Community Wildfire Protection Plan

Hot Sulphur Springs-Parshall Fire Protection District, Colorado











Prepared for:

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Community Wildfire Protection Plan

For

Hot Sulphur Springs – Parshall Fire Protection District, Colorado

February 3, 2011

Wildland Fire Associates, LLP

Carl Douhan Esther Mandeno

This project was administered by the Hot Sulphur Springs-Parshall Fire Protection District and funded by the district and a grant from the Bureau of Land Management. Data and recommendations developed for this project are advisory in nature and are NOT intended to replace specific site assessments. At any given time the ephemeral nature of the vegetation may affect fuel condition present within the study area. Wildland Fire Associates and its agents assume no liability in the event a catastrophic wildland fire damages or destroys public or private property.

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Submitted by:	_ Date:
Project Leader, Wildland Fire Associates	- Duty.
Reviewed by:Bureau of Land Management	_ Date:
Reviewed by: USDA Forest Service	_ Date:
Reviewed by: Grand County Emergency Management	Date: 5/24/10
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Reviewed by:	_ Date:
Reviewed by: Fire Ohief, Hot Sulphur Springs-Parshall FPD	Date: 8-20-15
Accepted by: Colorado State Forest Service	Date: 5/6/6

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	Grand County Emergency Management	
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	Grand County Sheriff	
Reviewed by:	:	Date:
	Mayor, Hot Sulphur Springs	
	:	Date:
	Fire Chief, Hot Sulphur Springs-Parshall FPD	
Accepted by:		Date:
•	Colorado State Forest Service	

Wildland Urban Interface Hazards

Firefighters in the wildland urban interface may encounter hazards other than the fire itself, such as hazardous materials, utility lines, and poor access.

Hazardous Materials: Common chemicals used around the home may be a direct hazard to firefighters from flammability, explosion potential and/or vapors or off-gassing. Such chemicals include paint, varnish, and other flammable liquids; fertilizer; pesticides; cleansers; aerosol cans; fireworks; batteries; and ammunition. In addition, some common household products such as plastics may give off very toxic fumes when they burn. Stay OUT of the smoke from burning structures and any unknown sources, such as trash piles.

Illicit Activities: Marijuana plantations or drug production labs may be found in wildland urban interface areas. Extremely hazardous materials such as propane tanks and flammable/toxic chemicals may be encountered, as well as booby traps.

Propane Tanks: Both large (household size) and small (gas-grill size) liquefied propane gas (LPG) tanks can present hazards to firefighters, including explosion. See the "LPG Tank Hazards" discussion for details.

Utility Lines: Utility lines may be located above and below ground and may be cut or damaged by tools or equipment. Don't spray water on utility lines or boxes.

Septic Tanks and Fields: Below-ground structures may not be readily apparent and may not support the weight of engines or other apparatus.

New Construction Materials: Many new construction materials have comparatively low melting points and may "off-gas" extremely hazardous vapors. Plastic decking materials that resemble wood are becoming more common and may begin softening and losing structural strength at 80° F, though they normally do not sustain combustion once direct flame is removed. However, if they continue to burn, they exhibit the characteristics of flammable liquids.

Pets and Livestock: Pets and livestock may be left when residents evacuate and will likely be highly stressed, making them more inclined to bite and kick. Firefighters should not put themselves at risk to rescue pets or livestock.

Evacuation Occurring: Firefighters may be taking structural protection actions while evacuations of residents are occurring. Be very cautious of people driving erratically. Distraught residents may refuse to leave their property, and firefighters may need to disengage from fighting fire to contact law enforcement officers for assistance. In most jurisdictions firefighters do not have the authority to force evacuations. Firefighters should not put themselves at risk trying to protect someone who will not evacuate!

Limited Access: Narrow one lane roads with no turnaround room, inadequate or poorly maintained bridges and culverts are frequently found in wildland urban interface areas. Access should be sized up and an evacuation plan for all emergency personnel should be developed.

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1.0 Executive Summary

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

The *Healthy Forest Restoration Act* (HFRA) places renewed emphasis on community planning by extending a variety of benefits to communities with wildfire protection plans in place. HFRA recognizes community plans and priorities have an important role in shaping management on federal and non federal lands.

The Colorado Legislature has since created a specific law guiding community planning at the county government level, *C.R.S.* 23-31-312 Community wildfire protection plans, county government, guidelines and criteria, legislative declaration, definitions.

During much of the last decade, Grand County has been affected by the largest mountain pine beetle epidemic in the State of Colorado. Mountain pine beetle infestations increased exponentially over the past several years and are thought to have killed up to 90 percent of the lodgepole pine forest on both private and public lands within the county. The mountain pine beetle epidemic has raised public awareness of the potential for wildland fire which has always persisted in Grand County. The ensuing die-off of large continuous stands of lodgepole pine forest necessitated the need for wildland fire planning and mitigation projects which began in earnest in 2001-2002 with the development of a countywide fire management plan. Since the beginning of the epidemic, hundreds of small and large private property owners throughout the county have implemented fuels reduction work on their properties, treating thousands of acres. Subsequent large-scale public land timber sales and fuel treatment projects have begun across the county landscape complimenting mitigation work conducted on private lands. The devastation caused by the mountain pine beetle and its aftermath greatly emphasized the need to develop a strategy for protecting the communities, developments and subdivisions, and other essential infrastructure at risk in the area served by the Hot Sulphur Springs – Parshall Fire Protection District (district).

In the summer of 2010, a core decision-making team composed of the Hot Sulphur Springs – Parshall Fire Protection District, the town of Hot Sulphur Springs, Grand County Emergency Management, Colorado State Forest Service, Bureau of Land Management, and USDA Forest Service was established to prepare a CWPP for the district. The planning area was expanded beyond the actual fire protection district boundaries to include the lands within the Williams Fork Valley, critical infrastructure, such as primary utilities, watersheds, thoroughfares, communication infrastructure, and portions of the forested areas

to the north and south of the fire protection district. A contractor, Wildland Fire Associates LLP, was hired to assist in the planning process.

Some homeowners in the planning area are actively practicing the mitigation measures recommended by FireWise, a tool designed to protect homes and other property from the impacts of a wildfire. However, other homeowners have taken little or no action to protect their properties from wildland fire. The inconsistent application of FireWise mitigation measures may place their neighbors at increased risk from wildfire.

The purpose of this document is to provide stakeholders, including land and property owners; town, county, state and federal officials, agencies, and departments; recreational users; local fire departments and fire protection districts; business owners; the Union Pacific Railroad; and utility companies; and other interested parties living in the planning area with an overview of existing wildland fuel conditions, share preliminary findings, and recommend a possible course of action that will reduce the impacts of a wildland fire to those living in the planning area. The need for quick action was brought home when two wildfires occurring less than a week apart in the foothills of the Front Range destroyed or heavily damaged approximately 200 homes and other structures while this plan was being developed,

On October 3, 2010, much closer to home, the 473 – acre Churches Park Fire broke out on the east side of Sheep Mountain and burned an estimated 400 acres the first day. The observed fire behavior included torching and crowning with spot fires occurring a half mile ahead of the main fire.

2.0 INTRODUCTION

2.1 Policy Guidance

Though wildland fires play an integral role in many forest and rangeland ecosystems, decades of effort directed at extinguishing every fire that burned on public lands has disrupted many of the natural fire regimes that once existed. Moreover, as more and more communities develop and grow in areas that are adjacent to fire-prone lands in what is known as the wildland urban interface, wildland fires pose increasing threats to people and their property (USDI/USDA FS 2000).

The National Fire Plan (NFP) was developed in August 2000, following a landmark wildland fire season, with the intent of actively responding to severe wildland fires and their impacts on communities while ensuring sufficient firefighting capacity for the future. The NFP addresses five key points: firefighting, rehabilitation, hazardous fuel reduction, community assistance, and accountability (USDI/USDA FS 2000).

The NFP continues to provide invaluable technical, financial, and resource guidance and support for wildland fire management across the United States. The USDA Forest Service and the Department of the Interior are working together to successfully implement the key points outlined in the NFP by taking the following steps:

- 1. Assuring that necessary firefighting resources and personnel are available to respond to wildland fires that threaten lives and property.
- 2. Conducting emergency stabilization and rehabilitation activities on landscapes and in communities affected by wildland fire.
- Reducing hazardous fuel (dry brush and trees that have accumulated and increase the likelihood of unusually large fires) in the country's forests and rangelands.
- 4. Providing assistance to communities that have been or may be threatened by wildland fire.
- Committing to the Wildland Fire Leadership Council, an interagency team created to set and maintain high standards for wildland fire management on public lands.

Congress, the Administration, states, tribes, local governments, and many others throughout the country recognized that achieving the key points outlined in the NFP was a long-term challenge. A series of strategy documents, the Healthy Forests Initiative, and the Healthy Forests Restoration Act provided the framework necessary to lessen risks to people and restore forest and rangeland health by addressing hazardous fuel buildup on public lands and reducing the threat of wildland fire.

A key principle—coordination—was stressed when the U.S. Department of the Interior and the U.S. Department of Agriculture prepared a joint strategy for addressing hazardous fuel to reduce the risk of catastrophic wildland fires on more than 180 million acres of public forests, woodlands, and rangelands. The 60-page report, *Protecting People and Natural Resources – A Cohesive Fuels Treatment Strategy*, outlines a coordinated approach to fuels treatment adopted by the five major federal land management agencies: Bureau of Indian Affairs, Bureau of Land Management, U.S. Fish and Wildlife Service, National Park Service, and USDA Forest Service (USDI/USDA FS 2006). It describes practices that have worked since the agencies began collaborating on the strategy and establishes a framework for future priority-setting, accountability, and partnerships to reduce the fuel buildup that contributes to large destructive fires. Four principles guide the strategy:

- Prioritization: First priority should be given to the wildland urban interface (WUI) and second priority to areas outside the WUI. Priority treatments must concentrate on sites where vegetation is most likely to support catastrophic fires that threaten vital resources or locations of particular value to local communities. In addition, non-WUI treatments must be applied to areas where fuel loads could quickly increase to dangerous levels without active management.
- 2. Coordination: Coordinating land management activities, including fuels reduction, timber sales, insect and disease eradication, habitat improvement, watershed improvement, and other vegetation management activities, is key to maximizing their combined benefits toward overall fuels management objectives and achieving a well- coordinated fuels management program.
- 3. Collaboration: Each year's federal program should increasingly reflect the input and priorities of local, tribal, and state interests.
- 4. Accountability: The strategy builds in accountability through an approved monitoring plan and state-of-the-art geographic information system, assuring

continued improvement in the ability of federal land managers to systematically track and support program planning, implementation, and effectiveness.

The strategy outlined in the document provides a strategic and realistic approach for reducing fuels on federal lands

The Cohesive Fuels Treatment Strategy aims to lessen risks from catastrophic wildland fires by reducing hazardous fuel buildup in forests and woodlands and by reducing threats from flammable invasive species in rangelands, with an emphasis on protecting communities.

by focusing on specific goals that address the multiple factors that influence fuels treatments and by working collaboratively to achieve them. These four key principles are incorporated in this risk/hazard assessment.

2.2 The Fire Environment

The fire environment is defined as surrounding conditions, influences, and modifying forces that determine wildfire behavior¹. Firefighters recognize three components of the fire environment: **weather**, **topography**, and **fuel**. These components affect the likelihood of a fire starting, the speed and direction at which a wildfire will travel, the intensity at which a wildfire burns, and the ability to control and extinguish a wildfire. Although weather and topography cannot be changed, the fuels (or vegetation) can be modified.

Weather – Dry, hot, and windy weather increases the likelihood of a major wildfire. These conditions make ignition easier, allow fuels to burn more rapidly, and increase fire intensity.

Topography – Of all the topographic features, steepness of slope most influences fire behavior. As the steepness of slope increases, the fire spreads more quickly. Other important topographic features include aspect (south- and southwest-facing slopes usually have more fires) and narrow, steep drainages, which can significantly increase the rate of spread.

Fuel – Fuel is required for any fire to burn. In regard to wildfire, fuels almost always consist of living vegetation (trees, grasses, shrubs, wildflowers) and dead plant material (dead trees, dried grass, fallen branches, pine needles, etc.). The amount, size, moisture content, arrangement, and other fuel characteristics influence ease of ignition, rate of fire spread, length of flames produced, and other fire behavior descriptors.

Wildfires can spread in a variety of ways. The three most common ways are by flames generated by burning material heating and burning adjacent fuel, by heat from the fire igniting fuels above the fire below, and by embers carried by the wind or convection column ahead of the flaming front. Many homes and outbuilding are lost when embers, carried ahead of the main fire, ignite fuels on the roof or are blown into attic crawl spaces or eave vents.

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¹ Adapted from: US Fish and Wildlife Service, Bureau of Land Management, National Park Service, Bureau of Indian Affairs, and USDA Forest Service. *Living With Fire*.

2.3 Wildland Urban Interface

Throughout this plan, the term wildland urban interface will come up again and again. The following explanation was adapted from USDA Forest Service Gen. Tech. Rep. PSW-109 (1989) and the Federal Wildland Fire Management Policy and Program Review. Final Report (1995):

The wildland urban interface (WUI) is defined as the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels.

There are three types of wildland urban interface, each with its own demographic characteristic and land management problems.

Mixed Interface or Intermix
Classic Interface
Occluded Interface

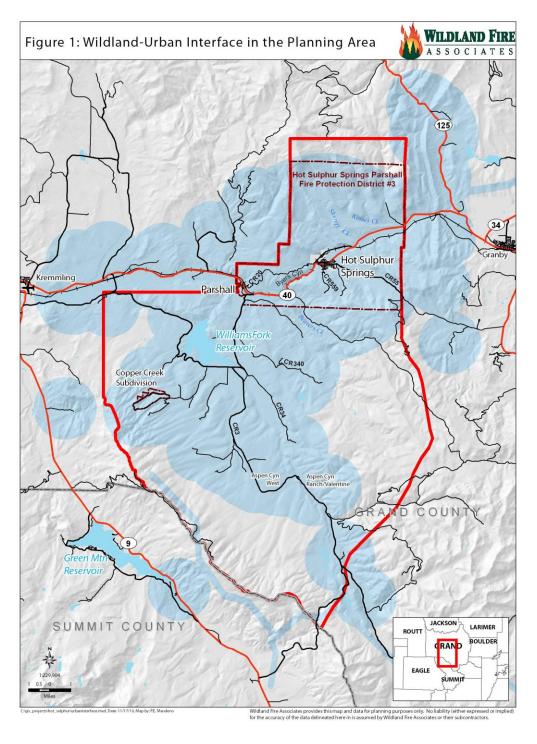
The Intermix – The intermix ranges from single homes or other buildings scattered throughout the wildland area to medium-sized subdivisions. Typical are summer homes, recreation homes, ranches, and farms in a wildland setting. Usually these are isolated structures surrounded by large areas of vegetation-covered land, but can include developments like Snow Mountain Ranch where the nearest fire suppression forces are some distance away. When a fire starts, the individual homes are very hard to protect because few fire agencies have the resources to provide an engine or two for each house that may be threatened in a large fire.

The Classic Interface – By far, the greatest numbers of people live in (and are currently moving into) what can be called the classic interface. This is the area where homes, especially new subdivisions, press against the wildland. Fires starting in adjacent wildland areas can propagate a massive flame front during a wildfire, and numerous homes are put at risk by a single fire which sometimes overwhelms fire protection forces and water supplies. Typical examples include Colorado's Front Range.

