by an abundance of dead and highly flammable litter and woody debris that will carry a ground fire readily and rapidly upslope to Gold Hill from either main drainage.

[11] This should say "1970s" and is confirmed by newspaper reports of the time such as "Bark Beetles Lay Siege to Ponderosa Pines: 1,000 Casualties Counted Near Gold Hill," Daily Camera, August 8, 1971.

3.2.2 Previous and Currently Planned Fuel Reduction Activities

The following summarizes both previous and currently planned private, town, federal, and fire district fuel reduction activities in terms of their impact on vegetative hazards.

Some landowners within the GHFPD have taken action to reduce vegetative hazards on their properties beyond creating defensible space around their homes. These actions are significant on an individual basis but are unlikely to mitigate the risk of wildfire for entire communities.

The Forest Management Committee of the Gold Hill Town Meeting has managed a small fuel reduction project on the north slope immediately north of the Town of Gold Hill, primarily on BLM/County land. This effort is expected to provide some protection to the town in the case of a fire coming up the north slope.

The USFS is acting to reduce vegetative hazards on the USFS lands within the GHFPD. Two projects, the Sugarloaf Fuels Reduction Project to the south of Gold Hill Road and the James Creek Fuels Reduction project to the north, have planned significant fuel treatments. The primary objective of these efforts is to reduce the risk of crown fire initiation and spread by thinning forests and removing the ladder fuels necessary for a surface fire to reach the crown of trees. Some of this work has begun and has reduced vegetative hazards in the "West of Gold Hill" community within GHFPD. Additional information concerning the Sugarloaf and James Creek Fuels Reduction Projects can be found at: http://www.fs.fed.us/r2/arnf/projects/ea-projects/brd/index.shtml.

Finally, plans are in process for the GHFPD to work with the Four Mile Fire Protection District to begin a fuel reduction project in the southeastern part of the GHPFD that borders Four Mile. This effort will reduce risks to the Gold Run Subdivision, Rim Road, and the Town of Gold Hill, especially for a southeast wind-driven fire that can occur in the summer months.

3.2.3 Data Available on Vegetative Fuel Hazards within the GHFPD

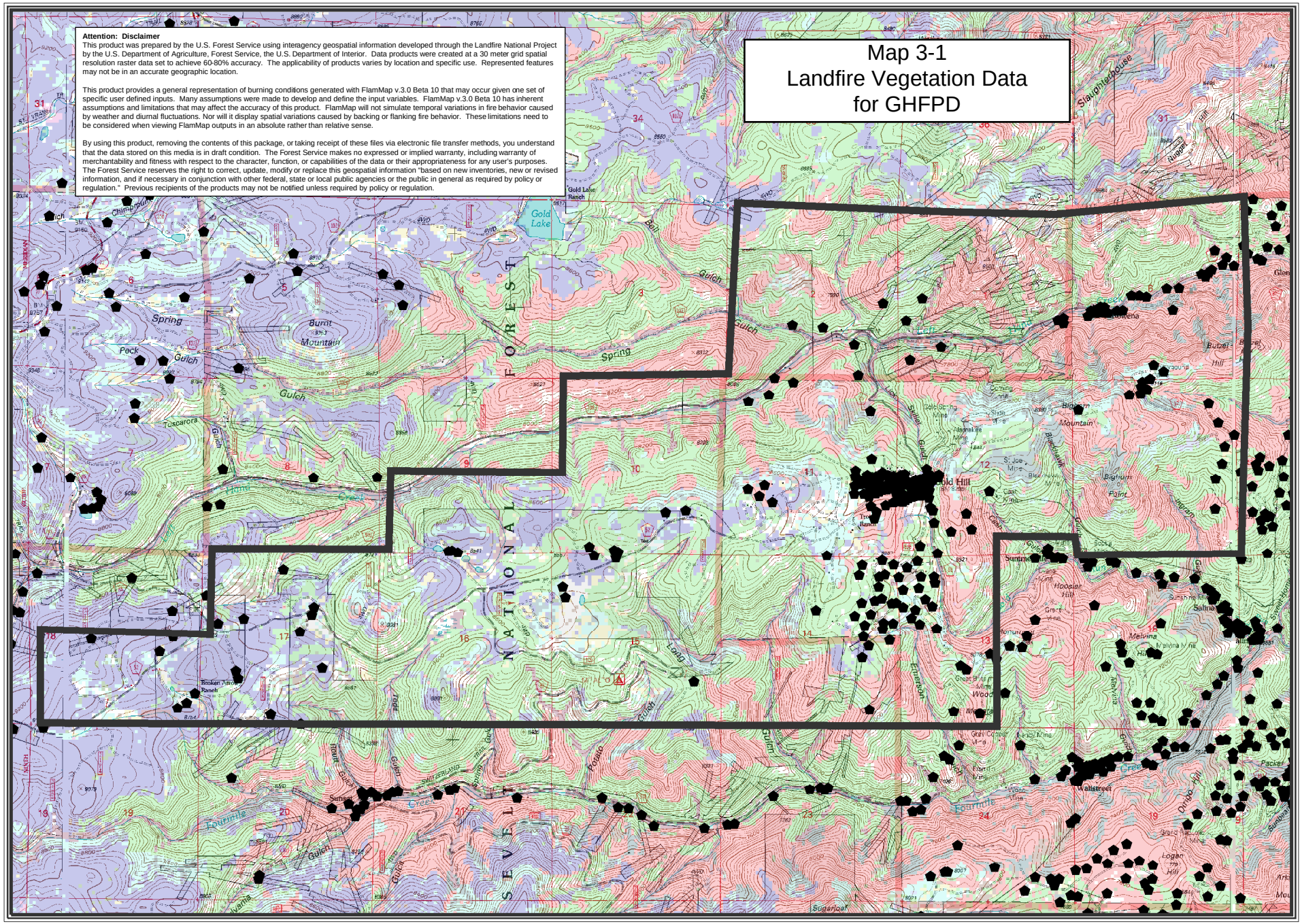
The USFS, CSFS, and Boulder County all gather and share information on vegetation types in the Front Range. Maps 3-1 and 3-2 are topographic maps of the GHFPD providing information on existing vegetation types and slope, respectively. This information is from the Landfire National Project. [12] Map 3-1 shows the prevalence of lodgepole pine at higher elevations while ponderosa pine and mixed conifer forest occur at lower elevations. In addition, the map shows the dominance of dry mixed conifer forest on the southern slopes of the GHFPD.

[12] Landfire, also known as the Landscape Fire and Resource Management Planning Tools Project, is a five-year, multi-partner project producing consistent and comprehensive maps and data describing vegetation, wildland fuel, and fire regimes across the United States. It is a shared project between the wildland fire management programs of the U.S. Department of Agriculture Forest Service and U.S. Department of the Interior (see www.landfire.gov).

The slope data presented in Map 3-2 are grouped according to the feasibility of fuel treatment. At slopes under 30 percent, ground-based equipment can be used; between 30 and 50 percent, thinning must be done manually; above 50 percent, the area is considered to be untreatable. Note the extensive areas within the GHFPD that have slopes over 50 percent. These include areas in and around the GHFPD communities of Rowena, the Lefthand area, and the Snowbound area. Other untreatable areas exist to the south and southeast of the Town of Gold Hill, the Gold Run subdivision, and the Rim Road area. Excluding the broad area of the community described as "West of Gold Hill," all the communities within the GHFPD are threatened by steep, south-facing slopes. In addition, the Town of Gold Hill is threatened by a relatively steep, north-facing slope immediately to the north of town. This is significant because the prevailing winds late in the fire season are from the north-northwest.

Map 3-3 presents the Boulder County data from the Wildfire Hazard Identification and Mitigation System (WHIMS) project on wildfire hazards for the GHFPD. The WHIMS project was initiated after the 1989 Black Tiger Fire that destroyed 44 homes and caused $10 million in property damage (see www.co.boulder.co.us/lu/wildfire/whims.htm). Boulder County's summary of WHIMS is as follows:

> WHIMS combines wildfire hazard assessment, prevention, and suppression expertise, with fire and forest management knowledge using geographic data management and analysis techniques and technologies. WHIMS strives to
>
> - Identify local wildfire hazards and assess the risks to communities
> - Educate and motivate homeowners and private landowners and increase community involvement with wildfire awareness and preparation
> - Assist land managers and planners in making appropriate decisions about land management and development in fire prone areas
> - Assist local fire protection districts in pre-attack planning
> - Assist local emergency management and disaster relief agencies with disaster assessment and emergency response


Attention: Disclaimer
This product was prepared by the U.S. Forest Service using interagency geospatial information developed through the Landfire National Project by the U.S. Department of Agriculture, Forest Service, the U.S. Department of Interior. Data products were created at a 30 meter grid spatial resolution raster data set to achieve 60-80% accuracy. The applicability of products varies by location and specific use. Represented features may not be in an accurate geographic location.
This product provides a general representation of burning conditions generated with FlamMap v.3.0 Beta 10 that may occur given one set of specific user defined inputs. Many assumptions were made to develop and define the input variables. FlamMap v.3.0 Beta 10 has inherent assumptions and limitations that may affect the accuracy of this product. FlamMap will not simulate temporal variations in fire behavior caused by weather and diurnal fluctuations. Nor will it display spatial variations caused by backing or flanking fire behavior. These limitations need to be considered when viewing FlamMap outputs in an absolute rather than relative sense.
By using this product, removing the contents of this package, or taking receipt of these files via electronic file transfer methods, you understand that the data stored on this media is in draft condition. The Forest Service makes no expressed or implied warranty, including warranty of merchantability and fitness with respect to the character, function, or capabilities of the data or their appropriateness for any user's purposes. The Forest Service reserves the right to correct, update, modify or replace this geospatial information "based on new inventories, new or revised information, and if necessary in conjunction with other federal, state or local public agencies or the public in general as required by policy or regulation." Previous recipients of the products may not be notified unless required by policy or regulation.
Map 3-1
Landfire Vegetation Data
for GHFPD
ROOSEVELT NATIONAL FOREST
Legend
Gold Hill Fire Protection
Structures
aspen forest
lodgepole pine
dry mesic montane mixed conifer
mesic montane mixed conifer
ponderosa pine woodland
subapline mesic spruce fir
aspen mixed conifer
sagebrush
ponderosa pine savanna
montane subalpine grassland
montane riparian
Landfire Existing Vegetation
Gold Hill F.P.D. CWPP
0 0.25 0.5 1 Miles

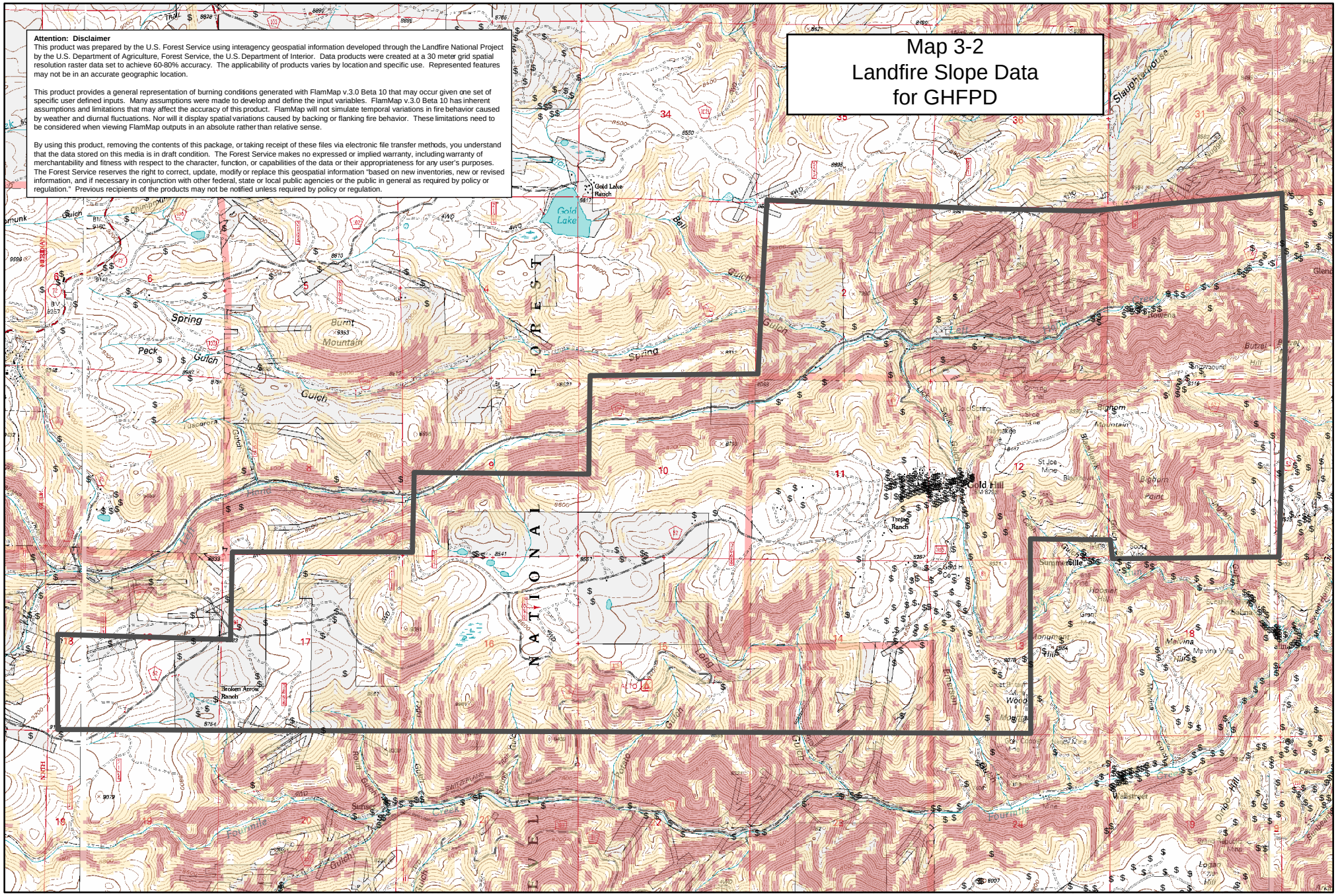
Map 3-2
Landfire Slope Data
for GHFPD

Attention: Disclaimer

This product was prepared by the U.S. Forest Service using interagency geospatial information developed through the Landfire National Project by the U.S. Department of Agriculture, Forest Service, the U.S. Department of Interior. Data products were created at a 30 meter grid spatial resolution raster data set to achieve 60-80% accuracy. The applicability of products varies by location and specific use. Represented features may not be in an accurate geographic location.

This product provides a general representation of burning conditions generated with FlamMap v.3.0 Beta 10 that may occur given one set of specific user defined inputs. Many assumptions were made to develop and define the input variables. FlamMap v.3.0 Beta 10 has inherent assumptions and limitations that may affect the accuracy of this product. FlamMap will not simulate temporal variations in fire behavior caused by weather and diurnal fluctuations. Nor will it display spatial variations caused by backing or flanking fire behavior. These limitations need to be considered when viewing FlamMap outputs in an absolute rather than relative sense.

By using this product, removing the contents of this package, or taking receipt of these files via electronic file transfer methods, you understand that the data stored on this media is in draft condition. The Forest Service makes no expressed or implied warranty, including warranty of merchantability and fitness with respect to the character, function, or capabilities of the data or their appropriateness for any user's purposes. The Forest Service reserves the right to correct, update, modify or replace this geospatial information "based on new inventories, new or revised information, and if necessary in conjunction with other federal, state or local public agencies or the public in general as required by policy or regulation." Previous recipients of the products may not be notified unless required by policy or regulation.