The Occluded Interface – An occluded interface is characterized by isolated areas of wildland within an urban area. The same demographic trends that influence the classic interface affect this one. As cities grow together to make a super city, islands of undeveloped land are left behind. Sometimes, these are specifically set aside as natural parks. Again, they may be steep, difficult places that are unsuitable as building sites. Frequently, they present a fire threat to adjacent homeowners. Examples in the planning area include undeveloped lots in subdivisions.

The type of intermix is not always clear cut. Small towns and villages may contain both classic and intermix areas depending upon how the "downtown" tends to mix with wildland vegetation at the city's fringes.

This plan looks primarily at two of the interface types: Intermix and Classic. A 1.5-mile buffer standard was adopted, regardless of land ownership, to define the wildland urban interface.



2.4 Background and History of Accomplishments

Prior to human occupation, fire and climate interacted to determine the vegetation on the landscape. Since then, human activity; fire suppression policies; domestic animals; the combined impacts of drought, insects, and disease; and introduced species (especially invasive plants) have been added to the equation. Within Colorado, wildland fire statistics show that the overall size and cost of wildland fire is increasing at an unprecedented rate. As Grand County—and specifically the lands within the planning area—transition from rural to more suburban-like, population density will increase and the WUI will expand into forested areas and rangelands that are at risk from wildland fire.

In addition to these factors, the rapid mortality of the lodgepole pine forest from mountain pine beetle infestations changed the fuel arrangements throughout the planning area. In 2006, Grand County was recognized as the epicenter of the largest mountain pine beetle epidemic in the State of Colorado. At that time, 70 percent of acres of lodgepole pine forest on both private and public land had been impacted. Today, it is estimated that over 90 percent of the lodgepole pine forest in the county and the planning area has been impacted.

In response to these factors and in consideration of the Healthy Forest Restoration Act (HFRA) and Colorado statutes, the Grand County Department of Natural Resources created a Community Wildfire Protection Plan for Grand County (Grand County DNR 2006). The countywide plan was a continuation and enhancement of the Grand County Fire Plan, which was completed in 2002 as a direct result of the National Fire Plan. A local citizen advisory committee was established to assist Grand County in developing the Community Wildfire Protection Plan. The advisory committee consisted of interested parties who represented municipal governments, local fire authorities, homeowners associations, private property owners and managers, law enforcement, Colorado State Forest Service, US Forest Service, and the Bureau of Land Management. The Grand County Community Wildfire Protection Plan was intended to serve as an "umbrella" document to the many localized Community Wildfire Protection Plans (CWPP) being developed by homeowner associations, fire protection districts, and municipalities.

The primary goal of the 2006 Grand County CWPP was to further expand a localized definition and boundary for the wildland urban interface. In addition, the CWPP will encourage the continued engagement of willing private property owners in meaningful wildland fire mitigation activities that are both economically feasible and ecologically sustainable. This CWPP will offer additional opportunities for diverse local interests to collaborate with federal and state land managers in shaping fuels treatment priorities on surrounding federal and nonfederal lands. Wildfire mitigation projects are most effective when a project can treat an entire area regardless of ownership or designation. The desired outcome will enhance protection for communities in the WUI and critical

infrastructure from catastrophic wildland fire. Priorities for fuel treatment may also include critical watersheds, public water and power facilities, and highly valued recreation areas. The community-based CWPPs will appropriately identify in finer detail the issues and situations unique to their area.

The Hot Sulphur Springs-Parshall Fire Protection District received a grant from the Bureau of Land Management to develop a CWPP that specifically addresses conditions unique to the lands within the district, the Williams Fork Valley, and other areas of development within the district's response area.

2.5 Core Team

A core decision-making team composed of the Hot Sulphur Springs – Parshall Fire Protection District, the town of Hot Sulphur Springs, Grand County Emergency Management, Colorado State Forest Service, Bureau of Land Management, USDA Forest Service, and Wildland Fire Associates (contractor) was formed. A listing of core team members can be found on page iii.

An initial meeting of the core team was held on June 17, 2010. The purpose of the meeting was to identify stakeholders and encourage their participation and define the roles they will play in the protection of the community from the impacts of a wildfire. Due to the already high number of calls for service in the unincorporated area, the team decided to expand the planning area beyond the actual fire protection district boundaries to include the lands within the Williams Fork Valley; and critical infrastructure, such as primary utilities, critical watersheds, thoroughfares, and communication infrastructure; and portions of the forested areas to the north and south of the fire protection district.

The goals identified by the core team are to:

- Identify areas within the Hot Sulphur Springs-Parshall Fire Protection District (district) response area that may be at risk from wildfire and outline ways to mitigate the possible impacts;
- 2. Identify stakeholders, encourage their participation, and define the roles they may play in a coordinated effort to protect the values at risk in the district response area that may be subject to the impacts of a wildland fire;
- 3. Identify wildland fuels management projects and recommend methods of managing wildland fuels that are both beneficial and acceptable to the area residents and other stakeholders, including land and property owners; town, county, state and federal officials, agencies, and departments; recreational users; local fire departments and fire protection districts; business owners; the Union Pacific Railroad; and utility companies; and other interested parties;

- 4. Identify the methods and resources that are available to better serve the residents of the William Fork Valley area;
- 5. Identify other issues and projects that must be addressed to ensure the safety and well-being of local residents and wildland fire fighters;
- 6. Coordinate efforts to secure adequate fuels treatment funding;
- 7. Continue to build on the existing FireWise education programs; and
- 8. Provide a community protection plan that will be supported and implemented by the stakeholders.

2.6 Methodology

The core team began by listing key stakeholders and constituencies whose involvement should be sought. Individual team members were given assignments to gather data and other information needed to complete the plan. The district engaged the services of a contractor, Wildland Fire Associates, LLP to recommend treatment options and to draft and finalize the plan.

As part of the process, subdivisions located in the planning area were assessed. The assessments were used to determine their vulnerability to a catastrophic wildfire. The results of the assessment were included in the base map and used by the core team to identify areas of concern and make decisions.

The contractor gathered comprehensive data sets that were used to develop a base map of the area and adjacent landscapes of interest. The data were used to make recommendations regarding areas needing protection and establishing risk-reduction priorities.

The wildland urban interface is defined as the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels². A 1.5-mile buffer standard was adopted, regardless of land ownership, to define the Wildland – Urban Interface.

The planning process and resulting recommendations also recognized the importance of the following premises when developing and implementing the CWPP for the district and the lands within the planning area:

It is important that the communities and stakeholders fully support the plan. To successfully compete for and receive grants, the community must be willing and ready, to the extent necessary, to actively participate in each identified project.

² USDI/USDA 1995. Federal Wildland Fire Management Policy and Program Review. Final Report. National Interagency Fire Center, Boise, ID, 45 p.

- Actions must be taken by all landowners to improve the safety of firefighters and the public in the event of a wildfire and to reduce the likelihood of a fire escaping initial attack and threatening nearby structures or other lands.
- □ The plan will identify near-term and intermediate actions, as well as future treatments and follow-up maintenance activities. It is necessary to recognize the importance of attempting to properly sequence treatments on the landscape by working first around and within the communities and subdivisions, and then moving further out into the surrounding landscape.
- □ It is quite likely, due to availability of funding, that the plan will be implemented in stages and completed based on established priorities.
- Mitigation measures should be cost effective to the extent possible.
- New treatments should complement fuels treatment work that has been completed to date by private landowners, the town of Hot Sulphur Springs, Grand County, the State of Colorado, the Bureau of Land Management, the U.S. Forest Service, and others.

The overriding treatment objective is to create defensible space with a forest canopy that would be less likely to support a crown fire. As a result, a crown fire would revert to a surface fire and spot fires ignited in advance of a crown fire would also remain surface fires, which could be more easily attacked by wildland firefighters, making it much easier to protect a structure or community against a high-intensity wildland fire. When fully implemented, the treatments will provide for safe and effective fire suppression actions while also considering the aesthetic values important to the local residents and other stakeholders.

2.7 Analysis Process

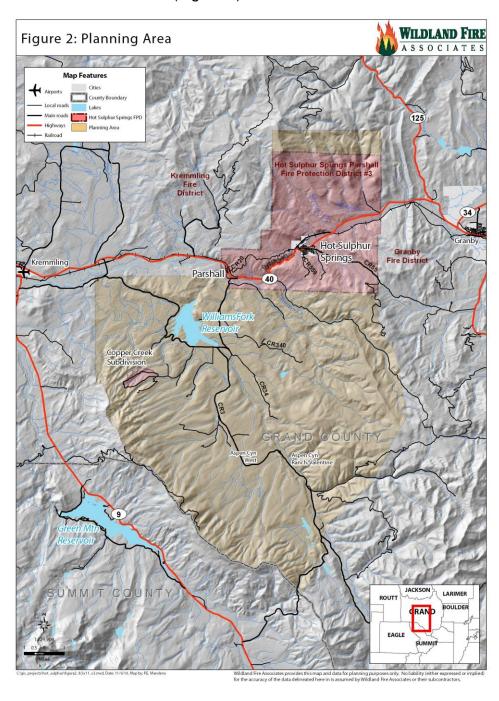
The data analysis completed for this plan is based on Geographic Information System (GIS) techniques and data. The process used is similar to processes used throughout the United States by federal, state, and local agencies. The process starts with assembling the best available data in two key categories: fuels and values at risk that can be lost or damaged in the event of a wildland fire. The data layers are then ranked according to importance on a qualitative scale, in this case 1-4. This qualitative scale is numerical in nature in order to take advantage of the efficient spatial processing capabilities of GIS.

After the ranking process is completed, the resulting layers of data are entered into a weighted overlay analysis. Simply put, the data layers are assigned a weight based on relative importance in relation to each other and then added together for a numerical ranking (low to extreme).

3.0 Planning

3.1 Planning Area Boundaries

The planning area is formed by the boundary between Grand and Summit Counties and the defined response area boundaries for the Kremmling Fire Protection District and the Hot Sulphur Springs-Parshall Fire Protection District on the west and north and the Granby Fire Protection District and terrain features on the east and south (Figure 2).



3.2 Planning Process

The publication *Preparing a Community Wildfire Protection Plan: A handbook for Wildland-Urban Interface communities*³ was used as a guide to prepare this plan. The steps outlined in the publication were used to identify tasks. The District Fire Chief, the core team, and the contractor reviewed the planning requirements, set various key parameters, developed a plan of action, and identified sources to acquire necessary documents and information required for the completion of the plan.

Meetings were held on June17 and August 19, 2010, with core team members and others to gather information and receive input, obtain recommendations, identify potential projects, make assignments, and set deadlines. A community meeting was held July 29, 2010, to gather information and receive input and to inform the community about the plan and the planning process.

A field assessment was completed for several subdivisions and two guest ranches located in the planning area in order to gather information necessary to complete the plan.

The contractor received necessary information from members of the core team and others. The first draft of the plan was posted on the contractor's website and then further distributed to interested parties using other means so that interested parties could read and comment on the plan prior to its completion.

A final hard copy and an electronic copy of the final draft plan will be presented to the district. Once the plan has been approved by the core team and is approved by the Colorado State Forest Service, it will be available for distribution to the stakeholders, including land and property owners; town, county, state and federal officials, agencies, and departments; recreational users; local fire departments and fire protection districts; business owners; the Union Pacific Railroad; and utility companies; and other interested parties.

³ Various Sponsors. 2004. Available on the Internet at: <u>www.safnet.org/policyandpress/cwpp.cfm</u>

4.0 Emergency Response, Wildfire Safety, and Evacuation Planning

4.1 Emergency Medical Response

The nearest medical facilities are located in Granby and Kremmling. Kremmling Memorial Hospital is a Level IV trauma center with physicians staffing the Emergency Room 24 hours a day, seven days a week. the Kremmling Memorial Hospital District offers flight for life helicopter service to several Front Range Hospitals and Grand County Emergency Medical Services offers traditional ground ambulance service. Several Level I trauma and burn centers and a facility specifically designed to treat children's injuries and burns are located in the Denver area.

4.2 Wildland Fire Response

Wildland and structural fire suppression services in planning area are provided by the Hot Sulphur Springs-Parshall Fire Protection District, which has a fire station located in each of the two communities. However, large portions of the planning area are outside of the district's formal coverage area and the residences of those areas are not aware that they are not formally protected. In areas outside the fire protection district boundaries, jurisdiction for management of wildland fires on non-federally owned lands falls to the Grand County Sheriff.

The level of response to an emergency is dependent on the time of day and day of the week as many of the firefighters work in neighboring communities. This factor can both impact response time as well as the number of responders.

Neighboring fire districts, such as Kremmling Fire Protection District and Grand Fire Protection District, Hot Sulphur Springs-Parshall Fire Protection District, and the cooperators listed above have routinely supported each other during wildland fire suppression activities in the form of mutual aid – both within and outside of the wildland urban interface. The overarching goal has been the timely suppression of wildland fires in order to protect life and property.

A listing of the resources available in Grand County can be found in appendix F.

4.3 Safety

A variety of safety issues are present in the planning area and others may materialize as the fuels continue to change due to the loss of lodgepole pine to the mountain pine beetle epidemic.

One of the immediate threats to wildland firefighters is the presence of vast stretches of standing dead lodgepole pine. First and foremost, standing dead lodgepole pines are susceptible to falling, especially during wind events. In a

press release dated July 10, 2010, the Colorado State Forest Service noted that lodgepole pines in beetle-kill areas were falling at an increasing rate, based on observations from foresters in Grand County. In fact, it is estimated that 96,000 live and dead trees are falling daily in the State of Colorado. The falling trees pose an imminent threat not only to wildland firefighters but outdoor enthusiasts, mountain homeowners, and those working outside.

Conversion of fuels in the areas hard hit by the mountain pine beetle is already occurring. As the areas, once dominated by dense stands of lodgepole pine that blocked out the sunlight, are opened by natural processes or fuels management projects, other vegetation, such as grasses and forbs, will react and become established. Areas that were at one time susceptible to high-intensity crown fires may become areas subject to rapidly moving ground fires, especially in the spring before green up and the fall after the grasses and forbs have cured.

In many cases, the needles and small branches on the standing trees have already fallen, reducing the probability of a crown fire; however, over time, the expected fire intensity and rates of spread will change as the standing dead boles fall to the ground and dry out and the ground fuels change in response to a changing environment. Changing fuels and their condition and arrangement may make it more difficult to suppress fires occurring in these areas.

Many county and private roads, which provide access to ranches and scattered home sites, are very narrow and are sometimes located in narrow valleys or on hillsides with heavy vegetation. Examples include County Road 2, County Road 34, County Road 37/373 (Copper Creek Estates), County Road 559, County Road 340, and Kinney Creek Road beyond the boundary between federal and private lands.

First responders and incident commanders must size up the situation and develop their plan of attack accordingly. The district has developed pre attack plans for subdivisions and neighborhoods in their area of responsibility, identified suitable water sources, and developed informal plans to protect structures and subdivisions outside the district.

4.4 Evacuation

Due to ingress and egress issues and the location of some of the subdivisions and other areas of development, it may be necessary for the inhabitants to leave their homes quickly. A copy of the section regarding evacuation has been taken from the Grand County Community Wildfire Protection Plan included in appendix C. Any area-specific plans developed in the future should incorporate the following guidelines for trigger points and be included in appendix C, as well.