$ Structures

Gold Hill Fire Protection Boundary

Slope Landfire Data

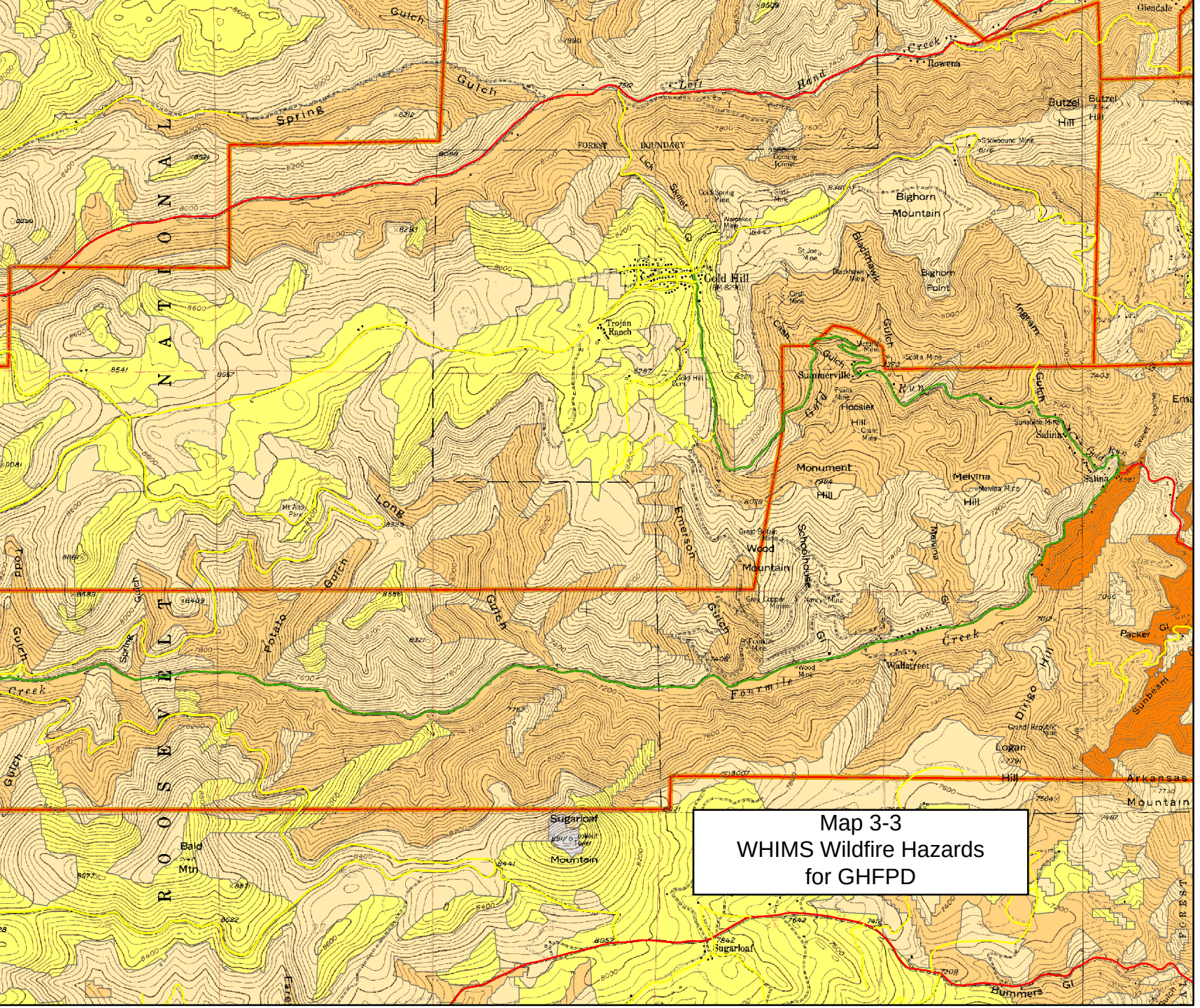
<VALUE>

- 0 - 30% Ground Based Equipment
- 31 - 50% Manual
- 51% and above Untreatable

Landfire Slope
Gold Hill FPD CWPP

®

0 0.25 0.5 1 Miles



Legend

- Fire Dist Boundary

Wildfire Hazard Type

HAZ_TYPE

- High Hazard
- Low Hazard
- Moderate Hazard
- No Risk
- Very High Hazard

Road Types

SURFACE

- GRAVEL
- P/G
- PAVED

BOULDER COUNTY FIRE MANAGEMENT

DISCLAIMER:
This map is for illustrative purposes only, and is not suitable for parcel specific decision making. The areas depicted here are approximate. More site specific studies may be required to draw accurate conclusions.

Boulder County

Map by E. Folwell 9/14/06

The WHIMS information presented in Map 3-3 integrates slope, aspect, elevation, and vegetation fuel type and condition to determine wildfire hazards. The map shows that all of the GHFPD communities in the eastern half of the district are either located in or bordered by high hazard areas. The western section of the district containing the West of Gold Hill community is primarily low hazard with some areas of moderate hazard.

3.2.4 Relative Ratings for Vegetative Fuel Hazards

Table 3-2 shows the vegetative fuel hazards ratings for each community based on the information presented in this section. All the communities except West of Gold Hill are rated as High; West of Gold Hill is rated as Low.

Table 3-2
Relative Ratings:
Vegetative Fuel Hazards

Community	Vegetative Fuel Hazards
Town of Gold Hill	High
Gold Run Subdivision	High
Rowena	High
Lefthand area	High
Sunshine area	High
Snowbound area	High
Rim Road	High
West of Gold Hill	Low

3.3 Weather Patterns

Weather patterns can have a large impact on wildfire starts and spread. This is critical information for the selection and prioritization of treatment units because these areas should be located to slow down wildfires coming from the most likely directions.

"Fire weather" refers to high wind speeds, low humidity, warm temperatures, and low or zero precipitation. At an elevation of approximately 8500 ft on the eastern slope of the Southern Rocky Mountains, the GHFPD experiences these conditions on a regular basis, especially during the May-October fire season. According to the BLM Environmental Assessment (US DOI, 1986), precipitation in the Gold Hill Area averages only about 20 inches per year, one-fourth of which falls in May and June. The driest period is November-February with July and August the hottest months. November through March is the period with the strongest winds, but strong

winds with gusts up to 100 mph can occur at any time. The highest recorded wind gust at Gold Hill is 147 mph.

Exact weather statistics for the GHFPD are not available, but a weather station a few miles north at the Bar-K Ranch in Ward, CO (elevation 8598 ft) is used here to provide representative data. Table 3-3 shows monthly high wind speed/direction, the maximum gust/direction, temperature, average humidity, and total precipitation for the months of May through October 2004. As can be seen from this data, the area regularly experiences high winds of near to or greater than 20 mph, and after the spring season the humidity is very low, 20 percent or less. The prevailing wind direction is from the southwest in the spring and then the northwest in summer and fall, although diurnal patterns due to heating and cooling of the eastern slopes bring southeasterly winds that are not reflected in the monthly data. Figure 3-1 illustrates a typical daily pattern in the summer. Note the dramatic wind shift from the northwest to the southeast beginning in mid-morning and extending through the early evening. The southeasterly afternoon winds range from about 3 to 8 mph with a 9 mph gust. These conditions are similar to those that occurred during the 1989 Black Tiger fire.

Table 3-3
Weather Statistics
(KCOBAR-K1 Weather Station)

2004	May	June	July	August	Sep	October
Wind: Monthly high, direction	24 mph, SW	21 mph, WSW	13 mph, NNW	12 mph, WSW	19 mph, NW	24 mph, WNW
Wind: Maximum gust, direction	26 mph, SW	22 mph, WSW	16 mph, NNW	14 mph, WSW	19 mph, NW	28 mph, NW
Temperature: High, Low, Average	78°, 18°, 49° F	105°, 0°, 54° F	90°, 42°, 61° F	87°, 35°, 57° F	78°, 30°, 53° F	62°, 26°, 42° F
Average Humidity	51%	32%	20%	20%	19%	21%
Total Precipitation	1.08 inches	2.78 inches	2.95 inches	2.54 inches	0.00 inches	0.44 inches

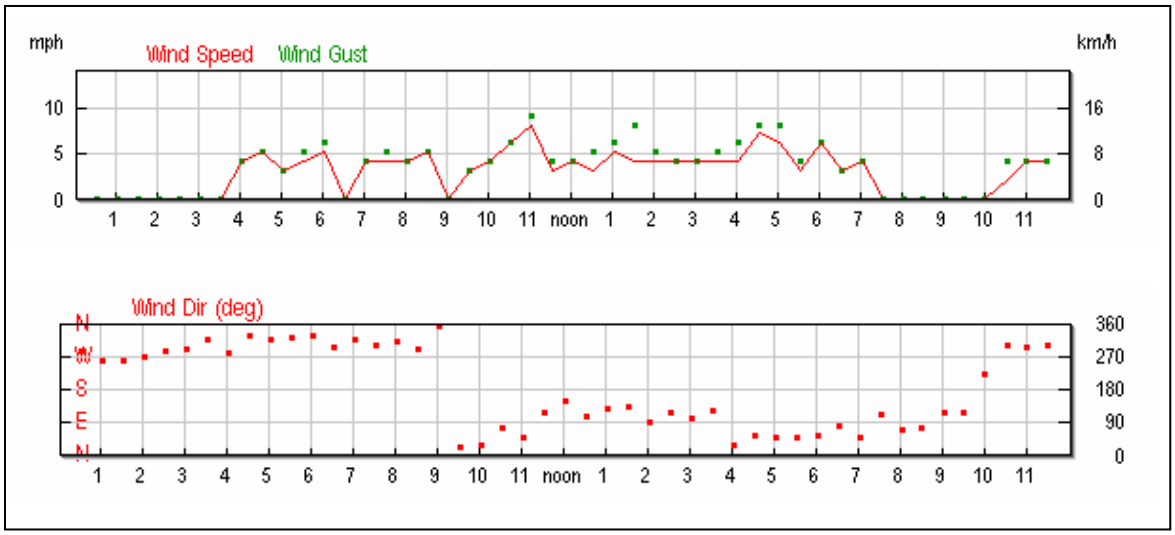


Figure 3-1. Diurnal Wind Speed and Direction – Summer Pattern

3.3.1. Relative Ratings for Weather Patterns

Based on the available data for weather patterns in the GHFPD, there does not appear to be any measurable difference between the communities and so individual ratings are unnecessary.

3.4 Previous Fires/Fire Occurrence

The frequency and scope of fire occurrence in the GHFPD is needed for the risk assessment to understand if one community is more likely to burn than another. This subsection presents research regarding historic fires in the area, data on Boulder County fires since the 1960s, recent examples from GHFPD records of fire calls over the last three years, and the relative rankings among the communities for fire occurrence.

3.4.1 Historic Fire in the GHFPD

The area in and around the GHFPD has a long history of wildfires. The original town of Gold Hill was destroyed by a wildfire in 1860. The town was then rebuilt in its current location. In 1894, a large wildfire that began near the town of Ward came very close to burning the town again. A recent study by Professor Veblen sampled fire history at 41 sites on the eastern slope of the Northern Front Range to understand climatic and human influences on fire frequency and fire intervals (Veblen, et al, 2000). Tree ring analysis of fire scars at the 41 sites recorded fires as early as 1474 and as recently as 1986.

The study collected historic fire interval data (i.e., the time period between two consecutive fires affecting the same area or individual tree) over the period 1650-1929 for six different elevation

zones ranging from 6,180 ft to 8,758 ft. The results show that for the elevation range similar to that found in the GHFPD (8,200-8,607 ft), average fire intervals ranged from about 17 to 40 years, but with minimum and maximum intervals of 1 and 92 years, respectively. The study also found high standard deviations in the average fire intervals, implying that fire occurrence was highly variable.

Figure 3-2 reproduces the map from the study showing the sites used. Note that the majority of these fire sites are in or close to the GHFPD and that many are located to the northwest or southeast of the fire district, indicating that, depending on the season, the prevailing winds would likely have spread fires across the district. In fact, the study goes on to analyze the extent of historic fires and states: "The occurrence of prehistoric fires at large percentages of the sample sites scattered throughout the study area in a single year demonstrates the potential for a large part of the montane zone to burn during a single year" (Veblen, et al, 2000, p. 1192). As an example, Figure 3-3 shows the widespread number of sites that recorded fire in two individual years, 1786 and 1859. These results are significant because they confirm that, without fire suppression and fuel reduction, the entire GHFPD is at great risk from catastrophic wildfire.

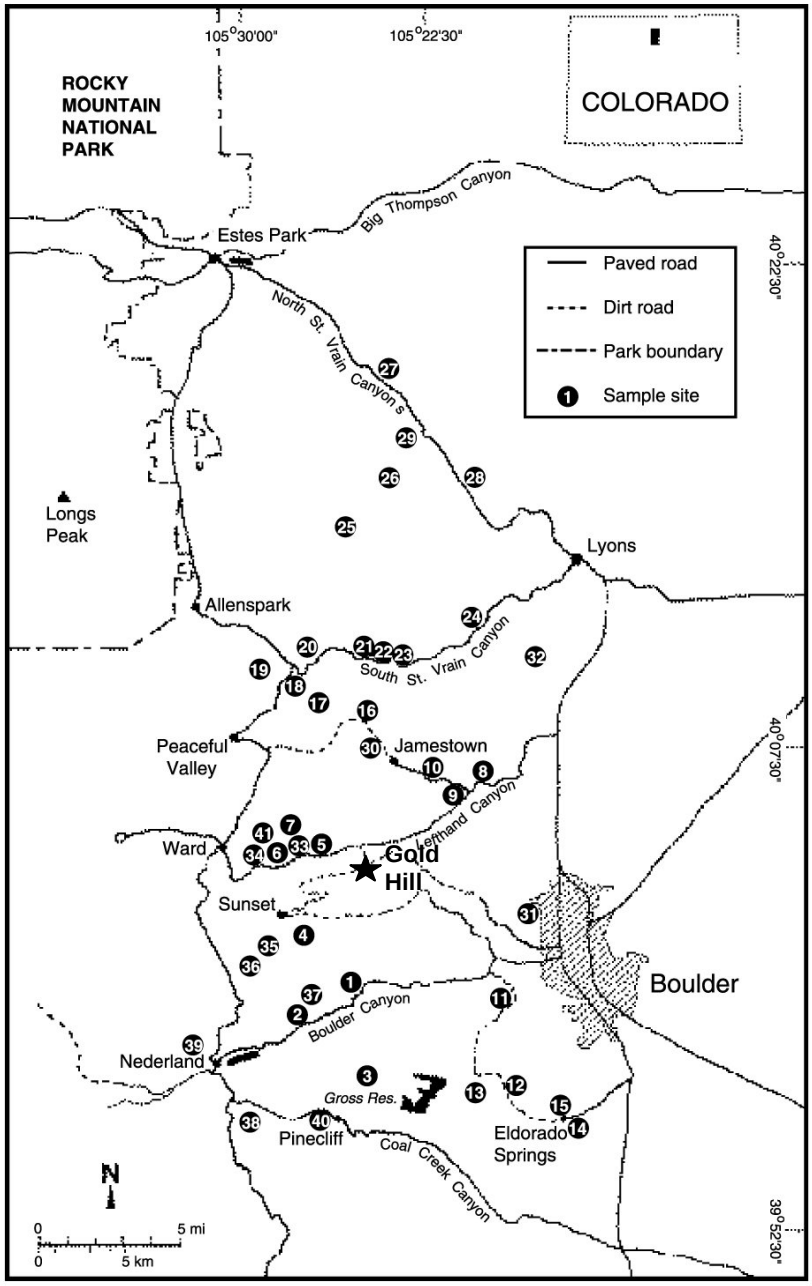
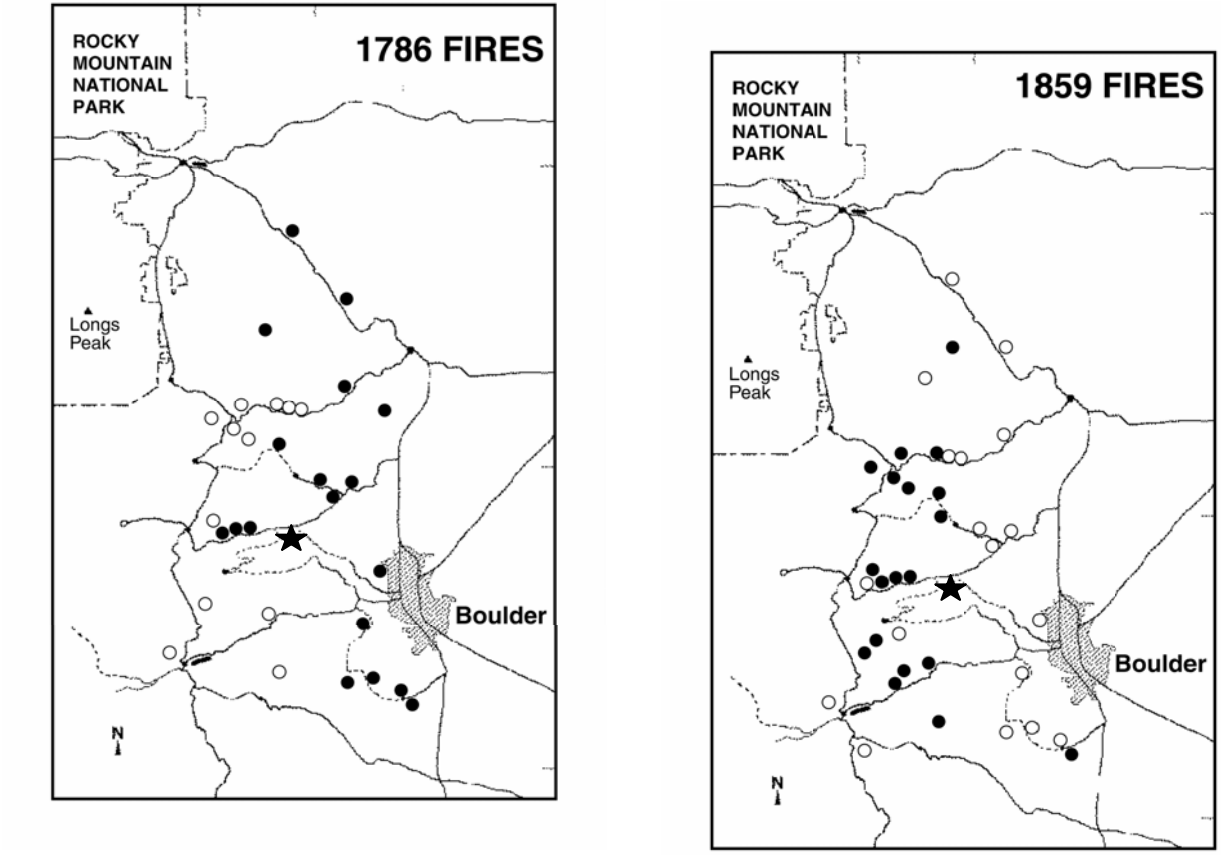


Figure 3-2. Front Range Fire History Sample Sites (reproduced with permission from Veblen et al, 2000, p. 1180; star marking Gold Hill added for this report)

Figure 3-3. Sites that Recorded Fire in 1786 and 1859 (filled circles) (reproduced with permission from Veblen et al, 2000, p. 1192)



In summary, the historic data suggest that widespread fires occurred in the area of the GHFPD prior to modern fire suppression and that fire frequency was highly variable, ranging from annual fires to decades without fire at the same site. In addition, the study shows the potential for a significant area of this region to burn within a single year.

3.4.2 Boulder County Fire Data

As for the data on more recent fires, Boulder County records show that, even in this era of fire suppression, significant fires have occurred in the county once every two years on average.[13] The following is a list of twenty-one Boulder County fires over the last 40 years compiled from county records:

1) 11/1/1964: Near Eldorado Springs (100 acres)
2) 5/28/1974: Near Gold Hill (160 acres)[14]: This fire started in the Gold Run Subdivision from a tree falling on a power line. The fire crossed Gold Run Road and burned up the slope to the top of the ridge.
3) 6/1976: Comforter Mountain (256 acres)
4) 8/9/1978: Fire caused by lightning burned more than 1,000 acres in the Northwestern part of Boulder County in Rocky Mountain National Park
5) 8/1979: Coal Creek Canyon (50 acres)
6) 10/6/1980: a fire caused by an arsonist burned 150 acres in the Pine Brook Hills Subdivision and a $150,000 home was destroyed.
7) 9/21/1984: USFS Land near Lyons (60 acres)
8) 8/1/1987: Between Boulder and Lyons (50 acres)
9) 11/4/1987: Southwest of Highway 36 (100 acres)
10) 2/21/1988: Sunshine Canyon (200 acres)
11) 9/7/1988: North of Ward (160 acres)
12) **Lefthand Canyon and Beaver Lake Fire - September 1988:** The Lefthand Canyon Fire and Beaver Lake Fire occurred in September of 1988 in the canyon above Buckingham Park and close to Beaver Lake near Ward. Approximately 1,500 acres were burned in Lefthand and 700 acres at Beaver Lake for a total of 2,300 acres. Houses in the area were threatened, but no structures were lost. The fires were believed to be man-caused.
13) **Black Tiger Fire - July 9, 1989:** The Black Tiger Fire destroyed 44 homes on Sugar Loaf Mountain and burned over 2,100 acres. Property damage was $10 million. The Boulder County area was experiencing very hot temperatures, low humidity and gusty

[13] Research by Professor Veblen indicates that fire occurrence appears to be strongly linked to El Nino-La Nina climate events. These climate phases produce alternating wet and dry periods over 2-5 years. Peak fire occurrence is typically several years after El Nino events produce an increase in fuels and when a La Nina phase produces an unusually dry spring (Veblen et al, 2000).

[14] Has been revised to 56 acres.

winds. Conditions were just right for a wildfire. The fire was man-caused.

14) **Olde Stage Road Fire - November 24, 1990:** The fourth major wildfire since 1988 was the Olde Stage Road Fire. The fire started when a man with a history of mental problems threw a burning mattress out his front door. Winds gusting to 80 mph fanned the fire out of control. Ten homes, five out-buildings and approximately 3,000 acres burned.
15) 7/15/1991: West of Boulder Hills Subdivision Six miles North of Boulder (135 acres)
16) 7/14/1994: Near Ward (50 acres)
17) 9/3/1996: Rabbit Mountain-Lyons (50 acres)
18) **Walker Ranch Fire- September 15, 2000:** The first major fire since the Olde Stage Fire in 1990 occurred on Walker Ranch on September 15, 2000 following a summer with little rain and extreme temperatures. The fire burned approximately 1,100 acres and was probably human caused. Even though there were over 250 homes in the area, no structures were lost. Firefighting costs were estimated at $1.5 million. A FEMA fire suppression declaration was made to help cover firefighting costs.
19) 7/19/2002 - Wonderland Lake Fire (400 acres)
20) **10/29/2003 – Overland Fire:** After two months of minimal precipitation along the Front Range, westerly chinook winds gusting to up to 70 mph downed a tree onto power lines near Jamestown. Almost 4,000 acres burned and12 homes and 19 structures were destroyed. Fire fighting costs were estimated at $400,000.
21) 9/01/2005: North Foothills Fire (55 acres)

3.4.3 Illustrative GHFPD Fire Calls

Records from the Gold Hill Fire Protection District over the last three years indicate the variety of fire related challenges facing this rural mountain district. Table 3-4 shows the number of fire-related calls (i.e., excluding medical) for smoke reports, car fires, structure fires, unattended campfires, and wildland fires from 2003-2005. Note that approximately half the calls are for actual fires versus smoke reports.

Table 3-4
Number of Fire-Related Calls Responded to by GHFPD

Year	Smoke Reports	Car Fires	Structure Fires	Unattended Campfires	Wildland Fires	Total
2003	10	1	0	3	3	17
2004	3	2	0	0	2	7
2005	8	2	2	3	0	15
Total	21	5	2	6	5	39

Luckily, none of these fires developed into major situations due to the quick response of the fire department and the lack of extreme weather conditions. The following are informal summary descriptions of three of these events provided by the GHFPD.

1. On October 5, 2003 in the afternoon, smoke report and flames were sighted at 8000 Sunshine

Canyon Rd. A lightning strike from a past lightning storm had finally burned along the root and surfaced causing about 1/8th of an acre to burn. Surrounding ground and root system, rocks were very hot with hidden hot pockets. Lots of time spent on this one to assure it was out. This was on BLM/private land with access being a rocky one-way in, same way out four wheel drive road, within 200 yards of an historic old miners' cabin. Terrain was steep and rocky. Low wind that day.

2. On July 22, 2005 in the early evening, car fire reported at 6900 Sunshine Canyon Rd. Gold Hill Resident driving home left overheating car at side of road under the shade of a tree. The car continued to overheat, caught fire and caught the tree on fire. This fire was in the vicinity of several homes and was on the border of Gold Hill and Sunshine Fire Districts. Four Mile Fire also responded to a mutual aid tone. The adjacent landowner had recently completed significant mitigation work on the side of the road where the car caught fire removing many trees and low-lying limbs, otherwise this fire could have been much more serious. Minimal wind and good emergency response.

3. October 2, 2005. School-related parties (e.g., for graduation, beginning of school) held out at Mount Alto on the south end of the Switzerland Trail and at Rocky Point off of the Gold Hill Rd, constantly cause concern for unattended campfires. The summer of 2005 was no different when the morning after a party, fire department members and a county sheriff deputy found three smoldering fire rings and one grill all posing a wildland fire threat. Local residents are always on alert to this ongoing and pending hazard and hike the area and pass on reports of smoke and hot fire rings to the fire department.

3.4.4. Relative Ratings for Fire Occurrence

Based on the information presented in this subsection on previous fires and on consultation with local fire officials, wildfire does not appear to be more or less likely in one region of the GHFPD than another. Every area has a high potential for wildfire, and so the ratings for each community would be the same. As for weather patterns, ratings are unnecessary since they will not affect the results.

3.5 Homes and Infrastructure Vulnerability

Determining the likelihood of ignition for structures (i.e., structural vulnerability) as well as for important infrastructure such as roads and power lines is the subject of this part of the community risk assessment. This sub-section focuses on the structural vulnerability of homes within the GHFPD. Roads are addressed under fire-fighting preparedness in Section 3.6. Determining the vulnerability of power lines and transformers, however, was beyond the scope of this first edition of the CWPP due to the difficulty of obtaining power line maps from Xcel. This is a goal of future CWPP updates.

The structural vulnerability rating for a community reflects the relative likelihood that the average home/structure within the community will burn as compared to the average home/structure in another community. In contrast to the previous risk categories, community-specific data on vulnerability are readily observable. The following risk sub-categories, or risk factors, were chosen in consultation with state and county wildfire personnel as the key determinants of vulnerability for each home/structure:

- Wood shingle or wood shake roof
- Wood siding
- Overhanging eaves, balconies, decks, and/or unenclosed stilt construction
- Lack of defensible space (defensible space is defined for this effort as: no vegetation or wood piles within 15 feet of the home and 10 feet or better crown spacing of trees within 100 feet of the home)
- Lack of fire-fighting water cistern dedicated to the home[15] (community cisterns are not addressed in this risk category—they are addressed under Fire-Fighting Preparedness, Section 3.6)

While Boulder County's WHIMS project collects this type of structural vulnerability data, the information for Gold Hill was determined to be about 10 years old. As a result, the CWPP Task Force agreed to collect new data specifically for the CWPP. Task Force volunteers surveyed homes in each of the eight communities to determine the percent of homes/structures with each risk factor. Volunteers completed the community surveys based on local knowledge and by driving through each community and observing each home without disturbing the homeowner.

3.5.1 Relative Ratings for Structural Vulnerability

In contrast to the descriptive ratings that were directly assessed for vegetative fuel hazards, weather patterns, and previous fires, the ratings in this category are developed by applying a scoring model to the data collected for each of the five structural vulnerability risk factors listed above. The presence of any risk factor is assigned a score of 3. A score for each community is calculated by multiplying the percent of homes possessing each risk factor by 3 and then adding across the risk factors to produce the total score. For example, if 50 percent of the structures in a community had wood siding, then the wood siding score for that community would be 3 x 50% = 1.5. If the community had 50 percent of its structures possessing all five risk factors, then the community's total structural vulnerability score would be 1.5 + 1.5 +1.5 + 1.5 +1.5 = 7.5. The maximum possible score is 15: if 100 percent of a community's structures had all five of the risk factors. The lowest possible score is 0. Table 3-5 shows the total number of homes/structures surveyed in each community, the percent of buildings with each risk factor, the calculated score, and the relative rating assigned based on the range of scores.

[15] After the 1989 Black Tiger fire, all new home construction is required to include a water cistern dedicated for fire fighting (usually 1500-2500 gallons) and may not be used for other needs. Since most homes in the area are older, if a cistern was not readily observable, the assumption was made that the home did not have one.

Table 3-5
Structural Vulnerability Ratings by Community

Community	# of Buildings Surveyed	Percent of Buildings With Each Risk Factor					Total Score	Relative Rating
		Wood Shingle or Wood Shake Roof	Wood Siding	Overhanging Eaves, Balconies, Decks, and/or Unenclosed Stilt Construction	Lack of Defensible Space	Lack of Fire Fighting Cistern		
Town of Gold Hill	85	0%	99%	44%	66%	98%	9.21	High
Gold Run Subdivision*	41	0%	85%	76%	61%	78%	9.0	High
Rowena	23	4%	87%	43%	83%	96%	9.39	High
Lefthand area	10	0%	80%	57%**	80%	90%	9.21	High
Sunshine area	3	0%	67%	100%	0%	0%	5.01	Low
Snowbound area	12	17%	75%	83%	58%	83%	9.48	High
Rim Road	6	0%	100%	17%	50%	67%	7.02	Medium
West of Gold Hill	47	0%	72%	36%	34%	87%	6.87	Medium

* Data provided by CSFS
** Data unavailable for one-third of homes; percentage based on those with data

3.6 Lack of Fire-Fighting Preparedness

The lack of fire-fighting preparedness ratings focus on how the physical characteristics of a community (e.g., steep terrain) affect the ability of the fire department to successfully fight a fire in each community (as opposed to around a single home); it is not a rating of the abilities of GHFPD personnel. A High rating means that the community poses significant challenges for fire fighting, and that the magnitude of impacts due to wildfire could be community-wide. As for structural vulnerability, this risk factor is broken down into observable sub-categories, or risk factors, permitting data gathering specific to each community, and a scoring model is used to develop the descriptive ratings for each community. The following five risk factors are based on guidance from the SAF CWPP handbook, local fire officials, and CSFS:

1) Sufficient access/egress (e.g., the presence of a dead-end road is a problem)

2) Access to water for community fire fighting (e.g., availability of community cisterns or nearby streams—not the smaller cisterns dedicated to homes)
3) Distance from the Gold Hill fire barn
4) Community land area (i.e., size)
5) Community topography (primarily concerned with slope)

3.6.1 Relative Ratings for Lack of Fire Fighting Preparedness

The Gold Hill Fire Protection District was the primary source of the information for this risk category. The eight communities within the GHFPD differ greatly across the risk factors. Table 3-6 shows the information gathered for each community and the scores depending on the presence and nature of each risk factor, following the convention of 3, 2, or 1 for High, Medium, or Low. Since there are five risk factors, the highest possible score is 15 and the lowest possible score is 5. The relative ratings are based on the range of total scores.

Table 3-6
Lack of Fire Fighting Preparedness Ratings by Community

Community	Sufficient Access/ Egress[a]	Access to Water for Community Fire Fighting (Cisterns, stream)[b]	Distance From Fire Dept.[c]	Community Land Area[d]	Community Topography[e]	Total Score	Relative Rating
Town of Gold Hill	Yes	Yes (two 12K gal cisterns)	< I mi	Small	Flat to Mod. Steep	6	Low
Gold Run Subdivision	No (Gold Trail dead ends)	Yes (one 12K gal cistern)	0.5-2 mi	Large	Flat to Mod. Steep	11	High
Rowena	Yes	Yes, seasonal (Lefthand Creek)	2 mi	Small	Flat to Very Steep	9	Medium
Lefthand area	Yes	Yes, seasonal (Lefthand Creek)	1 mi	Small	Flat to Very Steep	9	Medium
Sunshine area	Yes	Yes (Sunshine FD cistern)	2+ mi	Medium	Flat to Mod. Steep	9	Medium
Snowbound area	Yes	Sunshine FD cistern or possible shaft water	2 mi	Small	Flat to Very Steep	9	Medium
Rim Road	No (dead end)	No	1-2.5 mi	Medium	Flat to Mod. Steep	13	High
West of Gold Hill	Yes	No	0.5-5 mi	Large	Flat to Mod. Steep	12	High

[a]Yes = 1; No = 3
[b] Yes, cisterns = 1; 2 = Yes, seasonal and Snowbound case; No = 3
[c] <1 mi = 1; 1-2 mi = 2; > 2 mi = 3
[d]Small = 1; Medium = 2; Large = 3
[e]Flat = 1; Mod. Steep = 2; Very Steep = 3

3.7 Historic, Cultural, and Ecological Values at Risk

Significant historic, cultural, and ecological values exist within the GHFPD. This part of the risk assessment rates the communities in terms of the extent to which their historic, cultural, or ecological resources could be damaged by wildfire, fire-fighting activities, or fuel treatment activities. As mentioned in Section 2.0, several of the communities within the GHFPD have lengthy and important histories due to the area being the first mining settlement in what was then known as the Nebraska Territory. In addition, the diversity of vegetation and topography in the GHFPD combined with the large amounts of undeveloped land create a breadth of ecological resources. Task Force members compiled a list of historic/cultural/ecological sites based on local knowledge, historical documents, environmental assessment (EA) documents prepared by the USFS and BLM, and information provided by the Center for Native Ecosystems (CNE). For the purposes of the CWPP, this analysis focuses only on those historic/cultural/ecological sites within the GHFPD that would be put at risk due to wildfire and/or fuel treatment activities or fire fighting. A complete list of important sites is beyond the scope of this effort. The first part of this subsection focuses on historic and cultural resources and the second discusses ecological issues.

3.7.1 Historic/Cultural Values

A number of important historical/cultural sites within the GHFPD are at risk. Table 3-7 lists each site at risk within each community and indicates the potential risk to the site from wildfire, fire mitigation (i.e., fuel treatment), or fire fighting activities. The column indicating the "overall risk" to the site reflects both the relative historic/cultural importance of the site as well as its potential to be damaged. For example, the sites receiving a "High" rating are typically historically important with wood structures that could be destroyed by fire. Sites receiving "Medium" and "Low" ratings are likely judged less historically important and/or less susceptible to wildfire and wildfire-related activities.