Trigger points should be based on measurable factors such as:
 Weather factors such as relative humidity (RH) and wind speed and direction;
□ Fire Behavior;
□ Topographical boundaries;
☐ Time constraints, including time of day and time required to evacuate the area;
□ Distance to safety zones;
□ Loss of suppression resources;
 Other operational considerations (e.g., firefighter fatigue, loss of lookouts or communication, weather change).

5.0 Community Description

5.1 General Information

The Hot Sulphur Springs-Parshall Fire Protection District and associated planning area is located in the south-central portion of Grand County, Colorado. The Colorado River bisects the planning area as it flows from east to west through open valleys and Byers Canyon. The southern portion of the planning area is comprised primarily of the Williams Fork River drainage, while the northern portion is dominated by Elk Mountain, a prominent butte which overlooks Hot Sulphur Springs and the Colorado River valley to the east.

The town of Hot Sulphur Springs is the only incorporated community, and Parshall is the only unincorporated community in the planning area. There are several platted subdivisions, including the northern portion of Copper Creek Subdivision, which is within the Hot Sulphur Springs Fire Protection District, and Aspen Canyon Ranch, Valentine, and the southern portion of the Copper Creek Estates which are not.

Hot Sulphur Springs, the county seat for Grand County, is described by the Grand County Tourism Board⁴ as the small town that has played an important part in the history of the area. Named for the hot springs that line the canyon along this stretch of the upper Colorado River, the area was first visited by passing Ute and Arapaho hunting parties who called the area "big medicine." White trappers and hunters first visited the hot springs in the early 1800s, and by the turn of the century, the town was a popular resort community. Today, the small town is home to a resort that is considered to be one of the finest in the nation.

Parshall is located west of Hot Sulphur Springs and serves as the gateway to the recreational opportunities available in the Williams Fork Valley, Williams Fork Reservoir, and a well-known quest ranch.

The planning area encompasses 142,693 acres of which 60,823 acres are in private ownership, 27,539 are managed by the Bureau of Land Management, 51,468 are managed by the USDA Forest Service, and 2,863 acres are in state and local government ownership (Figure 3). A map delineating ownership can be found in appendix B.

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⁴ Available on the Internet at http://www.grand-county.com/hot-sulphur-springs.html. Accessed July 15, 2010.

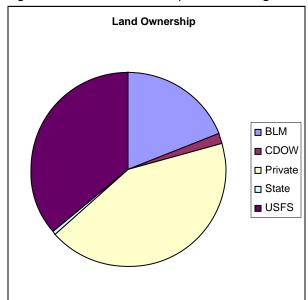


Figure 3: Land Ownership in Planning Area

5.1.1 Topography, Slope, Aspect, Elevation

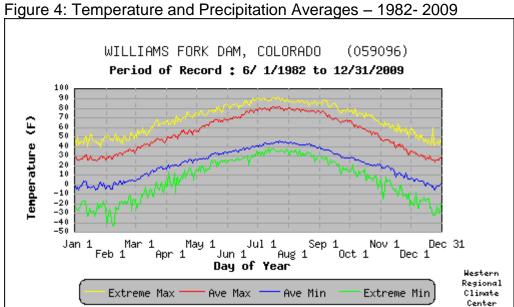
The topography of the planning area is varied. Hot Sulphur Springs (7,680 feet msl) and Parshall (7,589 feet msl) are among the lowest points in the planning area. In the 10,000-foot range, the northern reach of the Williams Fork Mountains on the west and a portion of the Blue Ridge on the east are among the highest points within the study area. The steepest slopes are found in Byers Canyon; the majority of the slopes in the study area could be classed as moderate. Aspect varies based on location. The western portion of the Williams Fork drainage has a predominately eastern aspect, and the area north of the Colorado River has a predominately southern aspect. The remaining portion of the planning area has a variety of aspects, depending on location.

5.1.2 Meteorology, Climate, Precipitation

Colorado's highly variable climate is a consequence of high elevations and the complex topography of the mountains, plains, and plateaus. Climate varies over space and time, resulting in a wide variety of climatic conditions. Grand County and to some extent the lands within the Hot Sulphur Springs – Parshall Fire Protection District demonstrate the variables that can occur. As a result of complex global weather patterns, periods of drought can also occur—some can be long-lived.

Based on over 37 years of records (1982-2009) recorded at a weather station at the Williams Fork Dam, which is located southwest of Parshall, the annual average day time temperature is 57.3° F. The average temperature range during that period of time varies from a high of 79.3° F in July to an average minimum temperature of -2.1° F in January. Average annual precipitation is 14.6 inches.

The wettest month is July, which receives on average 1.76 inches of precipitation, and the driest month is December, which averages less than an inch (0.82"). The area in the vicinity of Williams Fork Dam receives 74 inches of snow a year, on average. The graph below, developed by the Western Climate Center, displays temperature and precipitation trends for the Williams Fork Dam area. The data from the Williams Fork Dam weather station is considered to be representative of the weather conditions for the majority of the planning area.



Source: Western Regional Climate Center. Station Number 059096. Available on the Internet at: http://www.wrcc.dri.edu/cqi-bin/cliMAIN.pl?co9096. Accessed 6/10/2010.

Table 1: Monthly Climate Summary, Williams Fork Dam, CO, 6/ 1/1982 to 12/31/2009

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Maximum Temperature (F)	27.2	32.1	42.4	52.7	63.3	72.9	79.3	77.4	69.6	57.5	41.1	28.9	53.7
Average Minimum Temperature (F)	-2.1	0.8	12.1	21.7	30.1	36.4	42.5	41.2	32.5	22.8	12.9	1.0	21.0
Average Total Precipitation (in.)	0.88	0.88	0.99	1.33	1.36	1.18	1.76	1.52	1.59	1.21	1.10	0.82	14.61
Average Total Snowfall (in.)	12.0	12.5	10.2	9.6	1.7	0.1	0.0	0.0	0.6	4.5	11.8	11.0	74.0
Ave. Snow Depth (in.)	10	13	9	2	0	0	0	0	0	0	2	5	3

Source: Western Regional Climate Center. Station Number 059096. Available on the Internet at: http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?co9096. Accessed 6/10/2010.

5.1.3 Hydrology

The headwaters of the Colorado River are located within Grand County, a short distance from Hot Sulphur Springs. The Colorado River is well established as it passes through the planning area. The Williams Fork River, a tributary to the Colorado, begins a short distance to the south of the planning area, along the Continental Divide, and enters the Colorado about 2 miles west of Parshall.

Another important feature is the Williams Fork Reservoir, which is owned and managed by Denver Water. The purpose of the reservoir is to help Denver Water manage flows in the Colorado River below key diversion points located upriver from Hot Sulphur Springs.

Keyser Creek, Little Muddy Creek, Beaver Creek, Kinney Creek, Sherriff Creek, and other smaller perennial and intermittent streams feed into the Colorado and Williams Fork Rivers.

5.1.4 Ecosystem Types

The elevational gradient of the planning area provides a wide range of ecosystems. Generally the area is dominated by lodgepole pine, which suffered 80 – 90-percent mortality, and patches of aspen, with Engelmann spruce/subalpine fir found in drainages and other wet, cool areas throughout the planning area. A small amount of Douglas fir is found in pure stands and mixed with lodgepole pine on some north-facing slopes. In the lower elevations of Muddy Creek, there are a few relic individual ponderosa pine trees. The remainder of the area consists of aspen groves and sagebrush and grassy meadows⁵. A map delineating vegetation classification and fuels type can be found in appendix B.

Much of the land in the two primary river valleys and other open areas within the study area is in private ownership and used for hay land, pasture land, and for other agricultural purposes.

Important riparian areas are well established along the Colorado River and Williams Fork River and, to a limited extent, along tributaries of both rivers.

5.1.5 Wildlife

The diversity of habitats within the planning area supports a large variety of wildlife species. Big game animals include elk, mule deer, moose, and black bear. The Colorado Division of Wildlife (CDOW) has identified areas within the

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⁵ Adapted from: USDA Forest Service, 2007. *Environmental Assessment-Blue Ridge Salvage and Fuels Reduction Project*. Sulphur Ranger District, Arapaho and Roosevelt National Forests and Pawnee National Grassland. October 2007. Page 41.

planning area as elk winter range and elk severe winter range. An important elk calving production area has been identified by CDOW for an area in the headwaters of Little Muddy Creek⁶.

Certain locations within the planning area are classified as mule deer winter range, and suitable Sage grouse habitat is located in sagebrush areas within the planning area⁷.

Small mammals including squirrels, porcupine, marmot, rabbits, chipmunks, voles, and beaver are common within the planning area. Carnivores include black bear, coyote, red fox, mountain lion, bobcat, and weasels. A large variety of bird species use the habitats within the planning, area including songbirds, woodpeckers, grouse, waterfowl, and raptors. Amphibians such as chorus frogs and tiger salamanders are found in aquatic habitats⁸.

Table 2: Species of Concern – Grand County

Species		Federal	State
American peregrine falcon	Falco peregrinus anatum	Recovery	Spl. Con.
Bald eagle	Haliaeetus leucocephalus		Spl. Con.
Western yellow-billed cuckoo	Coccyzus americanus	Candidate	Spl. Con.
Greater sage-grouse	Centrocercus minimus		Spl. Con.
Humpback chub	Gila cypha	FE	ST
Colorado pikeminnow	Ptychocheilus lucius	FE	ST
(squawfish)			
Razorback sucker	Xyrauchen texanus	FE	SE
Penland beardtongue	Penstemon penlandii	FE	
Canada lynx	Lynx canadensis	FE	SE
River otter	Lontra Canadensis		ST
Boreal toad	Bufo boreas boreas		SE

Sources: United States Fish and Wildlife Service (2010) Species Report – Grand County. Colorado Division of Wildlife (2010) Threatened and Endangered Species.

Spl Con.: Species of Special Concern (Not a statutory designation): FE: Federal Endangered; ST: State Threatened; SE: State Endangered.

Large herds of deer and elk find critical wintering habitat among many of the lower elevation ranches. Certain conservation easements have been acquired through the CDOW's Habitat Protection Program to protect migration routes and provide needed habitat for a wide variety of species. The CDOW recently acquired the 940-acre Grand View Ranch, which will protect important wildlife migration routes and habitat while providing additional hunting access. The Colorado River, its tributaries, and associated riparian areas are necessary to the perpetuation of fish species, including species of concern.

⁸ Ibid

⁶ Adapted from: USDA Forest Service, 2007. *Environmental Assessment-Blue Ridge Salvage and Fuels Reduction Project*. Sulphur Ranger District, Arapaho and Roosevelt National Forests and Pawnee National Grassland. October 2007. Page 41.

⁷ Ibid

The habitat needs for Species of Concern and other species will be considered when finalizing individual projects when federal funds are expended or as required by the state or county.

5.2 Homes, Businesses, and Essential Infrastructure at Risk

In addition to the two communities, ranches, small groupings of homes, and freestanding homes are present throughout the planning area. Widely scattered homes located on large 40-acre lots are prevalent in subdivisions, especially in the Williams Fork portion of the planning area. Although the number of people living in the area fluctuates greatly depending on the time of year, the total residential population for the planning area, according to the 2000 census, is 1,205. Of that total, based on zip code, 588 live in the Williams Fork - Parshall area and 617 live in Hot Sulphur Springs (2000 Census). Home values within the planning area vary greatly, depending on location, associated acreage, and other considerations.

The Hot Sulphur Springs Resort; Drowsy Water Guest Ranch; Aspen Canyon Resort; a variety of small businesses, most of which cater to area visitors; churches; and county offices and facilities are located in Hot Sulphur Springs and Parshall. Both communities are considered to be "bedroom communities" as the majority of local residents work at businesses located in neighboring communities or the Henderson Mill.

Distribution lines for electricity and natural gas are located in the Colorado River Corridor, the Williams Fork Valley, and the ridge that forms the Grand County – Summit County boundary. Other infrastructure includes water diversion structures, communications sites on Grouse Mountain and Parshall Divide, roads, and bridges, which are scattered throughout the planning area.

Elementary, middle school, and high school students in Hot Sulphur Springs attend school in Granby or elsewhere. Students west of Byers Canyon attend school in Kremmling.

5.3 Other Community Values at Risk

Recreational and day-use activities (fishing, hunting, hiking, mountain biking, camping, and winter sports) are important to the area's economy. Recreational areas include Williams Fork Reservoir, Colorado and Williams Fork Rivers, area guest ranches, nearby winter resorts, and Hot Sulphur Springs Resort.

5.4 ISO Ratings

The ISO rating for the area five miles from the Hot Sulphur Springs fire station is 6. For areas outside the five-mile buffer but within the district the rating is an 8b. The ISO rating for areas outside the five-mile buffer and outside the District is 10.

6.0 Resource Management Considerations

6.1 Fire Regimes and Condition Classes (FRCC)

Schmidt, et al. (2002) examined land conditions in the United States with regard to the degree of departure of fire regimes from historical fire cycles due to fire exclusion and other influences. They characterized the landscape by 5 Fire Regime Groups and 3 Condition Classes. Appendix C of *Protecting People and Natural Resources—A Cohesive Fuels Treatment Strategy* (USDI/USDA FS 2006) provides guidance for the identification of the various fire regime groups and fire condition classes.

When reviewing the status of the Fire Regimes Condition Classes of vegetation in the planning area, it is important to note that at this point in time there is little departure from the normal cycles. For example, even though the mountain pine beetle has decimated the stands of lodgepole pine, these areas have not missed a fire cycle. As the predominant vegetation in these areas change and a new vegetative community evolves, new fire regimes will be created and the process will start over.

6.2 Invasive (Nonnative) Species Management Considerations

Invasive species are those species that are nonnative to a particular ecosystem and whose introduction causes or is likely to cause economic or environmental harm or harm to human health. These species are highly competitive, highly aggressive, and easily spread. They include plants designated as "noxious" and animals designated as "pests" by federal or state law. A listing of noxious weeds designated by the State of Colorado can be found on the Internet at: http://www.colorado.gov/cs/Satellite/Agriculture-Main/CDAG/1174084048733.

Fire regimes and historical fire cycles can be altered by invasive species. Native shrubs and trees are often slow to reestablish after a wildland fire and require several years to complete their lifecycles. The fire return intervals of many of the vegetative types in the planning area are quite long. Nonnative and noxious weeds can colonize an area after a fire. Some, such as cheatgrass (*Bromus tectorum*), one of the more common noxious weed, which has been found growing above 10,000 feet⁹, burns readily and can contribute to wildfire occurrence with a short fire return interval. A shorter fire return interval often favors invasive species because the native shrubs and trees, many of which must come from seed, do not have adequate time to become reestablished and are lost from the system.

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⁹ Foley, Erin 2005. Floristic Inventory of the Arapaho National Forest and Bureau of Land Management Lands in Grand County, Colorado. (Online) Assessed November 8, 2010.

Invasive nonnative species must be considered when developing projects or assessing an area after a wildfire. Grand County has developed a noxious weed management plan. The purpose of the Grand County Noxious Weed Management Plan is to control targeted noxious weeds within Grand County as determined by the Colorado Noxious Weed Act. The targeted noxious weeds to be controlled are designated within the plan. Control is aimed at eradicating, reducing, suppressing or containing populations of non-native, invasive noxious weeds which pose a threat to the environment and economy of Grand County by reducing wildlife habitat, agricultural production, property value, and threatening the native plant population unique to Grand County¹⁰. Agency-specific guidance is available to federal and state agencies.