Table 3-7
Historic/Cultural Values at Risk
(sorted by community)

The Site and Description	Community	Potential Damage to Site due to Wildfire	Potential Damage from Fire Mitigation or Fire Fighting Activities	Overall Risk to Site
Town of Gold Hill: The town is a National Register Historic District. Various historical structures are described below:	Town of Gold Hill	Densely-distributed structures are wood and could be destroyed.	Certain properties could be damaged during fire fighting	High
The Bluebird Lodge: Built in 1873 by Mr. Wentworth, a hotel owner in Denver, the lodge has housed	Town of Gold Hill	Because it is wood construction, there is a great deal of potential damage.	The property itself has defensible space and probably wouldn't be damaged by fire mitigation or fire	High

The Site and Description	Community	Potential Damage to Site due to Wildfire	Potential Damage from Fire Mitigation or Fire Fighting Activities	Overall Risk to Site
many guests and known many names through the years. It is on the National Historic Register.			fighting.	
The Gold Hill School: First constructed in 1873, and rebuilt in 1883, the school had 31 students and one teacher its first year. Currently on the National Historic Register, it has served as a school ever since.	Town of Gold Hill	Because of its wood construction, there is a great deal of potential damage.	The property itself has defensible space and probably wouldn't be damaged by fire mitigation or fire fighting.	High
The Gold Hill Museum: Built around 1941 as the St. James Chapel, and currently on the National Historic Register, this building now serves as a museum.	Town of Gold Hill	Because of its wood construction, there is a great deal of potential damage.	The property itself has defensible space and probably wouldn't be damaged by fire mitigation or fire fighting.	High
The Gold Hill Inn: Built around 1927 and currently on the National Historic Register, the building has been owned and operated by the Finn family as a restaurant and entertainment hall since 1962.	Town of Gold Hill	Because of its wood construction, there is a great deal of potential damage.	The property itself has defensible space and probably wouldn't be damaged by fire mitigation or fire fighting.	High
The Gold Hill General Store: Built in 1888, this wood structure has served as a general store ever since. It is currently on the National Historic Register also.	Town of Gold Hill	Because of its wood construction, there is a great deal of potential damage.	The property itself has defensible space and probably wouldn't be damaged by fire mitigation or fire fighting.	High
The Cash Mine: This was an important early mine in Gold Hill discovered in 1872, located on the south slope 1/2 mile due east of Town of Gold Hill. 1872	Gold Hill	Historic wood headframe, shaft/hoist house, two old wood "shop" buildings, a new core shed—all could be destroyed by wildfire.	Neither fire mitigation nor fire fighting activities would be expected to damage the area more than a fire itself.	High
The Victoria Mine: This was an important early mine discovered in 1872. It is located 800 feet NE of Summerville to the south of Gold Hill	Gold Hill/Summerville	Two historic wood buildings, shaft/hoist house. Great potential of damage	Neither fire mitigation nor fire fighting activities would be expected to damage the structures more than a fire itself, but marshy grassland area	High

The Site and Description	Community	Potential Damage to Site due to Wildfire	Potential Damage from Fire Mitigation or Fire Fighting Activities	Overall Risk to Site
			could be damaged by heavy equipment.	
The Slide Mine: Located 0.75 miles NE of Gold Hill, this was the largest mine in Gold Hill after the discovery of tellurium in the early 1900s. It produced over $2 million in gold by 1910. 1875, 1913 claim dates.	Gold Hill	Great potential for damage to site and remnants of original structures	Neither fire mitigation nor fire fighting activities would be expected to damage the area more than a fire itself.	High
The Rex Mine: Located 4500 ft due SE of Gold Hill outside Summerville. Produced much ore over a long period with potential for more	Gold Hill	Great potential for damage to site and remnants of original structures	Wet area in valley could be damaged by heavy equipment	High
Who-Do Mine: Located 0.5 miles E of Gold Hill on south side.	Gold Hill	Historic headframe, hoist house, compressor building, brick outhouse, 2nd brick building could be damaged by wildfire	Neither fire mitigation nor fire fighting activities would be expected to damage the area more than a fire itself.	High
The Gold Hill Cemetery: Community cemetery dating from1866	Gold Run Subdivision	While fire would not destroy tombstones, it could negatively impact the many trees and other plantings and mementos left in the cemetery.	Fire mitigation could be needed near the cemetery but probably not in it. Fire fighting could damage tombstones and other ceremonial items.	High
Original Gold Hill Homestead, the Pugh ranch, built in the 1860s	Gold Run Subdivision	Because of its wood construction, there is a great deal of potential damage.	The property itself has defensible space and probably wouldn't be damaged by fire mitigation or fire fighting.	High
The Snowbound Mine: This historic mining site (1877) is on the National Historic Register. It consists of 12 buildings on 49 acres.	Snowbound area	Because of the wood construction of the mine and many cabins around it, there is a great deal of potential damage.	Neither fire mitigation nor fire fighting activities would be expected to damage the area more than a fire itself.	High
Brown's Cemetery in Rowena:	Rowena	While fire would not destroy tombstones, it could negatively impact the aesthetics of the site.	Fire mitigation could be needed near the cemetery but probably not in it. Fire fighting could damage tombstones and other ceremonial items.	Medium
The Old Green School House in Rowena:	Rowena	The remaining wood structure could be destroyed by fire.	Fire fighting could damage the structure. Fire mitigation activities	Medium

The Site and Description	Community	Potential Damage to Site due to Wildfire	Potential Damage from Fire Mitigation or Fire Fighting Activities	Overall Risk to Site
			would likely not have a major effect.	
Wood Mountain: The remaining historic mining structure was built around 1899. Mrs. Elsie Trask operated a 'Bed and Breakfast' from 1923-1926. It also served as a rest stop for miners and as an office for the mine company. The frame building is approximately 1,000 square feet.	Rim Road area	The remaining wood structure could be destroyed by fire.	Fire fighting could damage the structure. Fire mitigation activities would likely not have a major effect.	High
Colorado Mountain Ranch: This site was homesteaded in the late 1800s and became a dude ranch in 1920. It has been a summer camp for kids since 1947.	West of Gold Hill	Many of the structures are wood, surrounded by trees, so there is a great deal of potential damage.	Fire Mitigation or Fire Fighting could damage buildings, fences and corrals, and overall appeal/privacy of the property.	High
Hanson's Pond: This site was homesteaded in 1883 and burned in a major fire in 1894. A rare water plant has been found in the pond.	West of Gold Hill	Wildfire would not damage the pond per se.	Fire fighting and fire mitigation at the site could damage water quality, sensitive plants, and the aesthetics.	Medium
The Switzerland Trail: Built as a narrow gauge railroad in 1898 by Colorado & Northwestern, the tracks extended 25 miles from Sunset to Ward. The tracks were abandoned in 1919.	West of Gold Hill	Because only the railroad bed remains, there is no potential damage, other than to flora and fauna around the trail.	Fire mitigation and fire fighting might damage the aesthetic appeal of the trail.	Medium
Mount Alto: Located on the Switzerland Trail, this site was once a dance hall for those arriving by trail. It was also the site of a park where picnics and programs were held.	West of Gold Hill	The dance hall itself was destroyed by a fire. Because only the stone chimney remains, there is no potential damage, other than to flora and fauna around the trail.	No potential damage	Low
The "Old House" on the Stepanek Ranch. Also known as the "Ghost House." Current structure built in 1914.	West of Gold Hill	Because of its wood construction, there is a great deal of potential damage.	The property itself has defensible space and probably wouldn't be damaged by fire mitigation or fire fighting.	High

3.7.2 Ecological Values

Significant ecological values exist in the GHFPD due to the wide variety of flora and fauna in the district's large areas of undeveloped land. As for historic/cultural resources, it is critical to understand which of these species could be negatively impacted by wildfire, fuel mitigation projects, and/or fire fighting activities as well as their location within the GHFPD. While an extensive biological survey is beyond the scope of the CWPP at this time, information previously collected by the USFS, BLM, and the Center for Native Ecosystems provides a basis for identifying species at risk and their locations within the FPD. The CWPP Task Force commits to meet with federal, state, and/or other conservation specialists as appropriate to identify species issues within the proposed treatment units described in Section 4.0.

3.7.2.1 USFS Information

The USFS is required to evaluate the potential impacts of its actions on federally listed species (including endangered, threatened, and proposed), Forest Service sensitive species, management indicator species (MIS), and other species or habitats pertinent to its projects (USDA, James Creek EA, p. 68). Such species that could occur on the national forest lands within the GHFPD have been evaluated as part of the USFS Environmental Assessments for the James Creek and Sugarloaf Fuel Reduction Projects (see http://www.fs.fed.us/r2/arnf/projects/ea-projects/brd/index.shtml).

Table 3-8 summarizes the wildlife species that were addressed in these project analyses. (Note that since these EAs cover USFS land that extends both north and south of the GHFPD, not all of these species may be found within the GHFPD.) The conclusions regarding wildlife were that, while some individuals of certain species could be adversely impacted by the various proposed alternatives, their overall populations would not decline and that other species could actually benefit from the mitigation work.

Table 3-8
Wildlife Species Included in USFS James Creek and Sugarloaf Fuel Reduction Project EAs

Threatened or Endangered Species	Project Management Indicator Species	Sensitive Species		
		Birds	**Mammals**	**Amphibians**
Lynx	Elk Pygmy Nuthatch Warbling Vireo Mountain Bluebird Hairy Woodpecker	Black Swift Flammulated Owl Lewis' Woodpecker Northern Goshawk Olive-sided Flycatcher Peregrine Falcon American three-toed Woodpecker Fox Sparrow Loggerhead Shrike Golden-crowned Kinglet	American Marten Fringed Myotis Townsend's Big-eared Bat North American Wolverine Abert Squirrel Dwarf Shrew Ringtail	Boreal Toad Northern Leopard Frog Tiger Salamander

For plant species, the USFS EAs state that no federally listed or USFS sensitive species are found in the project areas, but that potential habitat for USFS sensitive species is present in the areas and that occurrences of other rare plants have been documented. Table 3-9 lists the USFS sensitive species mentioned in the EAs as well as the other rare plants. Again, as for wildlife, some of these species may only be found in USFS project areas beyond the GHFPD boundaries. Additional consultation with biologists will be necessary to determine which of these species may occur within the GHFPD.

Table 3-9
USFS Sensitive Plant Species and Other Rare Plant Species Addressed in USFS James Creek and Sugarloaf Fuel Reduction Project EAs

Common Name	Species Name	Typical Habitat
Slender moonwort	*Botrychium lineare*	Meadows, disturbed areas
Pale moonwort	*Botrychium pallidum*	Meadows, disturbed areas
Lesser panicled sedge	*Carex diandra*	Fens, bogs, willow carrs, pond edges, hummocks, marshes
Bristlystalked sedge	*Carex leptalea*	Fens, bogs, conifer swamps, pond edges, mossy floating logs, hummocks
Livid sedge	*Carex livida*	Fens, bogs
Yellow lady's-slipper	*Cypripedium calceolus*	Montane and subalpine forests
Roundleaf sundew	*Drosera rotundifolia*	Fens, ponds, kettle lakes
Slender cottongrass	*Eriophorum gracile*	Fens, bogs, wet meadows, pond edges
White adder's mouth	*Malaxis brachypoda*	Shady, moist riparian areas
Weber monkeyflower	*Mimulus gemmiparus*	Moist soil of forest seeps, granite seeps, slopes and alluvium, under granite overhangs

Common Name	Species Name	Typical Habitat
Rocky Mountain cinquefoil	*Potentilla rupincola*	Granite outcrops and ponderosa pine forest and woodlands
Dwarf raspberry	*Rubus arcticus*	Willow carrs and mossy streamsides
Autumn willow	*Salix serissima*	Marshes and fens
Lesser bladderwort	*Utricularia minor*	Subalpine ponds
Other rare species and plant associations documented in the area		
Larimer aletes	*Aletes humilis*	Found in 2003 survey
Gayfeather	*Liatris ligulistylis*	Not found in 2003 survey
Clustered lady's-slipper	*Cypripedium fasciculatum*	Not found in 2003 survey
Reflected moonwort	*Botrychium echo*	Not found in 2003 survey
Western moonwort	*Botrychium hesperium*	Found in project area
Ponderosa pine/Weber spike fescue forest and woodland	*Pinus ponderosa/Leucopoa kingii*	Occurs in proposed treatment units
River birch/mesic forb riparian shrubland	*Betula occidentalis/Mesic forb*	Not known to occur in proposed treatment units
Beaked hazelnut montane riparian forest	*Corylus cornuta*	Not known to occur in proposed treatment units
Parry outgrass grassland	*Danthonia parryi*	Occurs in proposed treatment units
Quaking aspen/river birch forest	*Populus tremuloides/Betula occidentalis*	Found in project area
Blue spruce/river birch forest	*Picea pungens/ Betula occidentalis*	Found in project area
Bebb willow shrubland	*Salix bebbiana*	Found in project area
Lesser panicled sedge quaking fen	*Carex diandra* quaking fen	Found in project area

In addition, the USFS explicitly recognizes the Todd Gulch Fen as an ecologically significant area and prohibits mechanical treatment within 100 feet (USFS, Sugarloaf EA, Appendix A, p.3). The following description of the importance of protecting fens in Colorado is taken from a USFS wetlands policy statement (USFS, File Code: 2070/2520-7/2620, March 19, 2002):

> Fens are wetlands with water-saturated substrates and an accumulation of about 30 cm or more of peat (organic soil material). Peatlands, which include fens, bogs, and muskegs, are widely distributed across boreal regions. Fens are much less common in the lower latitudes of the continental U.S. In Colorado, these unique and ancient ecosystems are somewhat more common than in the northern Rockies, and may be the most common wetland type in the 8,500–10,000 ft. elevation range. Fens are relict wetlands from the last glaciation, and as a result have very unique characteristics found nowhere else on the landscape. Although they occupy only a small percentage of the landscape in the southern Rocky Mountains and the Nebraska sandhills, fens are an important element of biological diversity, and often support globally rare plant and invertebrate species and unique species assemblages.
>
> Fens are typically formed in basins with impeded drainage. Peat develops due to incomplete decomposition of dead plant material in saturated soils. Once peat has accumulated to about 30 cm, the availability of oxygen and nutrients essential to plant growth are significantly reduced. Fens in our region are normally ground water driven, have pH above 5.5, and are dominated by grasses, sedges, or willows. Because of their water-holding capability, fens provide very stable habitats. For example, many of the fens of Colorado are over 10,000 years old, with organic soil accumulation rates ranging from about 4 to 16 inches per thousand years. Because the rate of accumulation is so slow, these ecosystems are essentially irreplaceable.

The U.S. Fish and Wildlife Service, Mountain-Prairie Region, has made conservation and protection of fens one of their wetland priorities. Furthermore, the Mountain-Prairie Region has determined that all functioning fens fall within their Resource Category 1. This means that the goal is no loss of existing habitat value, and that every reasonable effort should be made to avoid impacting these habitats. Mitigation for loss of fens is problematic, as there are no known methods to create new functional fens.

3.7.2.2 BLM Information

The BLM's EA identifies the following as a partial list of wildlife species expected to be present in the Gold Hill Area: black bear, mountain bluebird, bobcat, Nuttall's cottontail, coyote, mule deer, elk, red fox, blue grouse, mountain lion, yellow-bellied sapsucker, southern red-backed vole, and yellow warbler. Its analysis of the environmental consequences of its proposed actions indicate both positive and negative impacts: deadwood removal and tree thinning can reduce insect populations and habitat for some species, while at the same time leading to greater vegetative diversity that in turn increases wildlife diversity. Planting aspen could disrupt the current wildlife population mix but could ultimately have overall positive impacts due to increasing the presence of this habitat type and resulting mix of habitats.

3.7.2.3 CNE Information

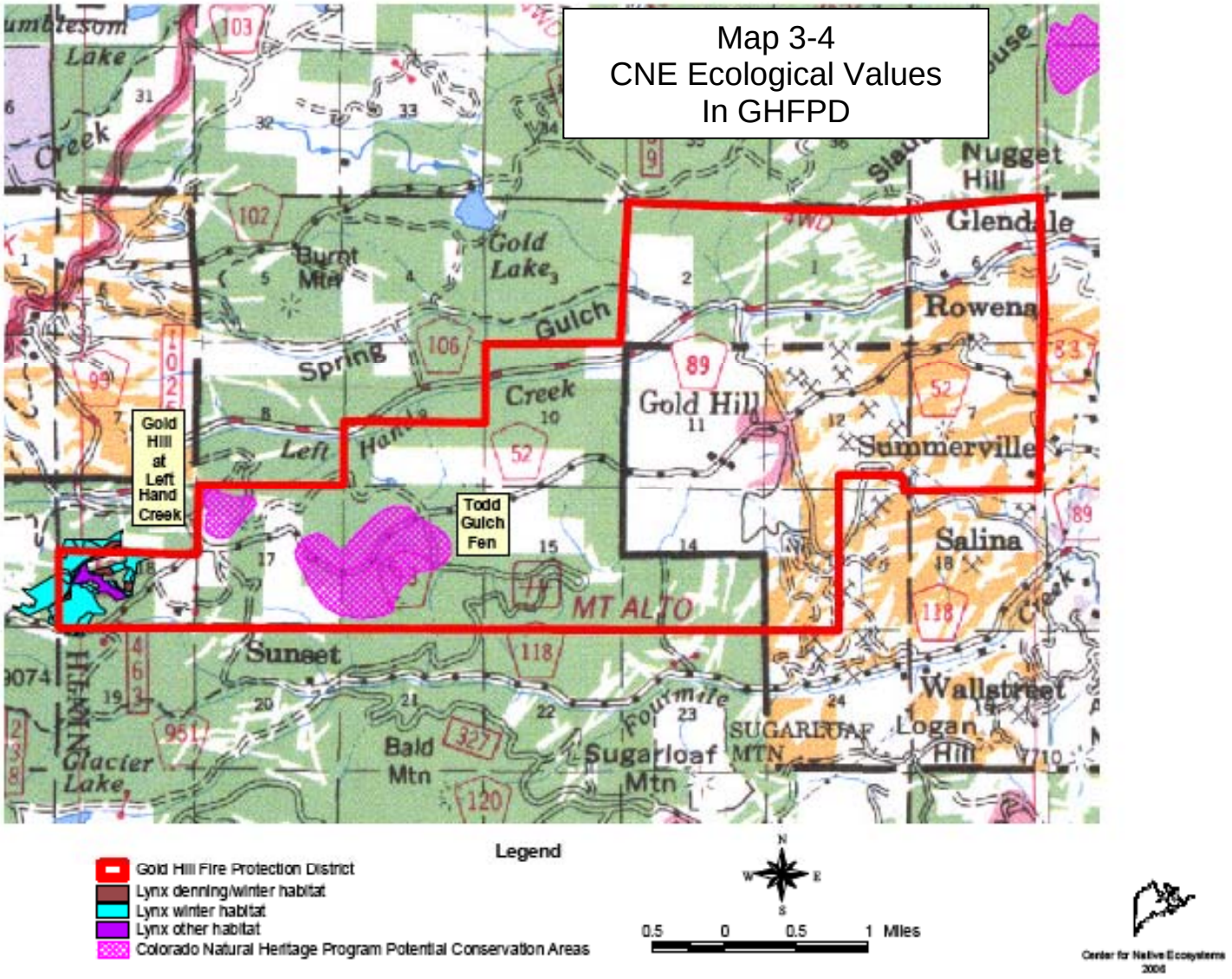
The Center for Native Ecosystems (CNE) works to protect and recover the native plants, animals, and habitat of the Greater Southern Rockies ecosystem. CNE has provided a summary of ecological values specific to the Gold Hill FPD, including Colorado Natural Heritage Program (CNHP) Potential Conservation Areas and globally- and state- imperiled species. Map 3-4 identifies the Todd Gulch Fen and an area termed "Gold Hill at Lefthand Creek," a montane grassland within a complex of grasslands and shrublands, as CNHP Potential Conservation Areas. Map 3-4 also shows areas of lynx habitat within the GHFPD at the extreme western edge of the district. CNE believes that impacts to fens, lynx, and slender moonwort (a small, perennial fern), in that order, would be the most important issues. CNE's perspective on these ecological resources is provided below (excerpted from email communication with Erin Robertson, staff biologist).

Regarding fens, CNE feels that a larger buffer zone during fuel reduction activities would be better than the 100 feet proposed by USFS for Todd Gulch Fen. The Grand Mesa National Forest recently expanded its 100-foot buffer around fens in the Ward Lake EA to include special management for a 300-foot buffer as well. Activities uphill of the fen or those that could affect the fen's hydrology should also be carefully considered before approval, even if they occur outside the 300 foot buffer area. If there is a fen present at "Gold Hill at Lefthand Creek," then it should also be managed like the Todd Gulch Fen.

As for lynx, CNE states that USFS should be implementing the Canada Lynx Conservation Assessment and Strategy (Ruediger et al, 2000). This document was prepared by the USFS, US Fish and Wildlife Service, and the BLM. In summary, it says that USFS should identify and protect lynx habitat areas and that forest management practices should be designed to preserve or

enhance habitat for snowshoe hare (the primary prey of the lynx) as well as for red squirrel (alternate prey). Specifically, practices that lead to regeneration of aspen are recommended as they provide habitat for these prey animals. The presence of lynx has not been documented in the GHFPD, although lynx habitat exists in the district, and residents have claimed to have seen them. Since lynx are protected under the Endangered Species Act, any fuel reduction project that could negatively impact them, even if they are found on private land, must be reviewed by the US Fish and Wildlife Service.

Slender moonwort (Botrychium lineare) is an official Candidate for Endangered Species Act protection. This status does not provide any special protections on private lands, but it does mean that USFS is not supposed to authorize or fund actions that contribute to the need to protect it under the Act. It also means that the US Fish and Wildlife Service believes that protection is warranted, and just does not have the funding yet to put it on the endangered species list. If this species does occur in the GHFPD it deserves a little extra consideration. However, it is often found in disturbed areas, so it is hard to decide how best to manage for it.


Map 3-4
CNE Ecological Values
In GHFPD
Gold Hill at Left Hand Creek
Todd Gulch Fen
Gold Hill
Summerville
Rowena
Nugget Hill
Glendale
Salina
Wallstreet
Logan Hill
Sugarloaf Mtn
Bald Mtn
Glacier Lake
Sunset
MT ALTO
Gold Lake
Burnt Mtn
Spring Gulch
Left Hand Creek
Fourmile Creek
SUGARLOAF MTN
Legend
Gold Hill Fire Protection District
Lynx denning/winter habitat
Lynx winter habitat
Lynx other habitat
Colorado Natural Heritage Program Potential Conservation Areas
0.5 0 0.5 1 Miles
Center for Native Ecosystems 2006

3.7.2.4 Summary of Ecological Values at Risk

Table 3-10 summarizes the ecological values at risk in the GHFPD and is organized in terms of location and the potential damage due to wildfire, fuel reduction projects, and fire fighting, as was done for historic/cultural values. Note that all of the ecological values are located West of Gold Hill.

Table 3-10
Ecological Values at Risk in the GHFPD

Ecological value/site	Location	Potential Damage due to Wildfire	Potential Damage due to Fuel Reduction Activities	Potential Damage due to Fire Fighting	Overall Risk
Todd Gulch Fen: a wetland with peat accumulation. 316 acres (includes surrounding watershed). Irreplaceable. Moderate biodiversity significance. Colorado Natural Heritage Program Potential Conservation Area.	West of Gold Hill	Minimal	Significant damage could occur from heavy equipment in the area	Significant damage could occur from heavy equipment in the area	High
Gold Hill at Lefthand Creek: a montane grassland within a complex of grasslands and shrublands. 50 acres. High biodiversity significance. Colorado Natural Heritage Program Potential Conservation Area.	West of Gold Hill	Significant species loss could occur	Significant damage could occur from heavy equipment in the area	Significant damage could occur from heavy equipment in the area	High
Lynx habitat: winter, denning, and other habitat	West of Gold Hill	Significant habitat loss could occur	Significant damage could occur from heavy equipment in the area	Significant damage could occur from heavy equipment in the area	High
Slender moonwort (Botrychium lineare): a candidate for Endangered Species Act Protection	West of Gold Hill	Significant species loss could occur	Significant damage could occur from heavy equipment in the area	Significant damage could occur from heavy equipment in the area	High

As indicated in Table 3-10, each of these values must be protected from the heavy machinery and disturbance associated with fuels reduction projects and fire fighting. Wildfire itself would probably not have serious negative impacts on Todd Gulch Fen since it has likely been around since the last ice age, but it could destroy lynx habitat, the rare vegetation at Gold Hill at Lefthand Creek, and slender moonwort.

3.7.3 Relative Ratings for Historic/Cultural/Ecological Values at Risk

In summary, there are significant historic, cultural, and ecological values at risk within the Gold Hill FPD. The ratings for each community are shown in Table 3-11. The ratings are based on the importance of the values at risk, their potential damage due to wildfire, fuels reduction, and/or fire fighting, and the number of values/sites at risk within each community. The Town of Gold Hill and the Snowbound communities are rated High in this category because of their National Historic Register status and damage potential due to wood siding/frame construction. The West of Gold Hill community is also rated High, but this is primarily due to the extensive ecological values (Table 3-10) potentially at risk rather than historic or cultural values. The Gold Run subdivision, Rowena, and Rim Road communities have historic/cultural resources that could be damaged, although these resources are either judged less historically significant and/or have less potential extent of damage—hence their "Medium" rating. The Lefthand and Sunshine areas are rated Low due to their relative lack of values at risk.

Table 3-11
Relative Ratings:
Historic/Cultural/Ecological Values at Risk

Community	Historic/ Cultural/ Ecological Values at Risk
Town of Gold Hill	High
Gold Run Subdivision	Medium
Rowena	Medium
Lefthand area	Low
Sunshine area	Low
Snowbound area	High
Rim Road	Medium
West of Gold Hill	High

3.8 Population Size

Population size is an important driver of the magnitude of risk because of the potential for injury or mortality due to wildfire. Since specific population estimates are not available for each of the communities, the relative number of structures in each community (this data was gathered for the structural vulnerability assessment) is used as a proxy for relative population size.[16]

[16] A small number of the structures surveyed are summer-only cabins.

3.8.1 Relative Ratings for Population Size

Table 3-12 summarizes the data and the High, Medium, and Low Ratings.

Table 3-12
Relative Ratings:
Population Size

Community	Approx. Number of Homes/ Structures	Relative Rating
Town of Gold Hill	85	High
Gold Run Subdivision	44	Medium
Rowena	23	Medium
Lefthand area	10	Low
Sunshine area	3	Low
Snowbound area	12	Low
Rim Road	6	Low
West of Gold Hill	47	Medium

3.9 Community Risk Assessment Results

The overall community risk assessment results combine the results for the seven risk categories presented in the previous sub-sections to determine an overall risk score and overall risk rating. As described in Sections 3.3 and 3.4, ratings were not assigned in the categories of weather patterns or previous fires, as each community is judged to face similar risks in these cases, and therefore the ratings would not affect the results. Table 3-13 shows the risk ratings in each of the five remaining categories for each community and indicates "NA" for "not assigned" for weather patterns and previous fires. The final two columns contain the overall risk score and the overall risk rating for each community. The scoring model is applied as before (High = 3 points; Medium = 2 points; Low = 1 point) and the overall risk score is the sum across the categories. The highest possible score is 15 and the lowest is 5. The overall risk ratings are assigned based on an inspection of the range of overall scores and on the average score for each community (the overall score divided by 5). The general rule of thumb is as follows: the communities rated High

risk have an average score that rounds to 3, Medium risk communities' average scores round to 2, and Low risk communities' average scores round to 1.[17]

The results show that the Town of Gold Hill, the Gold Run Subdivision, Rowena, and the Snowbound area are rated as High risk, followed by the Lefthand area, Rim Road, and West of Gold Hill communities with Medium risk, and the Sunshine area with Low risk. These results have a direct bearing on the proposed treatment units and the recommendations to reduce structural vulnerability described in Section 4.0.

Table 3-13
Community Risk Assessment Results

Community	Risk Categories--Ratings							Overall Risk Score	Overall Risk Rating
	Vegetative Fuel Hazards	Weather Patterns	Previous Fires	Structural Vulnerability	Lack of Fire Fighting Preparedness	Historic, Cultural, Ecological Values	Pop'n Size		
Town of Gold Hill	High	NA	NA	High	Low	High	High	13	High
Gold Run Subdivision	High	NA	NA	High	High	Medium	Medium	13	High
Rowena	High	NA	NA	High	Medium	Medium	Medium	12	High
Lefthand area	High	NA	NA	High	Medium	Low	Low	10	Medium
Sunshine area	High	NA	NA	Low	Medium	Low	Low	8	Low
Snowbound area	High	NA	NA	High	Medium	High	Low	12	High
Rim Road	High	NA	NA	Medium	High	Medium	Low	11	Medium
West of Gold Hill	Low	NA	NA	Medium	High	High	Medium	11	Medium

NA: Not assigned because all communities similarly affected.

[17] The Sunshine community average score was 1.6, but it was assigned a Low overall risk rating since it had the lowest overall score.

4.0 Community Mitigation Plan

The community mitigation plan identifies and prioritizes areas within the GHFPD for fuel reduction projects, estimates likely treatment costs, reviews possible funding sources, and makes recommendations to reduce structural vulnerability and improve emergency preparedness.

4.1 Identifying and Prioritizing Fuel Reduction Projects

The identification and prioritization of areas within the GHFPD for fuel reduction projects is the result of a two-stage process. First, wildfire scenarios were modeled to determine potential wildfire behavior: fire pathways, and areas of ground, torching, and crown fires. The fire behavior data indicated areas within GHFPD that could potentially benefit from fuels treatment. The CWPP Task Force reviewed these results and identified specific treatment areas factoring in local knowledge of fire-fighting conditions, terrain, and previously planned treatments. Second, the locations were prioritized according to the community risk assessment results presented in Section 3.0. The priority treatment areas are associated with the communities with "High" overall risk ratings: the Town of Gold Hill, the Gold Run Subdivision, Rowena, and the Snowbound area. Due to their proximity to the "High" risk communities, the Lefthand area and Rim Road communities will also benefit from many of the priority treatment areas. Additional, lower priority treatment areas were also specified to address the lower risk communities, provide contiguous treatment areas where feasible, and to ensure the accessibility of the major roadways.

The following subsections describe the fire behavior modeling and then the process that was used to select treatment units and priorities in more detail.

4.1.1 Fire Behavior Modeling

Fire behavior models simulate the spread of wildfire under specific weather conditions. Due to the complexity of fire behavior, however, no model can claim to provide perfect information. The reliability and usefulness of model results are a function of the simulation logic as well as the quality of the input data. USFS offered to simulate two fire scenarios for the GHFPD using a state-of-the-art model called FlamMap, developed by the USFS Missoula Fire Sciences lab and Systems for Environmental Management (see www.fire.org).

FlamMap generates maps of fire behavior (such as location and branching of fire pathways, ground, crowning, and torching fires) by integrating geographic information system (GIS) layers of fuel and vegetation with topography and fixed weather conditions. Research has shown that locating treatment units along fire pathways at the site of or just prior to areas of branching is most effective for slowing a fire. In addition, treatments should be located in areas where crown fire occurs. Newly available, satellite-based Landfire data for Colorado were used to meet FlamMap's input data needs (the vegetation and slope maps were presented in Section 3, Maps 3-1 and 3-2, respectively). Due to questions regarding the specific accuracy of the vegetation data and the complexity of the modeling, the CWPP Task Force decided that the FlamMap results would be used only as a starting point to identify treatment units. The Task Force's

knowledge of the local complexities caused by vegetation/fuels, terrain, and weather conditions would be used to interpret the results.

The CWPP Task Force developed two FlamMap scenarios in consultation with USFS staff.[18] The first scenario attempts to reflect the situation of a wildfire approaching GHFPD from the west late in the fire season—September/October—with extremely dry conditions and strong winds. Westerly winds of 25 mph are combined with 1000-hour fuels at 10 percent moisture[19] and 99th percentile fire weather conditions.[20] FlamMap models all potential fire pathways for this scenario by setting a continuous ignition line to the west of the district. Map 4-1 shows the model results for the western scenario: possible fire pathways into and through the fire district as well as areas of torching and crown fires. The major fire pathways in the western scenario are as expected: along the canyons that run west to east, including through Lefthand canyon in the northern part of the district, and through the canyons in the southern part of the district that more or less parallel Gold Hill Road. Fire pathways lead directly to and through all eight GHFPD communities. Throughout the district, potential torching fires occur along these fire pathways and on the steep south-facing slopes.

The second scenario attempts to reproduce the conditions of a wildfire approaching from the south/southeast—potentially more typical of a fire during the summer months when diurnal patterns prevail (see Section 3.3). A southerly ignition line is set in conjunction with a somewhat less extreme weather/fuels scenario: southeast winds of 15 mph, live fuel moisture content of 90 percent, and 95th percentile fire weather conditions. Map 4-2 shows the FlamMap results for the southern scenario. In this case, the major fire pathways into the district proceed up the largest south and southeasterly-oriented gulches--Emerson Gulch and Long Gulch—and directly threaten the Gold Run subdivision, Rim Road, the Town of Gold Hill, and the Lefthand area. Other fire pathways show threats to the Snowbound and Sunshine area communities. The Rowena and West of Gold Hill communities are potentially less threatened. As in the western scenario, extensive areas of potential torching fire occur along the fire pathways and on the south-facing slopes.