Agencies and individual landowners should work with the Grand County Division Natural Resources to monitor and control noxious weeds in treatment areas or areas impacted by a high-severity wildland fire.

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¹⁰ Grand County 2007. *Grand County Noxious Weed Management Plan* (Revised in 2007). Available on the Internet at: http://co.grand.co.us/DNR/Links/NoxiousWeedMgtPlan.pdf. Accessed November 8, 2010.

7.0 Community Risk Assessment

7.1 Environmental Factors

An observed phenomenon that may become more of a factor in the near future is the gradual warming of the environment. Whether or not "climate change" or "global warming" is a human-caused phenomenon, warmer and drier climatic conditions during the last decade have come on the heels of wetter and cooler conditions that had favored increases in fuel accumulation. Whatever its cause, a warm climatic cycle can contribute in any year to earlier snowmelt, drought, and heavy, isolated rainstorms. The early loss of snow cover, patchy rainfall, and low soil water absorption during intense rainstorms may contribute to lower live and dead fuel moisture during the summer months.

The current mountain pine beetle epidemic in Colorado and Wyoming is extensive, but it is unclear whether the current level is unprecedented. Most researchers note that mountain pine beetle epidemics are known to have occurred in lodgepole pine forests, but that the current epidemic is more extensive than has been seen in the past century.

Understanding and predicting the consequences of natural disturbance effects on landscapes is difficult. All of the natural disturbance factors – fire, insects, pathogens, wind, drought, etc. – are capable of affecting forest landscapes on various scales and may act individually or in combination. In the current mountain pine beetle epidemic, interactions between fire and beetle effects are certain, because the insects are changing fuel characteristics of forests significantly¹¹. Additional information related to the current mountain pine beetle epidemic and its impact on fire behavior can be found in appendix G.

7.2 Risk of Wildfire Occurrence

Prior to the mountain pine beetle epidemic, timbered areas in Grand County were known as the "Asbestos Forest." Wildland fires were not too common. The Jim Creek Fire, the largest recorded fire in the county, occurred several years ago (1924) and grew to 1,146 acres in 31/2 hours¹². With the exception of fires in grass and sagebrush, wildfires tend to be small, less than one acre. The majority of reported wildfires occurring in the planning area have been attributed to human causes at the rifle range, the railroad, hunters and campers, and

¹¹ Kaufmann M.R., G.H. Aplet, M. Babler, W.L. Baker, B. Bentz, M. Harrington, B.C. Hawkes, L. Stroh Huckaby, M.J. Jenkins, D.M. Kashian, R.E. Keane, D. Kulakowski, C. McHugh, J. Negron, J. Popp, W.H. Romme, T. Schoennagel, W. Shepperd, F.W. Smith, E. Kennedy Sutherland, D. Tinker, and T.T. Veblen. 2008. *The status of our scientific understanding of lodgepole pine and mountain pine beetles – a focus on forest ecology and fire behavior.* The Nature Conservancy, Arlington, VA. GFI technical report 2008-2.

¹² Dan Nolan 2010. Personal Communication; Noland, Dan, 2011 *The Jim Creek Fire*.

lightning. There are no complete individual wildfire statistics for the planning area. In Grand County, the Forest Service experiences 4.5 wildfires per year on average. The BLM averages 3.5 wildfires per year, while the Fire Protection District responds to an average of 8 wildfires per year.

7.3 Fire Behavior

Wildland fuels are broken down by wildland firefighters into fuel models. The predominant fuels within the planning area are classified as Northern Forest Fire Lab (NFFL) Models 1 – Short Grass, 2 – Sage (Grass understory), 8 – Closed hardwood litter, 9 – hardwood litter and 10 – Timber (Litter and understory).

Table 3 looks at the key factors of fuel model and fuel loading under relatively adverse weather conditions (high temperatures – low RH – wind) to predict rates of spread and flame lengths, both indicators of resistance to control, for the five most common fuel models found in the planning area.

Table 3. Vegetation, Fuel Models, & Fire Characteristics for Predominant Fuels

Vegetation	NFFL	Fuel loading	Rate of Spread	Flame
	Model			Length
Grassland	1	0.74 tons/acre	135 chains/hour	7.1 feet
Grass - Sage	2	4.0 tons/acre	50 chains/hour	8.4 feet
Aspen	8	1.5 tons/acre	3 chains/hour	1.2 feet
Riparian Areas - Fall	9	3.5 tons/acre	12 chains/hour	3.4 feet
Dead lodgepole pine w/	10	12.0 tons/acre	12 chains/hour	5.6 feet
heavy down fuel load				

Notes: Fuel loading is for fuels less than 3-inch (100-Hour timelag) dead and live. Rates of Spread are based on the following values: 0% slope, 6 % fine fuel moisture, and 6-mph midflame wind speed. Live fuel moisture is 90%. One chain is equal to 66 feet.

Source: Anderson, Hal E. 1982. *Aids to Determining Fuel Models For Estimating Fire Behavior* and the *Fireline Handbook* (PMS 410-1).

Observed fire characteristics, such as flame length and rates of spread, provide wildland fire fighters with an understanding of the expected fire behavior and resistance to control. Terrain features and changes in fuel types can alter the observed fire behavior – flame length and rate of spread – but the fire behavior will always dictate the most effective means necessary to control the fire. Table 4 provides an overview of effective suppression methods under certain fire behavior.

Table 4: Resistance to Control

Flame Length	Fireline Intensity	Interpretation
0 - 4	100	Persons using hand tools can generally attack fires at the head or flanks. A handline should hold the fire.
4 - 8	100 - 500	Fires are too intense for direct attack on the head by persons using hand tools. A handline cannot be relied on to hold fire. Equipment such as dozers, engines, and retardant aircraft can be effective.
8 - 11	500 - 1000	Fires may present serious control problems such as torching, crowning, and spotting. Control efforts at the head of the fire will probably be ineffective.
11+	1000+	Crowning, spotting, and major runs are common. Control efforts at the head of the fire are ineffective.

Source: Fireline Handbook - Appendix B

7.4 Risk Assessment

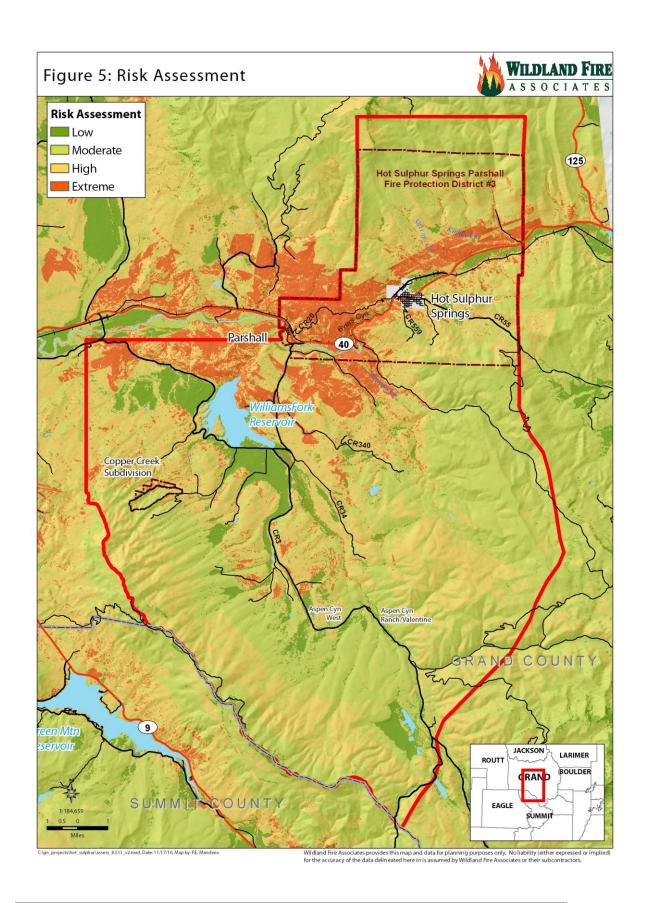
When the key GIS layers – vegetation, improvements, sensitive environmental factors, fuel condition class – were analyzed, four levels of risk were established: Low, Moderate, High, and Extreme. The various levels of risk to the values at risk are shown in Figure 5. A map also included in appendix B.

Although the area is designated as being at Moderate to High Risk, depending on fuel type, Copper Creek and Copper Creek Estates are very vulnerable to wildfire. Based on past experience, the contractor noted that factors such as heavy, often continuous concentrations of fuel and steep terrain could combine under adverse weather conditions or during periods of drought and contribute to an intense, rapidly moving wildfire that would be difficult to control.



Churches Park Fire. Fraser, Colorado. October 3, 2010.

Source: 9 News http://www.9news.com/news/article.aspx?storyid=156332&catid=339. Accessed 10/03/10.



8.0 Recommendations for Reducing Fire Hazards

8.1 Purpose

The purpose of this section is to provide stakeholders and those living in the planning area with an overview of existing wildland fuel conditions and recommend a possible course of action that will reduce the impacts of a wildland fire to those living in the planning area. The need for quick action was brought home when two rapidly moving wildfires in the foothills of the Front Range destroyed or heavily damaged approximately 200 homes and other structures while this plan was being developed.

To drive the point home even further, on October 3, 2010, the 473-acre Churches Park Fire broke out on the east side of Sheep Mountain and burned an estimated 400 acres the first afternoon (See Page 27). The observed fire behavior included torching and crowning with spot fires occurring a half mile ahead of the main fire.

8.2 Reduce Structure Ignitability

You Are At Risk! When strong winds and hot, dry days lead to wildfires, you cannot expect fire engines to park in front of your home to protect your family and possessions. As much as they may want to, there just aren't enough firefighters or equipment to defend every home. In a matter of minutes, a wildfire can jump from a burning hillside, race through your subdivision, and destroy your home and your neighborhood.

Grand County has adopted the Colorado State Forest Service "FireWise Community Fire Prevention Partnership" program, which is available on the Internet at: http://co.grand.co.us/DNR/Links/GCCWildfireProtectionPlan.pdf. This website outlines all the elements that go into saving lives and property from wildfire. Before wildfire threatens, business owners, landowners, and homeowners should design and landscape their home with wildfire safety in mind. This creates "defensible space," a key element in creating a FireWise community.

Defensible space, the area between a house and an oncoming wildfire where the vegetation has been modified to reduce the wildfire threat, should be created to provide an opportunity for firefighters to effectively defend the house. In the event that firefighters are not available, defensible space also improves the likelihood of a home surviving without assistance. The goal of defensible space is to reduce the chances of a wildfire spreading onto a homeowner's property and igniting homes and other structures and to reduce the risk of loss from a wildfire. Immediately dispose of cleared vegetation when implementing defensible space treatments and maintain defensible space annually. For additional information about creating defensible space and fire safe practices, the

Colorado State Forest Service's "Are you Fire Wise? Program" is available on the Internet at: http://csfs.colostate.edu/pages/are-you-firewise-program.html.

To protect your home, your family, and your possessions, follow the steps outlined below – and make your property "FireWise." To be FireWise you must carry out certain fire protection measures before a fire even starts. By following these simple fire safety steps to create defensible space, your home will have a chance to survive while firefighters work to bring the wildfire under control. The fey elements have been summarized below. The complete guidelines are available on the Internet at: http://csfs.colostate.edu/pdfs/wholenotebook.pdf

Access – Proper identification of your home is essential. During a major wildfire, firefighters from throughout the state (or even the nation) will arrive to assist local firefighters. They will rely on clear street signs and addresses to find your home.

Even if your street and house are clearly identified for firefighters, precious time can be lost if firefighters have difficulty getting to your house. Narrow roads, dead-end streets, steep driveways, and weak bridges can delay firefighters or prevent them from arriving at all; firefighting equipment is much larger and heavier than your family car or truck. Single lane roads or driveways should have turnouts at regular intervals with enough space to allow emergency vehicles and cars to pass. Road and street systems must be designed to provide safe emergency evacuation and fire department access. A minimum of two primary access roads should be designed into every subdivision and development. All private and public streets should be constructed to provide two traffic lanes, each a minimum of ten feet wide. This is just enough space for a fire engine and car to pass each other. Curves and intersections should be wide enough to allow large fire equipment to easily pass and turn. Streets and driveways must not be too steep or have sharp curves – this can prevent emergency equipment from gaining access to your home. Roads, driveways, and bridges should be built to carry at least 40,000 pounds, the average weight of a fire engine. Dead-end streets and long driveways should have turnaround areas designed as either a "T" or a circle large enough to allow fire equipment to turn around. Each of these steps will give firefighters a chance to find and protect your home. A few minutes delay can make a difference in saving your home.

Water Supply – Establish Your Emergency Water Supply. Water supply is vital for a fire department to protect a threatened house or extinguish a burning one. Even a FireWise house may not be able to survive a wildfire without an emergency water supply. A minimum water storage supply of 2,500 gallons is recommended for use in emergencies¹³. Once you have established an emergency water supply, you must make sure firefighters can get to it. If your water comes from a well, it is recommended that you have a gasoline-powered generator so firefighters can operate your pump during a power failure. For any

¹³ A 30,000 gallon storage structure is recommended for subdivision

emergency water supply, the outlet valve must be easily seen and visibly signed from the nearest road. You can obtain specific outlet, valve design, and thread requirements by contacting your local fire department

Defensible Space – Your first defense against wildfire is to create and maintain a defensible space around your home. This does **not** mean your landscape must be barren. A defensible space is an area, either man-made or natural, where the vegetation is modified to slow the rate and intensity of an advancing wildfire. It also creates an area where fire suppression operations can occur and helps protect the forest from a structure fire.

Wildfire hazards can be effectively reduced by following these defensible space guidelines developed by the Colorado State Forest Service.

characteristics, but typically a defensible space, on flat ground, extends a minimum of 75 feet around a home. This distance should be extended if the structure is located on a slope.
Thin out continuous tree and brush cover around structures. The initial 15 feet around a structure should consist of an area in which all flammable vegetation is removed. Beyond the initial 15 feet, trees should be thinned to 10-12 foot crown spacing. Occasionally, clumps of 2 or 3 trees are acceptable for a more natural appearance if additional space surrounds them.
Mow dry grass and weeds to a height of 6 inches or less for a distance of 30 feet from all structures.
Prune tree branches within the defensible space up to a height of 10 feet above the ground. Dispose of all slash and debris left from thinning by either chipping and hauling them away or by piling and burning.
Trim branches which extend over roof eaves. Remove branches within 15 feet of chimneys.
Maintain the defensible space annually by removing debris, shrubs, and other vegetation which has accumulated during the year.
Remove shrubs and small trees, or other potential ladder fuels from beneath large trees. Left in place, these fuels can carry a ground fire into the tree crowns.
Stack firewood and wood piles at least 30 feet from any structure. Clear away flammable vegetation within 10 feet of these wood piles

Place liquefied petroleum gas (LPG) tanks and fuel storage containers at least 30 feet from structures. Clear flammable vegetation from within 10 feet of all such tanks.
Clean pine needles, leaves, and other debris from roofs and gutters. This will eliminate an ignition source for firebrands, especially during hot, dry weather.

Remember, after you have established your FireWise environment, you must maintain it regularly.