4.1.2 Proposed Treatment Units

As the FlamMap results show, and as local officials are aware, the entire populated area of the GHFPD could be threatened by wildfire. In order to mitigate this threat, fuels treatment needs to occur. Since prescribed fire is very difficult to manage or infeasible near populated areas, forest management appears to be the best option for the GHFPD. Although it would be beneficial to treat almost all of the forest in the district, it is not economically feasible. For that reason,

[18] Clearly, analyzing more than two scenarios would be beneficial, but time and resource limitations required that two scenarios be chosen. Additional fire behavior modeling is identified as a goal for future work on the CWPP.

[19] Fuel that dries out in 1000 hours=42 days. 10 percent refers to the fuel moisture content. In an average year fuel moisture is about 18 percent; in an extreme drought year fuel moisture may get as low as 7 percent.

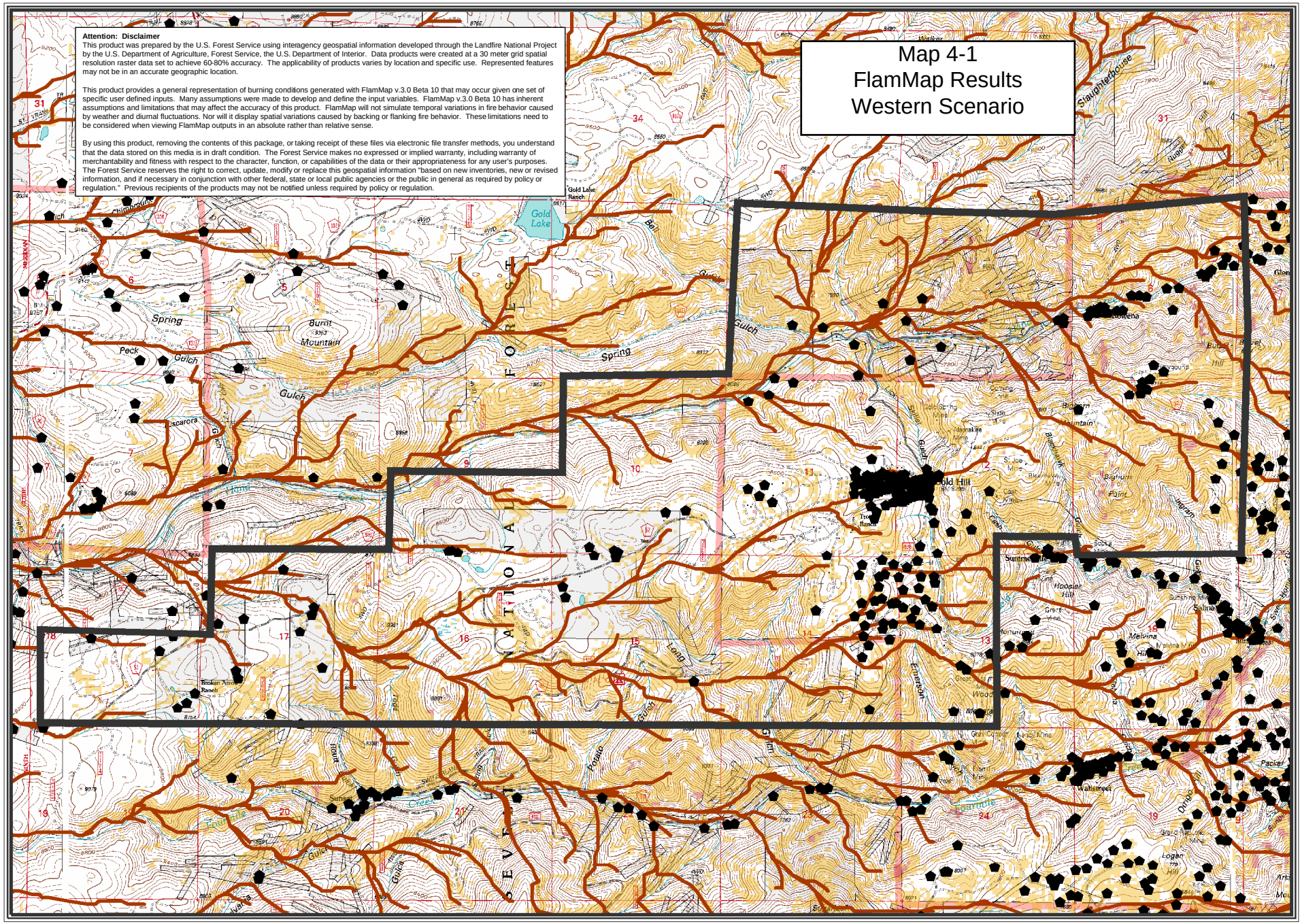
[20] (i.e., historically, fire conditions would have been worse only 1 percent of the time)

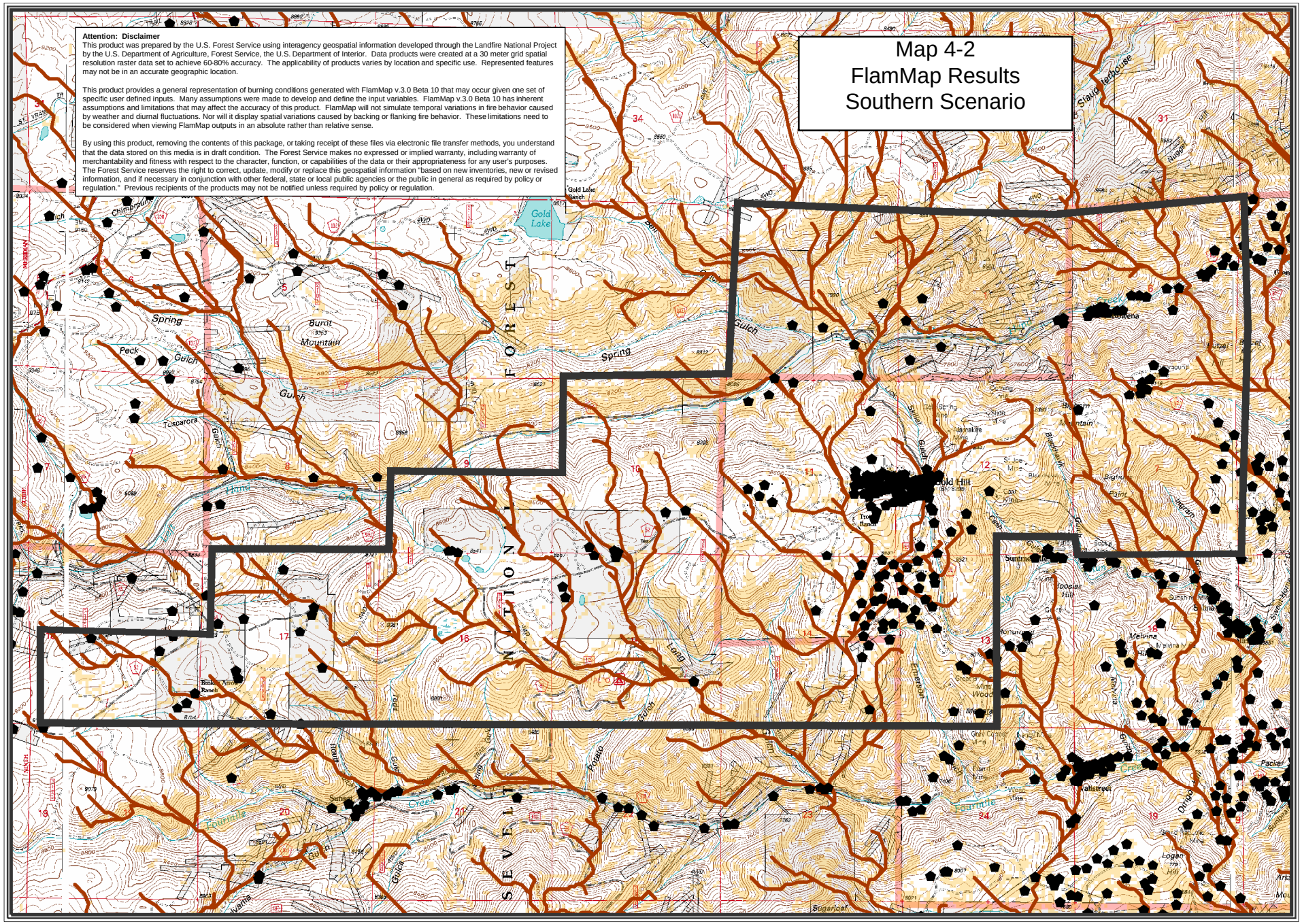
strategic placement of treatment units on the landscape should be used in order to strive for an overall benefit to the ecosystem and communities, while keeping the goals realistic. With that concept in mind, the CWPP Task Force worked to identify enough forest management on the ground to protect the values at risk and to minimize the damage of intense wildfires. The proposed treatments are based off the conceptual FlamMap results, but take all on-the-ground features into account as well as the local knowledge and experience of fire fighters and land managers. The treatments are consistent in mitigating the areas of concern identified by the community risk assessment and meet the CWPP Task Force expectations of the spread of wildfire in the two weather scenarios that were evaluated. The specific process used to locate strategic treatment locations is outlined below.

First, an initial set of possible treatment units was identified from the two FlamMap scenarios. The CWPP Task Force overlaid the FlamMap results onto the community base map and reviewed the results. The FlamMap information displays potential fire pathways and fire intensity information, while the community base map displays community locations. For each FlamMap scenario, circles were drawn onto the base map around areas of high fire intensity, where fire paths would threaten a community, and where fire paths would branch in many directions. The circles for each scenario were then combined onto one map to identify overlapping or duplicate treatment areas and create one overall set of potential treatment areas.

The next step was to transfer the circled treatment areas (aka draft polygons) onto aerial photography and contour maps. The draft polygon sizes and specific locations were then altered based upon the presence of homes, steep slopes, and the distance from roads. In order to maximize the effectiveness of the treatments while minimizing the potential costs, some of the units were trimmed in size, connected to existing meadows, shifted closer to roads, moved to cover higher density forests, and/or combined to make them contiguous treatments across the landscape. In addition, the draft polygons located on USFS land were found, in most cases, to duplicate existing USFS planned treatment areas as part of the Sugarloaf and James Creek fuel reduction projects. These treatment areas will be tracked separately from the treatments on non-USFS land. Finally, the treatment units were prioritized based on the community risk assessment results presented in Section 3.0: treatments surrounding the Town of Gold Hill, the Gold Run subdivision, Rowena, and the Snowbound communities are the priority.

Maps 4-3 and 4-4 show the prioritized treatment units superimposed on the FlamMap results for the two weather scenarios. Inspection of these maps shows the attempt to locate treatments just prior to or at major fire branching locations. Map 4-5 overlays the prioritized treatments on the community base map in order to show how the treatments relate to the community risk assessment. Treatment units addressing the risk to the Town of Gold Hill, the Gold Run Subdivision, Rowena, and Snowbound communities are shown in red. As mentioned above, most of the units drawn in the area West of Gold Hill (on USFS land) were found to be within projects already planned by USFS and are shown as such (in green). Lower priority treatments are shown in yellow and are designed to address the risks to the other communities, to provide contiguous treatment areas where feasible, and to ensure all major roadways remain accessible in case of wildfire.


Attention: Disclaimer
This product was prepared by the U.S. Forest Service using interagency geospatial information developed through the Landfire National Project by the U.S. Department of Agriculture, Forest Service, the U.S. Department of Interior. Data products were created at a 30 meter grid spatial resolution raster data set to achieve 60-80% accuracy. The applicability of products varies by location and specific use. Represented features may not be in an accurate geographic location.
This product provides a general representation of burning conditions generated with FlamMap v.3.0 Beta 10 that may occur given one set of specific user defined inputs. Many assumptions were made to develop and define the input variables. FlamMap v.3.0 Beta 10 has inherent assumptions and limitations that may affect the accuracy of this product. FlamMap will not simulate temporal variations in fire behavior caused by weather and diurnal fluctuations. Nor will it display spatial variations caused by backing or flanking fire behavior. These limitations need to be considered when viewing FlamMap outputs in an absolute rather than relative sense.
By using this product, removing the contents of this package, or taking receipt of these files via electronic file transfer methods, you understand that the data stored on this media is in draft condition. The Forest Service makes no expressed or implied warranty, including warranty of merchantability and fitness with respect to the character, function, or capabilities of the data or their appropriateness for any user's purposes. The Forest Service reserves the right to correct, update, modify or replace this geospatial information "based on new inventories, new or revised information, and if necessary in conjunction with other federal, state or local public agencies or the public in general as required by policy or regulation." Previous recipients of the products may not be notified unless required by policy or regulation.
Map 4-1
FlamMap Results
Western Scenario
Gold Lake
Spring
Peck Gulch
Burnt Mountain
Bell
Gulch
Hume Creek
Gold Hill
Slaughterhouse
Bowena
Hoosier Hill
Melvina
Salina
Walstreet
Logan Hill
Trouble Gulch
Sumner Creek
Potato
Long
Emerson
Ingram
Dripps
Packer
Bighorn Mountain
Broken Arrow Ranch
Gold Lake Ranch
NATIONAL FOREST
NEVADA
Legend
Gold Hill Fire Protection
Torching Fire
Structures
Active Crown Fire
Major Fire Paths West
Western FlamMap Scenario
Gold Hill F.P.D. CWPP
0 0.25 0.5 1 Miles


Attention: Disclaimer
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This product provides a general representation of burning conditions generated with FlamMap v.3.0 Beta 10 that may occur given one set of specific user defined inputs. Many assumptions were made to develop and define the input variables. FlamMap v.3.0 Beta 10 has inherent assumptions and limitations that may affect the accuracy of this product. FlamMap will not simulate temporal variations in fire behavior caused by weather and diurnal fluctuations. Nor will it display spatial variations caused by backing or flanking fire behavior. These limitations need to be considered when viewing FlamMap outputs in an absolute rather than relative sense.
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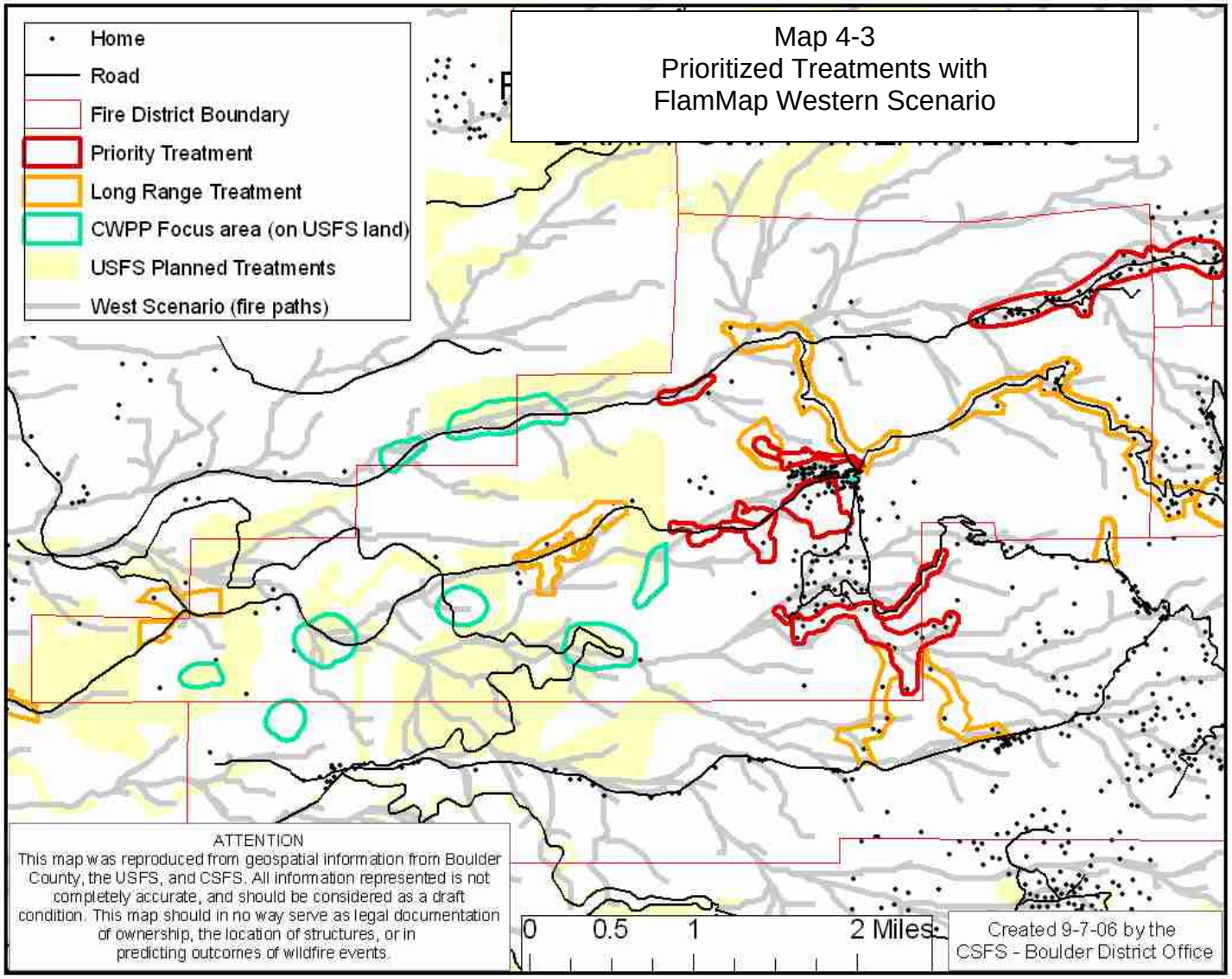
Map 4-2
FlamMap Results
Southern Scenario
Gold Hill
Spring
Peck Gulch
Burnt Mountain
Tuscarora Gulch
Flume Creek
Tourmile Creek
Ivanna Gulch
Sugarloaf
Gold Lake
Gold Lake Ranch
Chimney Rock
Slaughterhouse
Hunger
Bowena
Blackhawk Mtn
Ingram
Melvina
Logan Hill
Packer
Drisko
Eberson
Poplar
Long
Sunset
Sunset Mine
Joosian Hill
Gold Hill Fire Protection
Structures
Major Fire Paths Southeast
Torching
Active Crown Fire
Southeastern FlamMap Scenario
Gold Hill F.P.D. CWPP
0 0.25 0.5 1 Miles