Trees and Brush – Many naturally occurring plants in our area are highly flammable during the summer and can fuel a wildfire, causing it to spread rapidly. Removing flammable native vegetation and replacing it with low-growing, fire-resistive plants is one of the easiest and most effective ways to create a defensible space. Select landscape vegetation based on fire resistance and ease of maintenance, as well as visual enhancement of your property. In general, fire-resistive plants grow close to the ground; have a low sap or resin content; grow without accumulating dead branches, needles, leaves, or other debris; are easily maintained and pruned; and are drought tolerant in some cases. If fire-resistive plants are not available, vary the height of your landscape plants and give them adequate spacing. The taller the plants, the more widely they should be spaced.

Other Firewise Precautions – After you have created defensible space around your home, additional FireWise precautions may be necessary. Work with neighbors to clear common areas between houses and prune areas of heavy vegetation that may pose a threat to everyone. Avoid planting trees under or near electrical lines (they may eventually grow into or touch the lines in high winds, thus causing a fire). If part of your property extends outside of the newly created defensible space and is heavily forested, thin trees to decrease fire hazard and improve forest health. Remove dead, weak, or diseased trees and trees that are obviously leaning – leaving a healthy mixture of older and younger trees

Construction Design & Materials – Your house may be vulnerable to a wildfire because of its design, construction, and/or location. When preparing to build, buy or remodel, know what to look for in a FireWise home. A few modifications to your construction plans can reduce the chance of your house catching fire or help it resist further damage if it does catch fire. Don't let your house become more fuel for a wildfire. If you are building a new house, evaluate your building site. Choose a site away from heavily vegetated areas. Set your structure a minimum of 30 feet back from the ridges or cliffs; increase the distance if the home will be higher than one story.

Building Materials – Use fire resistive or non combustible construction materials, combined with design techniques to prevent or slow the penetration of fire beyond your home's exterior. Whenever possible, use brick, rock, or stucco – they resist fire much better than wood. If you decide on a wood exterior, it is **especially** important that you follow the FireWise practices in this notebook.

Roof – Your roof has the largest surface area of your structure and is the most vulnerable part of your house. It can easily catch fire from a wildfire's wind-blown sparks. Use class A or B roofing materials, such as asphalt shingles, slate or clay tile, or metal.

Siding/Walls – Use fire resistive or non combustible construction materials whenever possible. Use a minimum of a Class III flame spread-rated siding material – stone, brick, and stucco are best. Walls should be constructed of fire-resistive materials from the ground to the roof overhang.

Other Considerations – Build on the most level portion of the property. Avoid ridge tops, canyons, and areas between high points on a ridge. These are extremely hazardous locations for houses and firefighters because they become natural chimneys, increasing the intensity of the fire. Roof eaves extending beyond exterior walls are also susceptible to flame exposure. Limit them in length and box or enclose them with fire-resistive materials. Windows are often overlooked as fire hazards but can be serious risks. The heat from a wildfire may be enough to ignite the furnishings inside your house through the windows. Minimize the size and number of windows on the downhill side of the house or the side that would most likely be exposed to a wildfire. Consider both size and materials for windows and sliding glass doors. Multi-paned glass provides insulation from trapped air and gives more protection from radiant heat than single-paned glass. It also reduces breakage potential from wind-blown debris. To prevent sparks from entering your home through vents, cover exterior attic. soffit, and under floor vents with metal wire mesh (no larger than 1/8 of an inch). Install eave and soffit vents closer to the roof line than the walls. Design decks so that they are not located at the top of a hill directly in the line of a fire moving up slope. Enclose the undersides of balconies and decks on slopes with fire resistive materials. If not enclosed, these areas can trap flames and burning embers that can ignite your home. Use weed barrier fabric under deck and balcony areas to keep them free of vegetation. Cover chimneys and stovepipes with a non flammable screen (mesh no larger than 1/2 inch).

8.3 Area Specific Recommendations

The following recommendations for each area listed below are based on existing conditions and incorporate the principles of FireWise. No priority order has been established; however, general ratings of Very High, High, Moderate, and Low were assigned to each recommendation. Because they are only recommendations, each landowner or land management agency must develop site-specific plans – informal in the case of private landowners and agency specific for federal and state land managers – that address the circumstances unique to their property.

As demonstrated by the fires occurring in the Front Range in September of 2010, it is very important that each homeowner create and maintain good defensible space and fully implement the principles of FireWise, as time and finances permit, and federal agencies should continue to explore fuels treatments within the WUI. These will be common themes throughout the remainder of this section.

County Road 55

Environmental Considerations:

□ The vegetation transitions from grasses and sage near the town of Hot Sulphur Springs to mixed conifer, shrub, and aspen at Cottonwood Pass. Grasses and sage are flashy fuels that can contribute to rapid rates of fire spread. The heavier fuels in the upper reaches of the valley can burn with a much greater intensity. □ High winds can occur in the valley, which can contribute to increased rates of spread, flame lengths, and intensity. Access and Water Sources: □ County Road 55 is in good condition and provides two means of ingress and egress; it should easily accommodate emergency traffic. □ Water sources are available in Hot Sulphur Springs. FireWise Considerations: □ Not all of the homes are visible from the County Road 55 and not all of the homes have readily visible house numbers. All homeowners should ensure they have adequate house numbers and regularly maintain the grasses and other fuels around their homes, outbuildings, and other improvements. □ In the case of the homes in the upper end of the valley, starting at 3191 CR 55, the distance between structures and vegetation should be increased in order to ensure adequate defensible space. One structure with slab siding located in a shrub-forest mix has no defensible space; defensible space should be created. Mitigation: □ The need to create additional defensible space for the houses near Cottonwood Pass is of High priority. This is especially necessary for the slab-sided house. □ Regularly maintaining grasses and other fuels around homes, outbuildings, and other improvements is of High priority. □ Ensuring that homeowners have house numbers is of Moderate to High priority.		
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County Road 590

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	The vegetation in the area, located on the steep, north-facing hillside immediately south of the Hot Sulphur Springs city limits, is a thick stand composed of dead lodgepole pine, mixed conifer, and aspen, intermixed with down timber.
Ac	cess and Water Sources:
	The very narrow road terminates in an open area known locally as the Toth Ranch.
	Road access is poor. A new road that meets county standards should be built to provide access to the area, especially if additional development occurs in the future.
	Water sources are available in Hot Sulphur Springs.
Fir	eWise Considerations:
	Many homes within this area are older and are constructed with combustible
	siding or roofing. At least one is built on piers, which makes it very vulnerable to a wildfire
	occurring down slope. Defensible space varies greatly. Some homeowners have created some
	defensible space while others have not. Property owners who have not created defensible space should do so. Property owners who have created defensible space should remove additional brush and fine fuels close to the house and maintain the existing defensible space by mowing fine fuels near homes on a regularly scheduled basis. They should also remove debris from roofs and gutters at least annually.
	The fuel break being created south of the developed area by Anchor Point should help reduce the threat to life and property from fires occurring on U.S. Forest Service lands to the south. If the landowners create proper defensible space around their homes and implement the other elements of FireWise, it should not be necessary to develop a shaded fuel break along the road ¹⁴ .
Mi	tigation:
	Creating defensible space and maintaining the property on a regular basis are of High priority. Improving the road under the current situation is of Moderate priority, but would become a High priority should more homes or structures be built.

¹⁴ A shaded fuel break should be a minimum of 60 - 100 feet wide on relatively level ground or 110% the height of the forest canopy, whichever is greater.

Byers Canyon

Fa	ctors Unique to the Area:
	Byers Canyon is a major transportation corridor, containing US-40 and the Union Pacific line between Denver, CO and Salt Lake City, UT. There are very limited detour options available, especially for local residents and emergency response vehicles, when closures occur. A closure due to a wildfire or from heavy runoff or mudslides due to loss of ground cover would create a significant hardship on the local community and reduce the ability of public safety personnel to respond to incidents in the Parshall – Williams Fork area.
En	vironmental Considerations:
	Byers Canyon is very narrow with steep rocky walls. Vegetation is generally sparse on the south facing side; dominated by mixed, often heavy, conifer stands on the north facing side.
Ac	cess and Water Sources:
	US-40 is a major all-weather highway. Access to the area south of the highway may be problematic due to the lack of roads in the area. Water sources are available in Hot Sulphur Springs. Helicopter dip sites are available along the Colorado River.
Dis	scussion:
	Colorado DOT should maintain vegetation near eastbound pullouts in the canyon, and a shaded fuel break or other fuel management project should be completed on the southern ridge overlooking the canyon.

In the event that a wildfire significantly impacts the vegetation on the southern side of the canyon, the Incident Commander should immediately request that a Burn Area Emergency Recovery (BAER) Team or local resource advisor be dispatched so that mitigation measures can be instituted as soon as possible.
 Depending on factors such as fire behavior and environmental conditions, it

Mitigation:

Ш	Requesting a BAER Team or local resource advisor may be Critical,
	depending on the severity of the burn.
	Creating a shaded fuel break or implementing other fuel management

may be advisable to request air support in the form of a helicopter.

County Road 50 (Beaver Creek)

En	vironmental Considerations:
	The lower end of Beaver Creek is within the CDOW wildlife area and experiences some recreational use. Beaver Creek flows through a V-shaped valley. The vegetation in the Beaver Creek drainage varies by aspect and primarily consists of mixed conifer on the west side and sage-grass mix on the east side.
Ac	cess and Water Sources:
	Road access is fair; there is only one relatively narrow road in and out of the drainage. Beaver Creek and the CDOW facilities are relatively close to water sources in Parshall and it may be feasible to draft water from Beaver Creek or the Colorado River.
Fir	eWise Considerations:
	Three home sites are located on private lands further up the drainage. The last home site in the drainage lacks sufficient defensible space. The landowner must create adequate defensible space and should take other actions to meet FireWise standards.
	Property owners along Beaver Creek who have created defensible space should remove additional brush close to the houses and maintain the existing defensible space by mowing fine fuels near homes and remove debris from roofs and gutters annually.
	The headquarters complex for the CDOW wildlife management area is located on a bluff south of Highway 40 and west of County Road 50. There is adequate defensible space around the structures; however, the existing defensible space should be mowed on a regular basis.
Mi	tigation:
	The creation of additional defensible space, fully implementing FireWise, and maintaining the three properties on a regular basis are of High priority.

Parshall

En	vironmental Considerations:
	The Grand County CWPP indicates that the risk of wildland fire threatening Parshall is low ¹⁵ . The Colorado River flows below the community along large swaths of wet irrigated hay meadows. A paved highway is located between the community and the railroad and public lands to the east. Public lands surrounding Parshall are administered by the State of Colorado and BLM. These lands are mostly rangeland and heavy fuel loads are not present.
Ac	cess and Water Sources:
	Road access is good. US-40 forms the northern boundary of the town. There are water sources in Parshall and it may be feasible to draft water from the Colorado River using a dry hydrant on County Road 3, which is attached to the bridge or directly from the river.
Fir	reWise Considerations:
	Local residents, especially those on the west side of town, and the guest ranch should establish and maintain adequate defensible space.
Mi	tigation:
	 In consideration of the low occurrence of wildfires in the area, any fuels management projects could be considered to be Low to Moderate priority, depending on location. Developing a dry hydrant site on the Colorado River near the County Road 3 bridge to replace the existing dry hydrant is of High priority.

¹⁵ Grand County Department of Natural Resources (2006), Grand County Community Wildfire Protection Plan, Grand County Department of Natural Resources, Granby, CO, December 2006.

County Road 340

En	vironmental Considerations:
	The vegetation is primarily a grass-sage mix, with scattered groves of aspen, which are located primarily in north- or east-facing locations.
Ac	cess and Water Sources:
	County Road 340 provides access to an estimated 6 homes. The road is in good condition at its junction with County Road 3 but narrows as it heads south. There is a turnaround at the boundary of private – BLM land.
	The majority of the houses are hidden in aspen groves, and there are no house numbers.
	Power lines serving the home sites near the end of the road are underground. Water sources are available at Parshall, a draft site near the CR 3 bridge over the Colorado River, or Williams Fork Reservoir.
Fir	eWise Considerations:
	Homeowners should add house numbers and create and maintain adequate defensible space around homes and structures.
Mit	tigation:

□ House numbers could be considered of **Moderate** priority.
 □ Maintaining the properties on a regular basis is of **High** priority.

County Road 34

Environmental Considerations:

	Vegetation varies by aspect and terrain. The primary vegetative type on the flat area above the river is a grass-sage mix. A portion of the flat area has been converted to ranching operations, and a large central pivot irrigation system is being constructed to irrigate the rangelands located on the southern end of the flat area.
	North-facing slopes on the ridge have stands of aspen, some mix-conifer, and mountain pine beetle-killed lodgepole pine. The vegetation on the southfacing slope of the ridge is a sage-grass mix.
	There are mowed hay fields and aspen groves surrounding the ranch buildings at the end of the road. There is a riparian zone along the Williams Fork River.
Ac	cess and Water Sources:
	County Road 34 terminates at the Williams Fork Ranch, approximately 4.5 miles from its junction with County Road 3.
	The road is in good condition where it leaves County Road 3 but narrows as it heads south.
	There is a turnaround on the ridge before dropping down into the Williams Fork Ranch developed area.
	About a mile from the end, the road climbs out of the flat area through a series of heavily wooded drainages to the ridge. The road is relatively steep and narrow with tight corners that have limited sight distances.
	The brush and trees are very close to the road. The county or landowner should brush back at least 60 feet along the main road and roads leading to homes, creating a shaded fuel break when possible.
	There are adequate drafting sites at the Williams Fork Reservoir. It may be possible to draft from an irrigation ditch located near the road.
Fir	reWise Considerations:
	There are some long-established ranching operations along the road, as well as new homes that have been or are being built on the flats above the river or in the riparian area.
	Smaller home sites are located on the prominent east-west ridge near the end of the road.
	For the most part, house numbers are not present. Utilities are above ground.
	Some of the landowners have started to create defensible space, but they must regularly mow and clear around the structures and incorporate other FireWise principles. There are also jackpots of fuels in areas where extensive clearing has occurred.

County Road 34 (Continued)

Mitigation:

Brushing back at least 60 feet along the main road and roads leading to
homes, creating a shaded fuel break when possible, is Very Important .
Disposing of activity fuels that resulted from clearing operations is of High
priority, as is creating and maintaining defensible space.
House numbers could be considered of Moderate priority.
Widening the road and improving sight distance could be considered to be a
Moderate priority.
Installing a dry hydrant to take advantage of the irrigation ditch would be of
Low priority.

Aspen Canyon Ranch/Valentine

Environmental Considerations:

Generally, the ranch and subdivision are located in a broad valley bottom. ☐ The Williams Fork River serves at the eastern boundary for the developed area and County Road 3 is the western boundary. □ One structure is located on the east side of the river. Vegetation is light on the west side and is composed of mixed conifer or grass-sage mix on the eastside, depending on aspect. Access and Water Sources: The roads within the ranch and within the Valentine Subdivision are narrow but adequate. The weight limit on the bridge leading to the structure on the east side of the Williams Fork River should be determined. ☐ There is a draft site next to the bridge on the Morgan Creek Ranch road; a dry hydrant should be added. **FireWise Considerations:** ☐ The subdivision and ranch are not within the district. ☐ The homes in these two subdivisions are located off County Road 3, in the southern portion of the planning area. ☐ More than 70% of the homeowners have created defensible space and have taken other actions to improve the safety of their homes and outbuildings. ☐ There is a need for some homeowners to mow and maintain the defensible space that they have created. Mitigation: Determining the weight limit on the bridge is of **High** priority. ☐ Maintaining defensible space on a regular basis is of **High** priority. ☐ Installing a dry hydrant would be a **Moderate** priority.

Aspen Canyon West

Environmental Considerations:

	A situation is occurring in the Aspen Canyon West Subdivision, which was heavily impacted by the mountain pine beetle. Several landowners have cut down, bucked up, and piled trees killed by the mountain pine beetle. This has led to a fuel type conversion from lodgepole pine forest to grassland with scattered brush. Wildfires in this fuel type can move rapidly, especially during wind events. An unintended consequence of cutting and piling the dead timber is the presence of many piles of logging debris. When ignited, piles tend to loft a large number of embers that can travel downwind and ignite downwind fuels or structures.		
Ac	cess and Water Sources:		
	The roads in the subdivision are adequate and house numbers are present. There is a draft site located at the end of County Road 307; however, the road leading to the pond is steep. A dry hydrant should be developed, if possible, and a sign should be placed at the top of the hill which calls attention to the site's location.		
Fir	FireWise Considerations:		
	Homeowners should dispose of the piles as soon as possible. Homeowners should increase and maintain defensible space around their homes and outbuildings, and practice other elements of FireWise, such as cleaning roofs and gutters at least annually.		
Mitigation:			
	Disposing of the accumulation of logging slash and dead timber is of High priority. Maintaining defensible space on a regular basis is of High priority. Installing a dry hydrant and posting a sigh would be of Moderate to High priority.		

Copper Creek Subdivision and Copper Creek Estates

The northern portion of Copper Creek is within the district, while the southern area is not.

Environmental Considerations:

	and valleys that come off the Williams Fork Mountains to the west. The south-facing slopes are very steep—greater than 45 percent—while the north-facing slopes range between 20 and 45%. The vegetation in the area varies by aspect and land ownership. The south-facing slopes are composed primarily of grasses and brush. The north-facing slopes that have not been altered by the landowner are covered with thick stands of aspen, mixed conifer, and mountain pine beetle-killed lodge pole pine. Riparian areas composed of willow and aspen can be found in the valley bottoms.		
Ac	Access and Water Sources:		
	The primary access route to the area is adequate, while the secondary roads		
	in the area vary from narrow to narrower.		
	Some roads have steep grades with tight turns and are one-way in and out.		
	County Road 373 should be brushed back at least 110% of the height of the vegetation.		
	Street signs are not present and about half of the sites have house numbers.		
	All homeowners should display house numbers and create and maintain defensible space.		
	A pond on the north side of the subdivision is currently adequate to serve as a		
	draft site and other drafting sites are located at the Williams Fork Reservoir.		
	A dry hydrant should be added.		
	A good helicopter dip site is located east of the subdivision, but there is a		
	power line just west of the pond.		
	The district owns a plot of land at the entrance to the subdivision. A large		
_	water storage tank could be located on the site.		
	The BLM, USDA Forest Service, and state land managers should create		
	additional fuel breaks on the boundaries of the subdivision to aid in the		
	suppression of a wildfire, in the event one occurs.		

Copper Creek Subdivision and Copper Creek Estate (Continued)

□ The majority of the homeowners have not taken any action to reduce the amount of fuels or created defensible space, leaving them vulnerable to a wildfire. □ Some landowners have cut down all the dead lodgepole pine, leaving, in some cases, large jackpots of fuel and creating open areas composed

some cases, large jackpots of fuel and creating open areas composed primarily of grasses and brush. When ignited, large piles of logs and other debris can loft embers that can be carried by the wind; fires occurring in flashy fuels, such as grass, can spread quickly.

☐ Residents, recreational property owners, and owners of undeveloped land should work together to reduce fuel loads, brush back along roads, and increase defensible space throughout the subdivision.

Mitigation:

Encouraging the community to come together to treat the vegetation on a consistent basis is of Very High priority.
Disposing of the accumulation of logging slash and dead timber is of High priority.
Creating and maintaining defensible space on a regular basis is of High priority.
Installing a dry hydrant and posting a sigh would be of Moderate to High priority.
Widening single lane roads and brushing back at least 60 feet or 110% of the height of the vegetation, where possible, are of High priority.
Additional fuels reduction work should be completed on surrounding state and federal land to decrease the intensity of fire if it were to burn near the community is of High priority.

County Road 20

priority.

is of **Very High** priority.

En	Environmental Considerations:	
	The eastern portion of the area is very steep and primarily covered with mountain pine beetle killed lodgepole pine. The timbered area gives way to sagebrush – grass mix on the western portion of the route. The road in the sagebrush – grass mix is positioned so that it could serve as a fire break.	
Ac	cess and Water Sources:	
	County Road 20, a narrow road with steep grades and tight turns, is the only alternate east-west route in the area when US-40 is closed to traffic. The narrow road winds its way up a steep heavily wooded slope as it leaves the Hot Sulphur Springs area. Water sources are available in Hot Sulphur Springs and Parshall.	
FireWise Considerations:		
	Several homes built of highly combustible materials are scattered along the route. Many of the existing structures, constructed of flammable materials, have not been used in some time and are extremely vulnerable should a wildfire occur in the area. Structures that are occupied on a year-round or seasonal basis should create and maintain sufficient defensible space and make every effort to fully implement FireWise principles. The county has removed dead timber approximately 50 feet back from both sides of the road. The county should work with the existing landowners to treat fuels on both sides of the road where fuels are the heaviest. At a minimum, a 100-footwide shaded fuel break on the downhill side of the road should be created and maintained.	
Mitigation:		
	☐ Creating and maintaining defensible space on a regular basis is of High	

☐ The creation of a shaded fuel break at least 100 feet wide, where possible,

Byers Canyon Rifle Range at the Hot Sulphur Springs State Wildlife Area

Environmental and Economic Considerations: ☐ This popular shooting range is located on the north side of US-40 opposite the CDOW Area Office Complex. ☐ The site is south facing, generally dry, and the fuels beyond the backstops are primarily grasses and a limited amount of sage. A series of narrow ravines cut into the hillside north of the range lead to the crest of the ridge are capable of quickly drawing a wildfire to the crest of the ridge overlooking the canyon. ☐ The high level of human activity in the area – the range, a major regional highway, and the railroad – increase the risk of fire occurrence in a high value area. The CDOW has taken recent action to reduce the possibility of a wildfire occurring at the range. Following the October 16th incident, incendiary ammunition is no longer allowed to be fired at the range. It is believed that this regulation will help reduce the number of future wildfires. **Factors Unique to the Area:** ☐ The area in and around the range is heavily used and has experienced a higher than average number of wildfires from a variety of sources including. smoking, railroad activity, and lightning (Brad White, personal comm.). □ A wildfire, attributed to tracer ammunition, occurred at the range on October 16, 2010, and burned approximately 190 acres. There have been two other tracer induced fires at the range in the past 25 years. Suppression forces have been able to successfully control these and other wildfires that have occurred in the area by taking advantage of the change in fuels and terrain at the crest of the ridge north of the range or by aggressively attacking the fire using direct attack strategies and tactics. **Access and Water Sources:** □ US-40 affords very good access to the range proper. Assess to the ridge

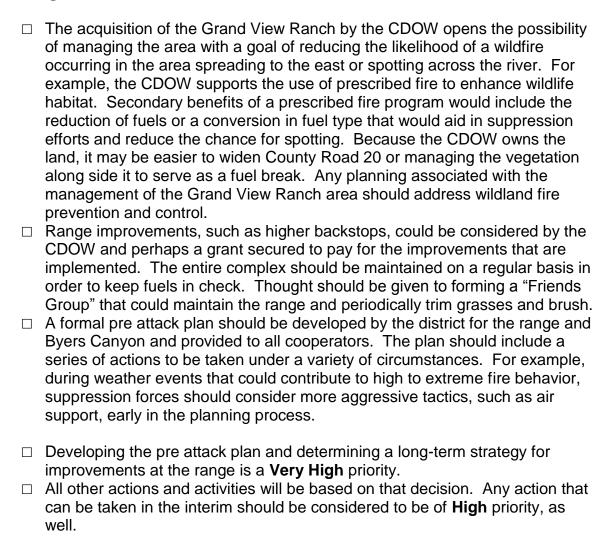
north of the range is limited to CR-20, a narrow road that travels through

□ Water sources are available in Parshall and Hot Sulphur Springs.

heavy fuels on its approach from the east.

Byers Canyon Rifle Range at the Hot Sulphur Springs State Wildlife Area (Continued)

Mitigation:



Hot Sulphur Springs

Environmental Considerations:

	Hot Sulphur Springs is low to moderate.
	The CWPP notes that this threat is mitigated by the fact that a fire will
	generally burn uphill and these stands occur higher than the town prope The fuel break being created south of the developed area by Anchor Pol should help reduce the threat to life and property from fires occurring on Forest Service-administered lands to the south. However, homeowners the fringes of town, especially on the east and south, and the resort shou create and maintain defensible space in response to the possibility of a wildfire, especially one that is wind driven. (Note: While this plan was be developed, a 1,000-acre, wind-driven grass fire destroyed one primary structure and three outbuildings near Greeley, CO.)
Ac	cess and Water Sources:
	Road access is good. Water sources are available in the town of Hot Sulphur Springs.
Fir	reWise Considerations:
	Homeowners on the outskirts of the town should increase and maintain defensible space around their homes and outbuildings to include annual maintenance of grass and brush, and practice other elements of FireWise, such as cleaning roofs and gutters at least annually.
Mi	tigation:
	The creation and maintenance of defensible space on the outskirts of town is of Moderate to High priority, depending on location.

Hot Sulphur Springs Water Supply Protection District

וט	scussion:
	The town of Hot Sulphur Springs created a Water Supply Protection District in order to maintain and protect the town's water works from injury and its water supply from pollution or from activities that will create a hazard to health and water quality.
	All planning for fuel management projects and wildfire suppression efforts must consider the impacts of the proposed actions on these important resources.
	Currently, fire retardant is not to be dropped from an air delivery system within 300 feet of a water source unless an incident commander feels lives or property are at risk.
	The town of Hot Sulphur Springs should consider developing a long-term plan to protect the watershed from the adverse impacts of a wildfire.
Ac	cess and Water Sources:
	Access can vary depending on location. Some areas may only be accessible by foot or air.
	Water sources are available in the town of Hot Sulphur Springs. The Colorado River should provide suitable helicopter dip sites.
Mitigation:	
	Protecting the watershed and the treatment facilities from wildfire is of Very High priority.
	Developing a long-term plan to protect the watershed from the adverse impacts of a wildfire is of High priority.

Sheriff Creek

	Environmental Considerations.	
	Sheriff Creek focuses on the Sheriff Creek drainage. The homes in the lower reaches of the drainage are located in a grass-shrub fuel type, while the structures in the upper portion of the drainage are located in dense timber. Areas in between vary depending on aspect.	
Ac	cess and Water Sources:	
	The road conditions vary greatly from a nearly impassible 2 track requiring vehicles with 4-wheel drive capabilities to a relatively well-maintained, though narrow, gravel road.	
	The road in the upper reaches of the drainage is also accessible from Kinney Creek by way of a narrow, sometimes steep logging road.	
	Water sources are available in the town of Hot Sulphur Springs and a local stock dam. The stock dam may also serve as a helicopter dip site.	
Fir	reWise Considerations:	
	One landowner in the upper reaches of the drainage has cut and piled all the dead lodge pole pine, which can create an embers problem (See previous discussions).	
	The structures in the upper reaches of Sheriff Creek are not defendable by fire suppression personnel.	
	All landowners should improve and maintain adequate defensible space and implement other FireWise principles.	
Mi	tigation:	
	It is of High priority that all landowners should improve and maintain adequate defensible space and implement other FireWise principles. The disposal of the accumulated logging slash is of Moderate to High priority.	
	In consideration of the location and associated costs, the improvement of the road to the upper cabin sites is of Low priority.	

Kinney Creek

Mitigation:

Environmental Considerations: The homes and outbuildings in Kinney Creek are sited in a grass-brush fuel model, and some could be exposed to high-wind events. A large fire, by local standards, burned through the area several years ago – before most of the homes were built. Access and Water Sources: Access is by way of a narrow but well maintained county road. Water sources are available in the town of Hot Sulphur Springs. The nearby Colorado River may serve as a helicopter dip site. FireWise Considerations: Mowing grasses and shrubs near homes and outbuildings will reduce danger to property.

The maintenance of defensible space is of **High** priority.

Drowsy Waters Guest Ranch

Environmental Considerations:	
	This well-known guest ranch is located in a narrow canyon with dead trees and grass-sage fuels on the lands above the developed area.
Ac	cess and Water Sources:
	A well-maintained, though narrow, gravel road leads to the ranch. There can be a large number of people present during the summer months; livestock is always present. In the event of a wildfire response and a simultaneous evacuation, the road configuration could make it difficult for firefighters to reach the ranch. If possible, the road should be brought up to county standards to accommodate emergency vehicle traffic, facilitate the evacuation of guests and residents, and accommodate the evacuation of livestock.
	A swimming pool and a small pond near the main lodge provide drafting opportunities.
	A pond below the ranch is not suitable as a dip site due to the presence of high-tension power lines.
FireWise Considerations:	
	The cabins are constructed of flammable materials with flammable roofs. The cabin roofs should be replaced with non combustible materials. This could be accomplished as part of the ranch's long-term maintenance program. A concerted effort must be made to create and maintain defensible space on
Ш	both sides of the canyon.
	Thought should be given to installing a sprinkler system that could utilize water in the swimming pool to protect the main lodge building and cabins.
Ot	her Considerations:

☐ The evacuation of guest and livestock is also an important element to consider. The property owner, Grand County Sheriff, Grand County Office of Emergency Management, and local fire suppression forces should develop an evacuation plan that identifies trigger points and actions to be taken in the event of a wildfire (See Section 4.4 for guidance).

Drowsy Waters Guest Ranch (Continued)

Mitigation:

The development of an evacuation plan is of High priority. Developing similar plans for other guest ranches is of Low to Moderate priority, depending on
their location and proximity to heavy fuels.
The creation of a better turnaround area for fire engines is of Very High
priority.
The creation and maintenance of defensible space on both sides of the
canyon is of High priority.
It is Very Important that roofing materials be upgraded when they are
maintained.
The improvement of the access road is of Moderate priority.
The development of a sprinkler system is of Low priority.

8.4 Fuel Treatment Projects

8.4.1 Introduction

Managing vegetation can be challenging due to soils, existing vegetation, rainfall patterns, and other weather phenomena. What may work on one site may not work on another, or a method that may work under one set of conditions at a given site may not work under different conditions at the same site. Therefore, it may be necessary to consider a variety of treatment options in order to find the one best suited for a specific project.

Other more subtle factors can come into play as well. For example, removing brush to create a fuel break without addressing invasive species can be trading one problem for another. Soil disturbance should be kept to a minimum.

Projects and treatment options on federal lands must be consistent with the goals and objectives outlined in the appropriate land use plan, other planning documents covering the area to be treated, and the 2001 Federal Fire Policy. It must also be viable within the limitations of federal budgets.

An important factor to consider is that many of the projects, especially those involving light fuels, will require treatment in out years. There is no guarantee that managers can receive funding for out-year treatment as part of the original project funding. It is often easier to receive funding for new projects than to receive funding to maintain past projects, especially if the existing project lowers wildfire risk from extreme to moderate. Therefore, it is extremely important to include a strong justification with a funding request for out-year treatment project funding. Current efforts to inform lawmakers and members of their staff about the importance of funding follow-up maintenance should be continued.