Map 4-3
Prioritized Treatments with
FlamMap Western Scenario
Home
Road
Fire District Boundary
Priority Treatment
Long Range Treatment
CWPP Focus area (on USFS land)
USFS Planned Treatments
West Scenario (fire paths)
ATTENTION
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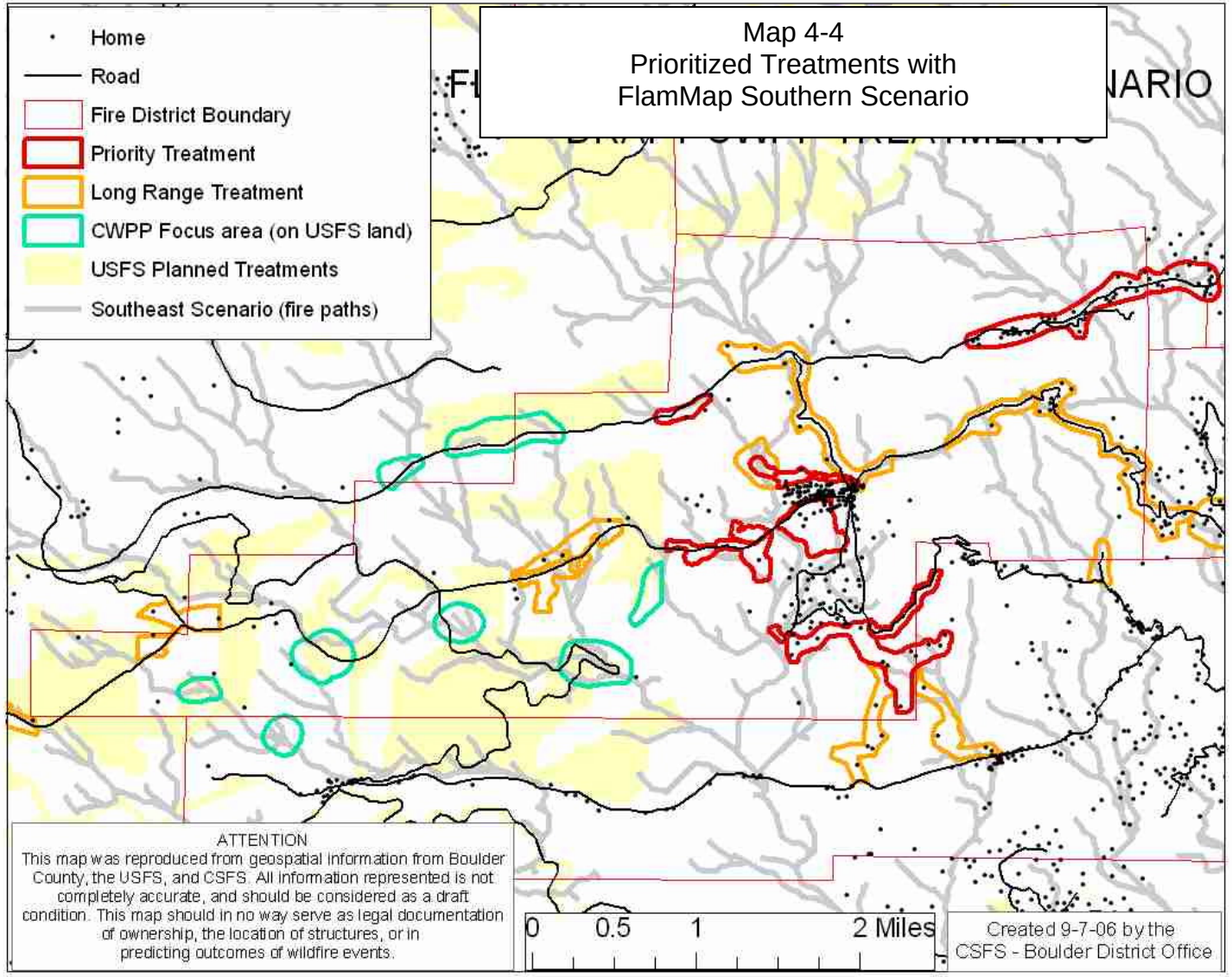
0 0.5 1 2 Miles
Created 9-7-06 by the
CSFS - Boulder District Office


Map 4-4
Prioritized Treatments with
FlamMap Southern Scenario
Home
Road
Fire District Boundary
Priority Treatment
Long Range Treatment
CWPP Focus area (on USFS land)
USFS Planned Treatments
Southeast Scenario (fire paths)
ATTENTION
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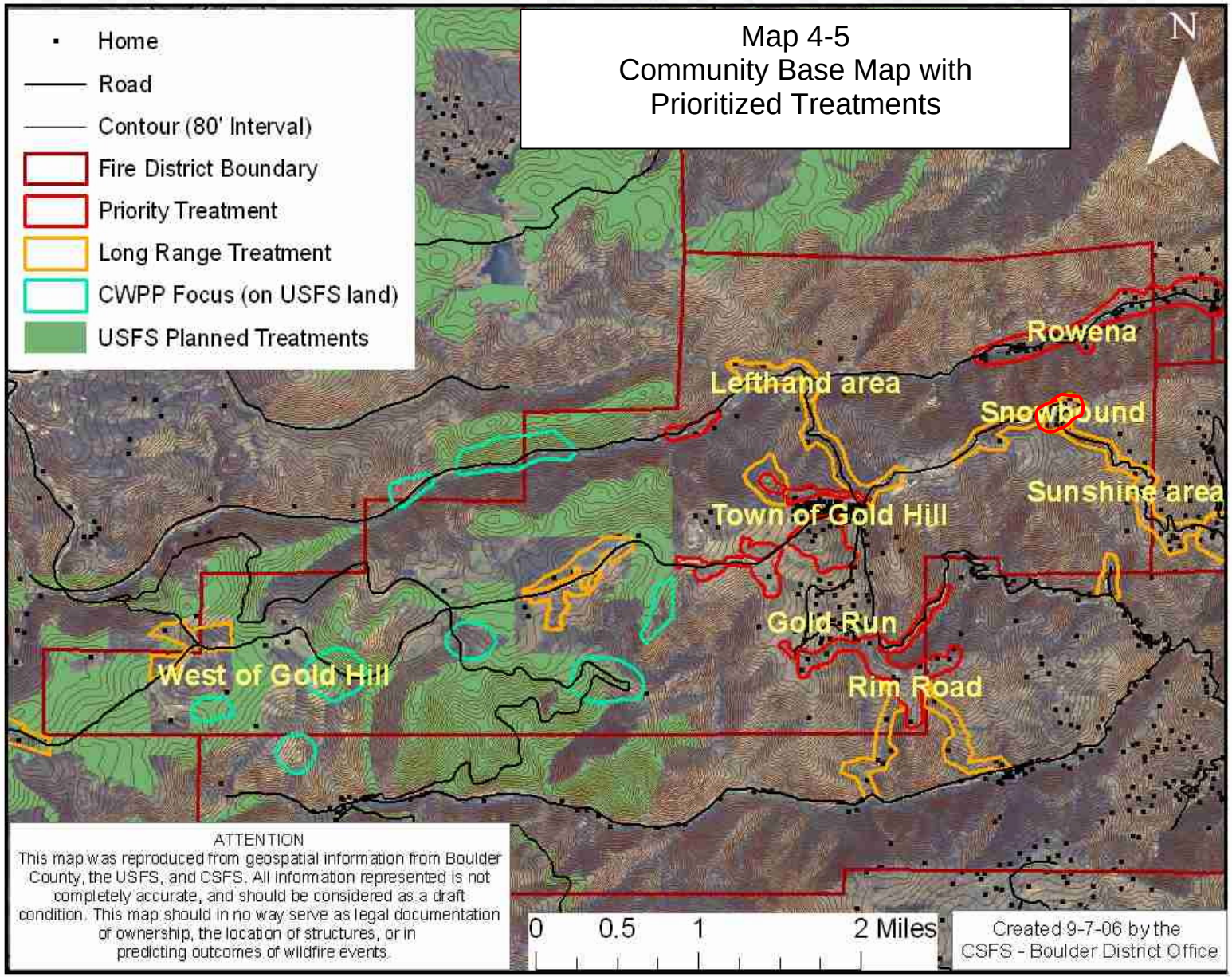
0 0.5 1 2 Miles
Created 9-7-06 by the
CSFS - Boulder District Office


Map 4-5
Community Base Map with
Prioritized Treatments
N
Home
Road
Contour (80' Interval)
Fire District Boundary
Priority Treatment
Long Range Treatment
CWPP Focus (on USFS land)
USFS Planned Treatments
Rowena
Lefthand area
Snowbound
Sunshine area
Town of Gold Hill
Gold Run
Rim Road
West of Gold Hill
ATTENTION
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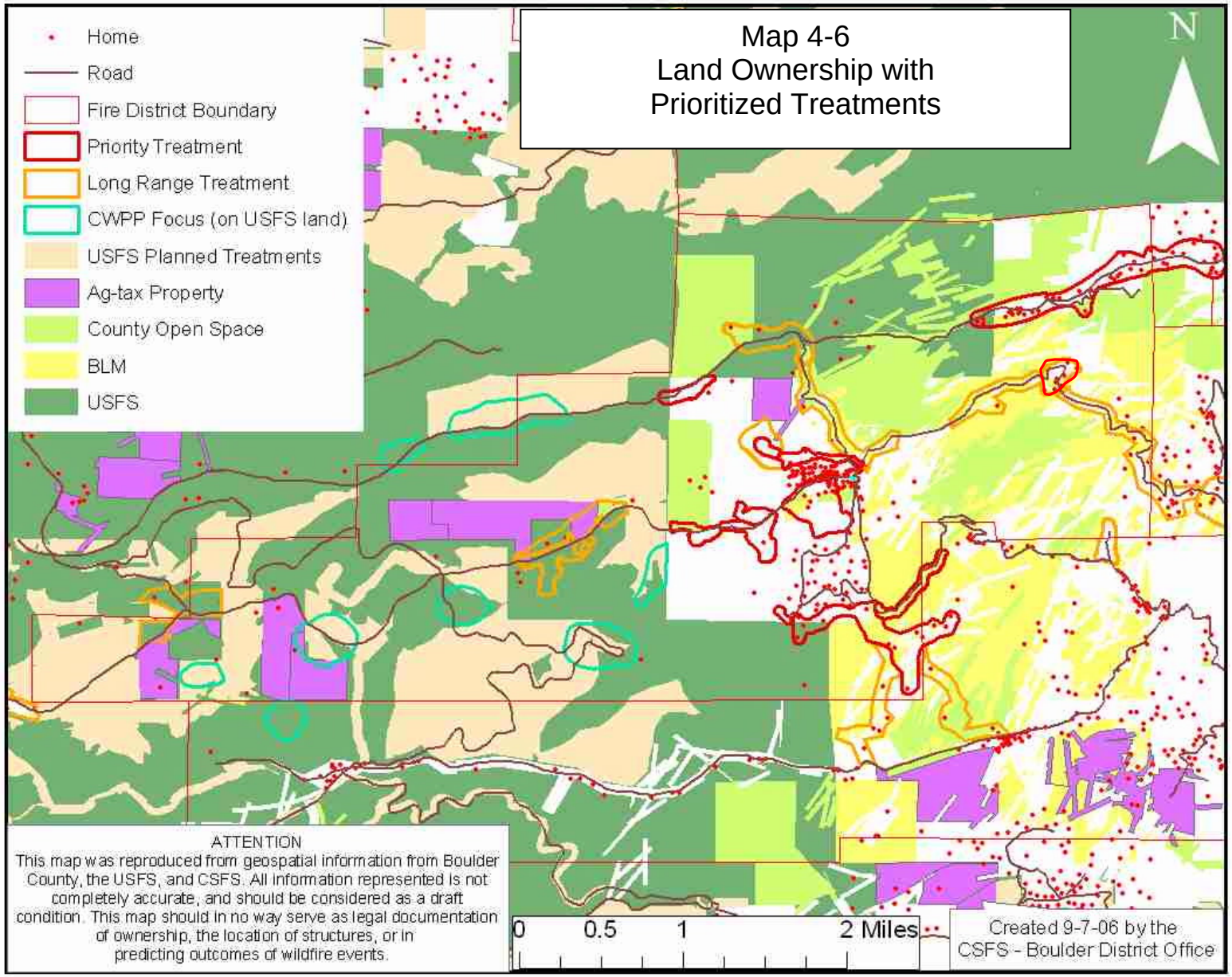
0 0.5 1 2 Miles
Created 9-7-06 by the
CSFS - Boulder District Office


Map 4-6
Land Ownership with
Prioritized Treatments
N
Home
Road
Fire District Boundary
Priority Treatment
Long Range Treatment
CWPP Focus (on USFS land)
USFS Planned Treatments
Ag-tax Property
County Open Space
BLM
USFS
ATTENTION
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0 0.5 1 2 Miles
Created 9-7-06 by the
CSFS - Boulder District Office

Table 4-1 provides a detailed list of the proposed treatment units and the number of acres involved, grouped by priority. The priority treatment areas encompass 446 acres. Boulder County tax assessor records have been accessed to determine the landowners associated with the treatment units.

Table 4-1
Proposed Treatment Units

Project Type	Project Area	Acres
Priority (red)	Gold Run Road Fuelbreak	24
	Gold Run Sub. South Fuelbreak	100
	Gold Run Sub. SW Fuelbreak ext.	4
	Gold Hill Town South Thinning	59
	Gold Hill Town North Fuelbreak	16
	Gold Hill Town NW Fuelbreak ext.	7
	Rowena Thinning	143
	West Gold Hill Road (Hall)	15
	West Gold Hill Road (Trojan North)	12
	West Gold Hill Road (Trojan South)	28
	Lefthand West Private Thinning	16
	Snowbound	22
	Total:	446
Long Range (yellow)	Upper Lickskillet	53
	Sunshine Canyon (East of Snowbound)	78
	Rim Road East	45
	Emerson Gulch/Rim Road West	50
	Far West Gold Hill Road Mining Claims	28
	Sawmill/Gold Hill Road Intersection	50
	Sunshine Canyon (West of Snowbound)	38
	East Gold Run Road Spur	16
	Sunshine/County Rd 83	52
	North Gold Hill Fuelbreak NW extension	25
	Gunung Mas	35
	Fisher/Truth Conciousness	42
	Lower Lickskillet	46
	Total:	558
USFS	USFS Switzerland Switchback	64
	USFS Upper Switzerland	35
	USFS West Gold Run Rd	57
	USFS Sunset North	28
	USFS Furthest West	19

Project Type	Project Area	Acres
	USFS SW of Gold Hill	25
	USFS Lefthand East	77
	USFS Lefthand West	21
	Total:	326

It is important to note that the potential for community-scale fuel reduction projects in Rowena and the Lefthand area is limited due to the severity of the slopes surrounding these areas (refer to Map 3-2). It is critical that these communities try to address the structural vulnerability and defensible space needs of individual homes. While grants to homeowners are available for defensible space projects (see 4.2.2), the goal of this CWPP is to focus on larger projects that will protect whole communities. As a result, part of the ongoing work by the CWPP Task Force will be to explore the potential for fuel reduction projects immediately to the west of each community to provide a fuel break against a fire coming from the west—the most likely direction of a fire that would threaten these communities.

Another factor affecting the feasibility of performing fuel reduction is the type of land ownership in the areas identified. Map 4-6 shows the treatment units on the GHFPD land ownership map. As indicated on the map, the majority of the proposed priority treatments are on private land, followed by BLM and USFS land. Participation by private landowners is completely voluntary, and the hope is that this CWPP provides a logical rationale for why these areas need treatment. The CWPP Task Force plans to contact private landowners, discuss the results of the CWPP process to date, and determine their willingness to participate in these fuel reduction projects.

4.2 Requested Funding and Possible Funding Sources

4.2.1 Requested Funding

The priority treatment areas listed in Table 4-1 represent approximately 446 acres. Assuming an average treatment cost ranging from $750 - $2,000 per acre, the total cost of treating these areas could range from $334,500 to $892,000. If these treatments are spread out over the next 10 years, the annual cost of treatment could average approximately $33,000 to $89,000 per year. The CWPP sets a goal of completing these priority projects over the next ten years, and hopes to begin some of the longer-range projects as well. If grants are received on the typical 50-50 cost-sharing basis, this means annual grant levels will need to total $16,500 to $44,750 per year and that the communities within the GHFPD will need to come up with an equivalent amount in cash and/or volunteer labor. Clearly, this is an ambitious goal for the relatively small population of the GHFPD. As mentioned, the CWPP Task Force is committed to meeting with private landowners to discuss these projects and refine the treatment areas. If private landowners are not willing to participate, then alternative treatment areas will be proposed.

4.2.2 Potential Funding Sources

Most of the grant funding for the projects identified in the CWPP will come through CSFS, csfs.colostate.edu/districts/boulderdist.htm, (303) 823-5774. Additional grants are available through Boulder County and the Natural Resources Conservation Service (NRCS). The list below shows the most likely programs for completing CWPP work.

State (all 50-50 grants)

a) SFA WUI - State Fire Assistance Wildand Urban Interface Grants –
Available annually around September to communities and fire districts.

b) FRFTP - Front Range Fuels Treatment Partnership Grants –
Applied for by the local CSFS district for work on CWPP projects.

c) Individual Landowner Grants –
One application is done for a wide variety of small grants processed through the local CSFS district office. Each interested landowner or small project group (<10 acres) fills out an application and is put on a waiting list. This grant is funded as money becomes available and is prioritized toward the highest community and resource benefit.

d) Agricultural Tax Program -
In 1990, the Colorado legislature enacted House Bill 1229 allowing certain forested properties to qualify for agricultural property tax status. A landowner who owns at least 40 acres of forested land, and is willing to manage the property to produce wood products, is now eligible to receive agricultural tax status without necessarily grazing or farming the land (CRS 39-1-102). CSFS is responsible for annually reviewing these properties and making recommendations to county tax assessors regarding "Forest Ag" eligibility. Landowners who own over 40 acres of contiguous forest can contact the local CSFS office at (303) 823-5774 for details on a beneficial change to their land tax classification. Landowners are required to complete active forest management annually to qualify for the tax benefit.

County

Community chipping grant (40% covered by county)

Natural Resources Conservation Service

a) Equip program – website:
http://www.co.nrcs.usda.gov/programs/eqip/2006EQIP/USPR/2006UpperSouthPlatteRiver.html
Natural Resources Conservation Service
Longmont Field Office
9595 Nelson Road, Suite D
Boulder County Fairgrounds
Longmont, CO 80501

phone: (303) 776-4034, ext. 3

b) Other grants become available periodically - Unknown details

Other Funding Sources

In addition to the above grants, the sources listed below may provide additional funding opportunities:

Colorado Wood Utilization & Marketing Program (www.colostate.edu/programs/cowood)

The Colorado Wood Utilization and Marketing Program (CO Wood) exists to support and expand Colorado's forest-based business sectors and consumers of wood products by providing technical assistance, applied research, education and extension assistance, industry advocacy, and promotion.

Community Facilities Grant Program (www.rurdev.usda.gov/rhs/cf/brief_cp_grant.htm)

The Community Facilities Grant Program provides assistance for rural areas & towns up to populations of 20,000 to construct, enlarge, or improve essential community facilities. Grants can be used for real estate and equipment such as fire stations and fire trucks. This program is administered by USDA and is part of their Rural Development Housing and Communities Facilities Program

El Pomar Wildland Fire Fund (www.elpomar.org)

El Pomar Foundation's 2005 Wildland Fire Fund supports efforts by volunteer fire agencies to purchase vehicles and vehicle accessories used to fight wildland fires. This program is designed to assist with the local fundraising necessary to acquire major capital items. El Pomar will consider grant proposals up to $15,000

Federal Excess Personal Property (FEPP) Program:(www.fs.fed.us/fire/partners/fepp/)

This program makes long-term loans of USFS equipment to local fire departments through the State Forest Service for use in fire fighting as well as mitigation and rehabilitation. There is no match required, but the equipment must be used for legitimate fire purposes. The "personal" part of the FEPP program simply refers to any tangible property that is not real estate. This can include trucks, aircraft, personal protective equipment, motor oil, nuts, bolts, fire hose, et cetera, but not buildings. Approximately 70% of the property involved in the Forest Service FEPP program is sub-loaned to local fire departments.

GreenWorks! (www.plt.org/greenworks)

The Greenworks! grant program promotes environmental community action and service-learning projects, and enables students to pursue community projects in fire management, wildfire, and other general environmental issues. This program provides small mini-grants for environmental education projects to educators who have completed a Project Learning Tree (PLT) workshop. It

is the community action/service-learning component of PLT, a nationwide environmental curriculum program designed for students from pre-kindergarten through 12th grade.

National Forest Foundation Grant Programs (www.natlforests.org)

The National Forest Foundation (NFF) is a nonprofit partner of the USDA Forest Service engaging America in community-based and national programs that promote the health and public enjoyment of the National Forest System. NFF also administers private gifts of funds and land for the benefit of the National Forests. NFF funds two grant programs applicable to comprehensive fire management, the community assistance program and the matching awards program.

Rural Fire Assistance (http://www.nifc.gov/rfa)

The Rural Fire Assistance (RFA) grant program is designed to support the fire protection capabilities of rural and volunteer fire departments (population or 10,000 or less) that typically fight fires near or on Department of the Interior (DOI) lands. Funding will be used to provide technical assistance, training, supplies, equipment and public education support to rural fire departments, thus enhancing firefighter safety and strengthening wildland fire protection capabilities. DOI lands are administered by one of the following four agencies: Bureau of Land Management (BLM), Bureau of Indian Affairs (BIA), U.S. Fish and Wildlife Service (FWS) and the National Park Service (NPS).

Small Business Innovation Research: Forests and Related Resources

This Small Business Innovation Research (SBIR) program develops environmentally sound techniques that: increase utilization of forestland materials and resources, and productivity of these forests; improve tree pathogen and insect control techniques; reduce ecological damage from forest operations; reduce wildfire risk; and improve wildfire control. Projects may also develop new products or technologies to increase the use of wood. The Cooperative State Research, Education and Extension Service (CSREES) program exists in three phases. The purpose of Phase I is to prove the scientific or technical feasibility of the proposed research and development effort. Phase II is the principal research and development effort. Phase III is the commercialization phase and there is no SBIR support provided for this phase.

Tums Firefighter Grant-in-Aid Program

The Tums Firefighter Grant-in-Aid program was designed to help provide fire departments with the most up-to-date firefighting equipment. With thousands of fire departments across the country struggling on shoestring budgets and lacking adequate protective clothing, breathing apparatus and up-to-date equipment, TUMS is proud to help fire departments. TUMS, America's first response to heartburn, is now supporting America's first responders to fire and local emergencies through the First Responder Institute (FRI). First Responder Institute, Inc. is a not-for-profit organization whose goal is to support local U.S. fire departments as well as emergency service personnel.

Volunteer Fire Assistance (VFA)

The Volunteer Fire Assistance program provides technical, financial, and other assistance to State Foresters and other appropriate officials to organize, train and equip rural and volunteer fire departments in rural communities (with populations of 10,000 or less) to prevent and suppress fires. This 10,000 population limit for participation in the VFA Program facilitates distribution of available VFA funding to the neediest fire departments. These funds can be used to improve communication capabilities, provide critical wildland fire management training, and purchase protective fire clothing and equipment.

4.3 Recommendations to Reduce Structural Vulnerability and Improve Emergency Preparedness

As documented in Section 3.5, Table 3-5, the only community within the GHFPD with a low risk due to structural vulnerability is the Sunshine area. This is primarily due to the fact that the homes in this area all have defensible space as well as fire-fighting cisterns. The other seven communities are rated as either medium or high risk. For example, more than 70 percent of the homes in these seven communities have wood siding. Almost none have fire-fighting cisterns dedicated to the home, and, excluding the homes in the West of Gold Hill community, at least 50 percent of homes lack defensible space.

The CWPP Task Force strongly recommends (as does the GHFPD) that all homeowners take action to reduce structural vulnerability by creating defensible space and installing fire-fighting cisterns (usually 1500-2500 gallons depending on the size of the home). Extensive defensible space guidelines have been developed by the Colorado State University Cooperative Extension. The document containing these recommendations is included in its entirety as Appendix B.

In addition to individual homeowner actions to reduce structural vulnerability, GHFPD communities should take community-level steps to improve emergency preparedness. Section 3.6 documents the physical characteristics of each community regarding fire-fighting preparedness. Table 3-6 shows that, excluding the Town of Gold Hill with low risk, the other seven communities are rated as either medium or high risk, primarily due to lack of community fire-fighting cisterns, access/egress problems, steep terrain, and distance from the fire barn. Table 4-2 lists recommendations developed by GHFPD to reduce structural vulnerability and improve community-level emergency preparedness (i.e., beyond individual homeowner actions).

Table 4-2
Recommendations to Reduce Structural Vulnerability and Improve Emergency Preparedness

Community	Recommendations
All communities except Sunshine	• Create defensible space around homes (see Appendix B) • Install home-dedicated fire-fighting cisterns (1500-2500 gallons)
Rowena	• Trained person(s) with radio communication skills • Two dry hydrants • Community cistern 30k gallons
Lefthand area	• Community cistern 30k gallons or dry hydrant • Trained person(s) with radio communication skills
Sunshine area	Trained firefighters
Rim Road	• Road turnouts for two way/emergency traffic • Escape route to Four Mile canyon • Mitigation around power lines • Detailed training with Four Mile Fire Dept • Community cistern 30k gallons
West of Gold Hill	Community cistern 30k gallons
Not specific to individual communities	• Officer training classes • Community education in basic aspects of wildland fire • Basic and intermediate wildland classes availability, S190(required)& S130 • Water backpacks • Brush Truck Type II • Community chipper or program • Trained firefighter(s) from each community

5.0 Implementation and Monitoring Plan

The GHFPD CWPP should be used as a resource to assist in the coordination of long-term interagency mitigation of catastrophic wildfire events. The CWPP Task Force agreed on nine primary objectives for the CWPP:

- Promote community involvement and education
- Attract the necessary funding to implement CWPP recommendations
- Reduce hazardous forest fuels
- Reduce structural vulnerability
- Improve emergency preparedness
- Improve forest health
- Improve fire prevention and suppression
- Encourage economic development
- Develop and implement multiparty monitoring system

The GHFPD/CWPP should be periodically reviewed and updated as needed. Successful implementation of this plan will require a collaborative process among multiple layers of government as well as a broad range of special interests. The remainder of this section describes the implementation and monitoring plans for the CWPP.

5.1 Fuels Treatment Implementation Plan

As indicated in Section 4.2.1, the CWPP has a goal of addressing its priority treatment areas over the next ten years. This translates to approximately 50 acres of treatment per year. In addition, chipping programs should be pursued to facilitate homeowner projects and other community fuel reduction projects. The CWPP Task Force will create an Implementation Group (IG) with the responsibility of working with CSFS to identify and apply for appropriate grants. In addition, the IG will be responsible for refining treatment parcel selection and contacting private landowners as needed to discuss possible treatments on their properties and the need for matching funds or in-kind donations of labor. IG members will include at least one member of the GHFPD, one community member who has been on the CWPP Task Force, and one member of the GHTM Forest Management Committee. In addition, participants from each of the eight GHFPD communities will be encouraged to join the IG. The IG will work closely with CSFS and Boulder County staff as appropriate to coordinate grant applications and grant administration.

5.2 Monitoring Plan

The CWPP Task Force will create a Monitoring and Administrative Group (MAG) that will be responsible for tracking the progress toward the nine CWPP objectives listed above and performing annual updates of the CWPP. The MAG will work closely with IG members to

document completed fuel treatments and costs. The MAG will also be responsible for general community outreach and education regarding structural vulnerability and defensible space. Table 5-1 lists the CWPP objectives that will be tracked by the MAG and the information it will endeavor to collect in support of the process.

Table 5-1
Monitoring Plan Objectives

CWPP Objectives	Performance Measure
Promote community involvement and education	• Number of educational programs/speakers • Participation in CWPP Task Force, MAG, IG • Participation by private landowners in fuels treatment, chipping programs, etc.
Attract the necessary funding to implement CWPP recommendations	• Grant monies received • Landowner/community funds/labor contributed
Reduce hazardous forest fuels	• Priority areas treated by acre • Federal acres treated • Acres moved between condition classes • Total acres treated
Reduce structural vulnerability	• Number of homes with defensible space • Number of homes with dedicated fire-fighting cisterns
Improve emergency preparedness	Progress implementing Table 4-2 recommendations
Improve forest health	• Acres of fuels treatments that meet restoration guidelines • Status of ecological values at risk (Table 3-10)
Improve fire prevention and suppression	• Acres burned (unplanned) • Structures lost, including historic/cultural values at risk (Table 3-7) • Ignitions
Encourage economic development	Track markets for firewood, biomass utilization
Develop and implement multiparty monitoring system	• Pre- and post-treatment surveys of fire rings and other recreational use • Progress made by MAG on all objectives in Table 5-1

At the end of each year's fire season, the MAG will produce an annual report detailing the success of CWPP project implementation and overall progress toward meeting CWPP goals. The MAG will review and make recommendations to the signatories to update the CWPP. This information will ensure timely decision making for all levels of government, and provide input necessary for the development of the next year's work plan and for prioritization of project recommendations both annually and for the next 5 years. The MAG will present the annual work plan to the CWPP signatories for their agreement and submission to CSFS and USFS for their concurrence and to have them forward the annual work plan for funding through the HFRA.

6.0 Literature Cited

Kaufmann, Merrill R., Thomas T. Veblen, and William H. Romme. 2006. *Historical Fire Regimes In Ponderosa Pine Forests Of The Colorado Front Range, And Recommendations For Ecological Restoration And Fuels Management.* Front Range Fuels Treatment Partnership Roundtable**,** findings of the Ecology Workgroup. www.frftp.org/roundtable/pipo.pdf.

Ruediger, Bill, Jim Claar, Steve Gniadek, Bryon Holt, Lyle Lewis, Steve Mighton, Bob Naney, Gary Patton, Tony Rinaldi, Joel Trick, Anne Vandehey, Fred Wahl, Nancy Warren, Dick Wenger, and Al Williamson. 2000. Canada lynx conservation assessment and strategy. USDA Forest Service, USDI Fish and Wildlife Service, USDI Bureau of Land Management, and USDI National Park Service. Missoula, MT

Society for American Foresters. 2004. *Preparing a Community Wildfire Protection Plan.* Available at: http://www.safnet.org/policyandpress/cwpphandbook.pdf. Accessed January 2006.

United States Congress. *Healthy Forest Restoration Act of 2003.* Available at http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=108_cong_bills&docid=f:h1904enr.txt.pdf. Accessed January 2006.

United States Census Bureau, *Census 2000.*

United States Department of Agriculture, United States Forest Service, James Creek Fuel Reduction Project Environmental Assessment, Arapaho-Roosevelt National Forest, Boulder Ranger District (see http://www.fs.fed.us/r2/arnf/projects/ea-projects/brd/index.shtml).

United States Department of Agriculture, United States Forest Service, Sugarloaf Fuel Reduction Project Environmental Assessment, Arapaho-Roosevelt National Forest, Boulder Ranger District (see http://www.fs.fed.us/r2/arnf/projects/ea-projects/brd/index.shtml).

United States Department of Interior, Bureau of Land Management. *Environmental Assessment, Gold Hill Area, Wildfire Hazard Reduction Plan.* Canon City District, Northeast Resource Area, August 1986.

Veblen, Thomas with T. Kitzberger, J. Donnegan. *Climatic and Human Influences on the Fire Regimes in Ponderosa Pine Forests in the Colorado Front Range.* Ecological Applications, 10(4), 2000, pp. 1178-1195.

Wildland Fire Leadership Council. *(2004) National Fire Plan.* Available at http://www.fireplan.gov/overview/whatis.html. Accessed January 2006.