8.4.2 Current and Proposed Large-Scale Fuel Treatment Projects

Since 2004, the BLM, USDA FS, and others have implemented or completed fuel treatment projects in the planning area.

A hazard tree removal project along the Grand County road rights-of-way in the eastern half of the county has been completed by the Grand County Road and Bridge Department. The total project cost was \$413,000. The county Natural Resources Department received \$257,000 in tree removal grants from the state and Grand County applied for and received additional grant funding from the BLM for 2010 to complete the remaining areas in west Grand County starting in the fall of 2010. The funding was received and they resumed the program. The standards call for the removal of over 2,000 trees along 22 miles of county rights-of-way in the project area.

Anchor Point Inc. has initiated the 12-acre Hot Sulphur Springs Fuels Reduction Project located immediately south of the town of Hot Sulphur Springs. The project was made possible though funding received as a result of the *American Recovery and Reinvestment Act of 2009*. The project area is located on private property divided between three landowners. Project objectives include reducing wildfire hazards within the project area and adjacent communities; .removing trees previously killed by the mountain pine beetle; enhancing ingress and egress access for homeowners and fire apparatus; and promoting regeneration within cut areas of conifer species and aspen.

The Arapaho and Roosevelt National Forest is planning to implement and complete the 17,000-acre Blue Ridge Salvage and Fuels Reduction Project over the next 10 years. Located to the south and east of the town of Hot Sulphur Springs, the Forest Service plans to use a variety of methods to treat the area, which was heavily impacted by mountain pine beetle.

The Bureau of Land Management recently completed the McQueary Gulch Fuels Treatment Project (175 acres) and is planning to implement others, including Reed Creek (200 acres) and, jointly with the Routt National Forest, a project to protect the Grouse Mountain Communications Site (153 acres).

These and other projects are included in appendix D, which will be updated as additional projects are added or completed.

8.5 Other Recommendations

There are a wide range of activities and actions that could be considered over time that may enhance the ability of the district to better respond to wildfires and the local community better prepare for them. These following ideas are examples that could be considered but are in no priority order.

Education and Outreach

Issue press releases in the spring and fall to be carried in the local paper informing their readers about the importance of making their properties fire safe and/or promoting FireWise.
Send direct mailings to all residents in Copper Creek Estates, the Williams Fork Valley, Sheriff Creek, and other remote areas about the importance of signing up for CodeRed®. Include information about FireWise in the mailing as well.
As part of Fire Prevention Week activities in schools, distribute FireWise promotional materials to school-aged kids. This activity could take on an interagency flavor and involve the BLM, Colorado State Forest Service, USDA Forest Service, and other local fire protection districts.
Use a large highway message board during hunting season to inform area visitors of the fire danger and/or to call attention to CodeRed®.

Equipment

The district should acquire at least one additional engine to respond to wildland fires. A larger, 4-wheel drive, multipurpose Type 3 engine would provide the degree of flexibility necessary in a rural environment. It would have a larger water supply that could be used to suppress a fire or protect structures until a support tender arrives, yet in the proper configuration, would have the maneuverability to gain access to a wildfire or structure fire via an unimproved road. Conversely, a Type 6 engine, the engine of choice for many federal and state agencies with wildland fire response obligations, has the speed to respond quickly and maneuverability to work in rough terrain necessary to hold a wildfire to a small area. Obviously, the final decision may have to be made dependent on available funding. However, based on the overall obligations of the district, a larger multipurpose engine would be a good addition to the district's fleet.

Type 3: A wildland engine with minimal pump capacities of 50 GPM, 500-gallon tank, 500 feet of 1 ½" hose, and 500 feet of 1" hose. The chassis GVWR is between 16,000 to 26,000 pounds.
□ Type 4: A wildland engine with minimal pump capacities of 70 GPM, 750-gallon tank, 300 feet of 1 ½" hose, and 300 feet of 1" hose. The chassis GVWR is in excess of 26,000 pounds.
□ Type 6: An initial attack wildland engine with minimal pump capacities of 50 GPM, 200 gallon tank, 300 feet of 1 ½" hose, and 300 feet of 1" hose. The chassis GVWR is between 9,000 to 16,000 pounds.

The district should complete a needs study to determine the best choice. The size and configuration should depend on available funding and the space available to house the piece of equipment. Foam production equipment should be included on any wildland fire apparatus the district acquires. Completing this study is of **Moderate** to **High** priority.

Information Kiosks – Information kiosks that can be used to inform local residents about FireWise and the actions that they can take to protect their homes from wildfire should be placed on district property at Copper Creek Estates and near the mailboxes that serve the Valentine Subdivision.

Portable Message Board – Use a portable message board whenever possible to inform local residents and visitors of high fire danger or the importance of signing up for Code Red, for example. The Fire Protection District may wish to purchase a unit of their own to use at their discretion.

District Boundary Signs – Signs should be posted on US-40 and major county roads to mark the district boundary. This would inform people living in outlying areas that they are not in the Fire Protection District.

House Numbers – The Grand County Planning and Zoning Department and the town of Hot Sulphur Springs should consider requiring house numbers within their jurisdictions so that homes can be more easily located.

Drafting Point Signs – Drafting points should be marked. The sign could be as simple as an 18 X 18-inch square sign, painted white, with **DP** painted in black. A white sign would be visible at night¹⁶.

IPad™ – An IPad™ or other similar electronic device capable of displaying maps, GPS locations of water sources, and preattack plans, for example, should be purchased and mounted in response vehicles, as determined by the fire chief.

Parshall Fire Station – Thought should be given to replacing the existing fire station in Parshall with one capable of housing first responders. Currently, there is only one firefighter who resides in the Parshall area. There should be a minimum of two and preferably three firefighters available to respond to fires. An energy-efficient, modern fire station with living quarters would provide an opportunity to meet this need.

8.6 Plan Update Process

This plan is a living document. Keep the core team alive. It will be necessary to update the plan as conditions change, new projects are added, or as projects identified in the plan are completed. The core team should meet annually in the early spring to review and update the plan to reflect these changes. Copies of the plan have been placed in 3-ring binders so that it can be easily updated in the future.

¹⁶ A list of drafting points and other water sources can be found in appendix E.

9.0 Summary and Conclusions

Building consensus will continue to be important within the core team and the communities and subdivisions in the planning area. Regular meetings must be held to make the plan available to local residents and to solicit input and support the process. The plan must be updated to reflect the changes to the various communities and subdivisions as new development takes place and initial projects are completed. Identifying and developing future projects should involve receiving input and comments from the communities and subdivisions in the planning area. The core team must work cooperatively to achieve larger goals.

The members of the core team must be proactive when seeking additional funds to complete future projects. Hazard fuel funds for some federal and state agencies have already been used to complete past projects. There will be everincreasing pressure to cutback funding for future wildland urban interface projects in light of increasing federal deficits. Creative financing will be the order of the day.

Areas that have been treated will need to receive follow-up treatment. The open nature of fuel breaks lend themselves well to the regeneration of certain tree species, grass, brush, and other fuels that could impact the ability of firefighters to manage a wildland fire. If ignored, defensible space created around dwellings and along roads can soon be lost to new plants filling the void.

Agencies, local residents, and other stakeholders must work together to proactively prepare for future wildland fires and changes in forest health. In the case of fire, the best offense is a good defense.

WILDLAND URBAN INTERFACE WATCHOUTS

The primary consideration is to first assure firefighter and public safety. It is a must to assess potential fire behavior, ingress/egress routes, nature of the threat, hazardous materials, and available water supplies before engaging in the protection of any structures. The first step in conducting a safe operation is to assess whether the firefighting operations can be conducted safely. Consider the "Wildland Urban Interface Watchouts" in completing a risk analysis for the urban interface area to be protected. Remember there are three categories of structures:

omormoor and and amod datagoned or disactarder	
Those that are not threatened.	
Those that are threatened.	
Γhose that have already been lost or are too dangerous to protect.	

Wildland Urban Interface Watchouts:

Poor access and narrow, one-way roads: A rapidly spreading fire could trap apparatus and personnel before they can turn around or move away from the flames and smoke.

Observe bridge limits: Exceeding bridge limits could lead to bridge failure with a resultant blocking of ingress/egress routes that could result in the loss of an escape route or loss of equipment.

Inadequate water supply: Without a reserve supply of water, the fire can overtake an area before the fuels can be cleared away.

Natural fuels are located 30 feet or closer to structures on level ground:

Remember structures on slopes require greater clearance. Structures are located on canyon slopes or "chimneys" on slopes of 30% or more with continuous, flashy fuels. The resulting rate of spread of any fire in this terrain can quickly extend beyond control.

Extreme fire behavior: Situations involving crowning, large flame heights and erratic fire behavior can extend in an unpredictable manner beyond the control of any number of personnel. Strong winds of 25+ MPH: Winds increase the chance of spotting over the heads of firefighters and trapping them between both fire areas. Winds also cause greater preheating of fuels in the path of a fire front.

The need to evacuate the public, livestock, pets, and/or animals: This critical activity can pull personnel from the firefighting activity and can distract attention from fire behavior at a time when the greatest alertness is needed.

Propane and aboveground fuel tanks that are next to wooden structures or close to vegetation.

Power lines and poles: What is their location in relation to the structures that are being protected? Watch for both overhead and downed power lines.

Local citizens are attempting suppression activities: Lack of knowledge in fire suppression may lead to unsafe tactics.

Airtanker retardant drops and helicopter bucket operations: Establish communications and keep fire personnel out of the drop zone.

Source: Incident Response Pocket Guide pg11.



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Appendix A

Wildland Fire Terms

WILDLAND FIRE TERMS

As Defined in the National Fire Plan (Edited)

A

Aerial Fuels: All live and dead vegetation in the forest canopy or above surface fuels, including tree branches, twigs and cones, snags, moss, and high brush.

Aerial Ignition: Ignition of fuels by dropping incendiary devices or materials from aircraft.

Agency: Any federal, state, or county government organization participating with jurisdictional responsibilities.

Anchor Point: An advantageous location, usually a barrier to fire spread, from which to start building a fire line. An anchor point is used to reduce the chance of firefighters being flanked by fire.

Aramid: The generic name for a high-strength, flame-resistant synthetic fabric used in the shirts and jeans of firefighters. Nomex, a brand name for aramid fabric, is the term commonly used by firefighters.

Aspect: Direction toward which a slope faces.

B

Backfire: A fire set along the inner edge of a fireline to consume the fuel in the path of a wildfire and/or change the direction of force of the fire's convection column.

Behave: A system of interactive computer programs for modeling fuel and fire behavior that consists of two systems: BURN and FUEL.

Blow-up: A sudden increase in fire intensity or rate of spread strong enough to prevent direct control or to upset control plans. Blow-ups are often accompanied by violent convection and may have other characteristics of a firestorm. (See Flare-up.)

Brush: A collective term that refers to stands of vegetation dominated by shrubby, woody plants, or low growing trees, usually of a type undesirable for livestock or timber management.

Brush Fire: A fire burning in vegetation that is predominantly shrubs, brush, and scrub growth.

Bucket Drops: The dropping of fire retardants or suppressants from specially designed buckets slung below a helicopter.

Buffer Zones: An area of reduced vegetation that separates wildlands from vulnerable residential or business developments. This barrier is similar to a greenbelt in that it is usually used for another purpose such as agriculture, recreation areas, parks, or golf courses.

Burn Out: Setting fire inside a control line to widen it or consume fuel between the edge of the fire and the control line.

Burning Ban: A declared ban on open air burning within a specified area, usually due to sustained high fire danger.

Burning Conditions: The state of the combined factors of the environment that affect fire behavior in a specified fuel type.

Burning Index: An estimate of the potential difficulty of fire containment as it relates to the flame length at the most rapidly spreading portion of a fire's perimeter.

Burning Period: That part of each 24-hour period when fires spread most rapidly, typically from 10:00 a.m. to sundown.

 \mathbf{C}

Campfire: As used to classify the cause of a wildland fire, a fire that was started for cooking or warming that spreads sufficiently from its source to require action by a fire control agency.

Chain: A unit of linear measurement equal to 66 feet.

Closure: Legal restriction, but not necessarily elimination of specified activities such as smoking, camping, or entry that might cause fires in a given area.

Cold Front: The leading edge of a relatively cold air mass that displaces warmer air. The heavier cold air may cause some of the warm air to be lifted. If the lifted air contains

enough moisture, the result may be cloudiness, precipitation, and thunderstorms. If both air masses are dry, no clouds may form. Following the passage of a cold front in the Northern Hemisphere, westerly or northwesterly winds of 15 to 30 or more miles per hour often continue for 12 to 24 hours.

Cold Trailing: A method of controlling a partly dead fire edge by carefully inspecting and feeling with the hand for heat to detect any fire, digging out every live spot, and trenching any live edge.

Command Staff: The command staff consists of the information officer, safety officer, and liaison officer. They report directly to the incident commander and may have assistants.

Complex: Two or more individual incidents located in the same general area, which are assigned to a single incident commander or unified command.

Contain a fire: A fuel break around the fire has been completed. This break may include natural barriers or manually and/or mechanically constructed line.

Control a fire: The complete extinguishment of a fire, including spot fires. Fireline has been strengthened so that flare-ups from within the perimeter of the fire will not break through this line.

Control Line: All built or natural fire barriers and treated fire edge used to control a fire.

Cooperating Agency: An agency supplying assistance other than direct suppression, rescue, support, or service functions to the incident control effort; e.g., Red Cross, law enforcement agency, telephone company, etc.

Creeping Fire: Fire burning with a low flame and spreading slowly.

Crew Boss: A person in supervisory charge of usually 16 to 21 firefighters and responsible for their performance, safety, and welfare.

Crown Fire (Crowning): The movement of fire through the crowns of trees or shrubs more or less independently of the surface fire.

Curing: Drying and browning of herbaceous vegetation or slash.

D

Dead Fuels: Fuels with no living tissue in which moisture content is governed almost entirely by atmospheric moisture (relative humidity and precipitation), dry-bulb temperature, and solar radiation.

Debris Burning: A fire spreading from any fire originally set for the purpose of clearing land or for rubbish, garbage, range, stubble, or meadow burning.

Defensible Space: An area either natural or manmade where material capable of causing a fire to spread has been treated, cleared, reduced, or changed to act as a barrier between an advancing wildland fire and the loss to life, property, or resources. In practice, "defensible space" is defined as an area a minimum of 30 feet around a structure that is cleared of flammable brush or vegetation.

Detection: The act or system of discovering and locating fires.

Direct Attack: Any treatment of burning fuel, such as by wetting, smothering, or chemically quenching the fire or by physically separating burning from unburned fuel.

Dispatch (Communications Center): The implementation of a command decision to move a resource or resources from one place to another.

Dispatcher (Communications Officer): A person employed who receives reports of discovery and status of fires, confirms their locations, takes action promptly to provide people and equipment likely to be needed for control in first attack, and sends them to the proper place.

Dispatch Center: A facility from which resources are directly assigned to an incident.

Division: Divisions are used to divide an incident into geographical areas of operation. Divisions are established when the number of resources exceeds the span-of-control of the operations chief. A division is located with the incident command system organization between the branch and the task force/strike team.

Dozer: Any tracked vehicle with a front-mounted blade used for exposing mineral soil.

Dozer Line: Fire line constructed by the front blade of a dozer.

Drip Torch: Hand-held device for igniting fires by dripping flaming liquid fuel on the materials to be burned; consists of a fuel fount, burner arm, and igniter. Fuel used is generally a mixture of diesel and gasoline.

Drop Zone: Target area for air tankers, helitankers, and cargo dropping.

Drought Index: A number representing net effect of evaporation, transpiration, and precipitation in producing cumulative moisture depletion in deep duff or upper soil layers.

Dry Lightning Storm: Thunderstorm in which negligible precipitation reaches the ground. Also called a dry storm.

Duff: The layer of decomposing organic materials lying below the litter layer of freshly fallen twigs, needles, leaves, and immediately above the mineral soil.

 \mathbf{E}

Energy Release Component (ERC): The computed total heat released per unit area (British thermal units per square foot) within the fire front at the head of a moving fire.

Engine: Any ground vehicle providing specified levels of pumping, water, and hose capacity.

Engine Crew: Firefighters assigned to an engine. The Fireline Handbook defines the minimum crew makeup by engine type.

Entrapment: A situation where personnel are unexpectedly caught in a fire behavior-related, life-threatening position where planned escape routes or safety zones are absent, inadequate, or compromised. An entrapment may or may not include deployment of a fire shelter for its intended purpose. These situations may or may not result in injury. They include "near misses."

Environmental Assessment (EA): EAs were authorized by the National Environmental Policy Act (NEPA) of 1969. They are concise, analytical documents prepared with public participation that determine if an environmental impact statement (EIS) is needed for a particular project or action. If an EA determines an EIS is not needed, the EA becomes the document allowing agency compliance with NEPA requirements.

Environmental Impact Statement (EIS): EISs were authorized by the National Environmental Policy Act (NEPA) of 1969. Prepared with public participation, they assist decision makers by providing information, analysis, and an array of action alternatives allowing managers to see the probable effects of decisions on the environment. Generally, EISs are written for large-scale actions or geographical areas.

Equilibrium Moisture Content: Moisture content that a fuel particle will attain if exposed for an infinite period in an environment of specified constant temperature and

humidity. When a fuel particle reaches equilibrium moisture content, net exchange of moisture between it and the environment is zero.

Escape Route: A preplanned and understood route firefighters take to move to a safety zone or other low-risk area, such as an already burned area, previously constructed safety area, a meadow that won't burn, or natural rocky area that is large enough to take refuge without being burned. When escape routes deviate from a defined physical path, they should be clearly marked (flagged).

Escaped Fire: A fire that has exceeded or is expected to exceed initial attack capabilities or prescription.

Extended Attack Incident: A wildland fire that has not been contained or controlled by initial attack forces, and for which more firefighting resources are arriving, en route, or being ordered by the initial attack incident commander.

Extreme Fire Behavior: "Extreme" implies a level of fire behavior characteristics that ordinarily precludes methods of direct control action. One of more of the following is usually involved: high rate of spread, prolific crowning and/or spotting, presence of fire whirls, and strong convection column. Predictability is difficult because such fires often exercise some degree of influence on their environment and behave erratically, sometimes dangerously.

F

Faller: A person who fells trees. Also called a sawyer or cutter.

Field Observer: Person responsible to the situation unit leader for collecting and reporting information about an incident obtained from personal observations and interviews.

Fine (**Light**) **Fuels**: Fast-drying fuels, generally with comparatively high surface area-to-volume ratios, which are less than 1/4-inch in diameter and have a timelag of one hour or less. These fuels readily ignite and are rapidly consumed by fire when dry.

Fingers of a Fire: The long narrow extensions of a fire projecting from the main body.

Fire Behavior: The manner in which a fire reacts to the influences of fuel, weather, and topography.

Fire Behavior Forecast: Prediction of probable fire behavior, usually prepared by a fire behavior officer, in support of fire suppression or prescribed burning operations.

Fire Behavior Specialist: A person responsible to the planning section chief for establishing a weather data collection system and for developing fire behavior predictions based on fire history, fuel, weather, and topography.

Fire Break: A natural or constructed barrier used to stop or check fires that may occur, or to provide a control line from which to work.

Fire Cache: A supply of fire tools and equipment assembled in planned quantities or standard units at a strategic point for exclusive use in fire suppression.

Fire Crew: An organized group of firefighters under the leadership of a crew leader or other designated official.

Fire Front: The part of a fire within which continuous flaming combustion is taking place. Unless otherwise specified the fire front is assumed to be the leading edge of the fire perimeter. In ground fires, the fire front may be mainly smoldering combustion.

Fire Intensity: A general term relating to the heat energy released by a fire.

Fire Line: A linear fire barrier that is scraped or dug to mineral soil.

Fire Load: The number and size of fires historically experienced on a specified unit over a specified period (usually one day) at a specified index of fire danger.

Fire Management Plan (FMP): A strategic plan that defines a program to manage wildland and prescribed fires, and documents the fire management program in the approved land use plan. The plan is supplemented by operational plans such as preparedness plans, preplanned dispatch plans, prescribed fire plans, and prevention plans.

Fire Perimeter: The entire outer edge or boundary of a fire.

Fire Season: 1) Period(s) of the year during which wildland fires are likely to occur, spread, and affect resource values sufficient to warrant organized fire management activities. 2) A legally enacted time during which burning activities is regulated by state or local authority.

Fire Shelter: An aluminized tent offering protection by means of reflecting radiant heat and providing a volume of breathable air in a fire entrapment situation. Fire shelters should only be used in life-threatening situations, as a last resort.

Fire Shelter Deployment: The removing of a fire shelter from its case and using it as protection against fire.

Fire Storm: Violent convection caused by a large continuous area of intense fire. Often characterized by destructively violent surface indrafts, near and beyond the perimeter, and sometimes by tornado-like whirls.

Fire Triangle: Instructional aid in which the sides of a triangle are used to represent the three factors (oxygen, heat, fuel) necessary for combustion and flame production; removal of any of the three factors causes flame production to cease.

Fire Use Module (Prescribed Fire Module): A team of skilled and mobile personnel dedicated primarily to prescribed fire management. These are national and interagency resources, available throughout the prescribed fire season, that can ignite, hold, and monitor prescribed fires.

Fire Weather: Weather conditions that influence fire ignition, behavior, and suppression.

Fire Weather Watch: A term used by fire weather forecasters to notify using agencies, usually 24 to 72 hours ahead of the event, that current and developing meteorological conditions may evolve into dangerous fire weather.

Fire Whirl: Spinning vortex column of ascending hot air and gases rising from a fire and carrying aloft smoke, debris, and flame. Fire whirls range in size from less than one foot to more than 500 feet in diameter. Large fire whirls have the intensity of a small tornado.

Firefighting Resources: All people and major items of equipment that can or potentially could be assigned to fires.

Flame Height: The average maximum vertical extension of flames at the leading edge of the fire front. Occasional flashes that rise above the general level of flames are not considered. This distance is less than the flame length if flames are tilted due to wind or slope.

Flame Length: The distance between the flame tip and the midpoint of the flame depth at the base of the flame (generally the ground surface); an indicator of fire intensity.

Flaming Front: The zone of a moving fire where the combustion is primarily flaming. Behind this flaming zone combustion is primarily glowing. Light fuels typically have a shallow flaming front, whereas heavy fuels have a deeper front. Also called fire front.

Flanks of a Fire: The parts of a fire's perimeter that are roughly parallel to the main direction of spread.

Flare-up: Any sudden acceleration of fire spread or intensification of a fire. Unlike a blow-up, a flare-up lasts a relatively short time and does not radically change control plans.

Flash Fuels: Fuels such as grass, leaves, draped pine needles, fern, tree moss and some kinds of slash that ignite readily and are consumed rapidly when dry. Also called fine fuels.

Forb: A plant with a soft, rather than permanent woody stem, that is not a grass or grass-like plant.

Fuel: Combustible material. Includes vegetation, such as grass, leaves, ground litter, plants, shrubs and trees that feed a fire. (See Surface Fuels.)

Fuel Bed: An array of fuels usually constructed with specific loading, depth and particle size to meet experimental requirements; also, commonly used to describe the fuel composition in natural settings.

Fuel Loading: The amount of fuel present expressed quantitatively in terms of weight of fuel per unit area.

Fuel Model: Simulated fuel complex (or combination of vegetation types) for which all fuel descriptors required for the solution of a mathematical rate of spread model have been specified.

Fuel Moisture (Fuel Moisture Content): The quantity of moisture in fuel expressed as a percentage of the weight when thoroughly dried at 212 degrees Fahrenheit.

Fuel Reduction: Manipulation, including combustion, or removal of fuels to reduce the likelihood of ignition and/or to lessen potential damage and resistance to control.

Fuel Type: An identifiable association of fuel elements of a distinctive plant species, form, size, arrangement, or other characteristics that will cause a predictable rate of fire spread or difficulty of control under specified weather conditions.

 \mathbf{G}

General Staff: The group of incident management personnel reporting to the incident commander. They may each have a deputy, as needed. Staff consists of operations section chief, planning section chief, logistics section chief, and finance/administration section chief.

Geographic Area: A political boundary designated by the wildland fire protection agencies, where these agencies work together in coordination and effective utilization

Ground Fuel: All combustible materials below the surface litter, including duff, tree or shrub roots, punchy wood, peat, and sawdust that normally support a glowing combustion without flame.

H

Haines Index: An atmospheric index used to indicate the potential for wildfire growth by measuring the stability and dryness of the air over a fire.

Hand Line: A fireline built with hand tools.

Hazard Reduction: Any treatment of a hazard that reduces the threat of ignition and fire intensity or rate of spread.

Head of a Fire: The side of the fire having the fastest rate of spread.

Heavy Fuels: Fuels of large diameter such as snags, logs, and large limb wood that ignite and are consumed more slowly than flash fuels.

Helibase: The main location within the general incident area for parking, fueling, maintaining, and loading helicopters. The helibase is usually located at or near the incident base.

Helispot: A temporary landing spot for helicopters.

Helitack: The use of helicopters to transport crews, equipment, and fire retardants or suppressants to the fire line during the initial stages of a fire.

Helitack Crew: A group of firefighters trained in the technical and logistical use of helicopters for fire suppression.

Holding Actions: Planned actions required to achieve wildland prescribed fire management objectives. These actions have specific implementation timeframes for fire use actions but can have less sensitive implementation demands for suppression actions.

Holding Resources: Firefighting personnel and equipment assigned to do all required fire suppression work following fireline construction but generally not including extensive mop-up.

Hose Lay: Arrangement of connected lengths of fire hose and accessories on the ground, beginning at the first pumping unit and ending at the point of water delivery.

Hotshot Crew: A highly trained fire crew used mainly to build fireline by hand.

Hotspot: A particular active part of a fire.

Hotspotting: Reducing or stopping the spread of fire at points of particularly rapid rate of spread or special threat, generally the first step in prompt control, with emphasis on first priorities.

Ι

Incident: A human-caused or natural occurrence, such as wildland fire, that requires emergency service action to prevent or reduce the loss of life or damage to property or natural resources.

Incident Action Plan (IAP): Contains objectives reflecting the overall incident strategy and specific tactical actions and supporting information for the next operational period. The plan may be oral or written. When written, the plan may have a number of attachments, including: incident objectives, organization assignment list, division assignment, incident radio communication plan, medical plan, traffic plan, safety plan, and incident map.

Incident Command Post (ICP): Location at which primary command functions are executed. The ICP may be co-located with the incident base or other incident facilities.

Incident Command System (ICS): The combination of facilities, equipment, personnel, procedure and communications operating within a common organizational structure, with responsibility for the management of assigned resources to effectively accomplish stated objectives pertaining to an incident.

Incident Commander: Individual responsible for the management of all incident operations at the incident site.

Incident Management Team: The incident commander and appropriate general or command staff personnel assigned to manage an incident.

Incident Objectives: Statements of guidance and direction necessary for selection of appropriate strategy (ies), and the tactical direction of resources. Incident objectives are based on realistic expectations of what can be accomplished when all allocated resources have been effectively deployed.

Infrared Detection: The use of heat sensing equipment, known as infrared scanners, for detection of heat sources that are not visually detectable by the normal surveillance methods of either ground or air patrols.

Initial Attack: The actions taken by the first resources to arrive at a wildfire to protect lives and property, and prevent further extension of the fire.

J

Job Hazard Analysis: This analysis of a project is completed by staff to identify hazards to employees and the public. It identifies hazards, corrective actions, and the required safety equipment to ensure public and employee safety.

K

Keech Byram Drought Index (KBDI): Commonly used drought index adapted for fire management applications, with a numerical range from 0 (no moisture deficiency) to 800 (maximum drought).

Knock Down: To reduce the flame or heat on the more vigorously burning parts of a fire edge.

L

Ladder Fuels: Fuels that provide vertical continuity between strata, thereby allowing fire to carry from surface fuels into the crowns of trees or shrubs with relative ease. They help initiate and assure the continuation of crowning.

Large Fire: 1) For statistical purposes, a fire burning more than a specified area of land e.g., 300 acres. 2) A fire burning with a size and intensity such that its behavior is determined by interaction between its own convection column and weather conditions above the surface.

Light (Fine) Fuels: Fast-drying fuels, generally with comparatively high surface area-to-volume ratios, which are less than 1/4-inch in diameter and have a timelag of one hour or less. These fuels readily ignite and are rapidly consumed by fire when dry.

Lightning Activity Level (LAL): A number, on a scale of 1 to 6, which reflects frequency and character of cloud-to-ground lightning. The scale is exponential, based on powers of 2 (i.e., LAL 3 indicates twice the lightning of LAL 2).

Line Scout: A firefighter who determines the location of a fire line.

Litter: Top layer of the forest, scrubland, or grassland floor, directly above the fermentation layer, composed of loose debris of dead sticks, branches, twigs, and recently fallen leaves or needles, little altered in structure by decomposition.

Live Fuels: Living plants, such as trees, grasses, and shrubs, in which the seasonal moisture content cycle is controlled largely by internal physiological mechanisms, rather than by external weather influences.

\mathbf{M}

Mineral Soil: Soil layers below the predominantly organic horizons; soil with little combustible material.

Mobilization: The process and procedures used by all organizations, federal, state and local for activating, assembling, and transporting all resources that have been requested to respond to or support an incident.

Modular Airborne Firefighting System (MAFFS): A manufactured unit consisting of five interconnecting tanks, a control pallet, and a nozzle pallet, with a capacity of 3,000 gallons, designed to be rapidly mounted inside an unmodified C-130 (Hercules) cargo aircraft for use in dropping retardant on wildland fires.

Mop-up: To make a fire safe or reduce residual smoke after the fire has been controlled by extinguishing or removing burning material along or near the control line, felling snags, or moving logs so they won't roll downhill.

Multi-Agency Coordination (MAC): A generalized term which describes the functions and activities of representatives of involved agencies and/or jurisdictions who come together to make decisions regarding the prioritizing of incidents, and the sharing and use of critical resources. The MAC organization is not a part of the on-scene ICS and is not involved in developing incident strategy or tactics.

Mutual Aid Agreement: Written agreement between agencies and/or jurisdictions in which they agree to assist one another upon request, by furnishing personnel and equipment.

N

National Environmental Policy Act (NEPA): NEPA is the basic national law for protection of the environment, passed by Congress in 1969. It sets policy and procedures for environmental protection, and authorizes environmental impact statements and environmental assessments to be used as analytical tools to help federal managers make decisions.

National Fire Danger Rating System (NFDRS): A uniform fire danger rating system that focuses on the environmental factors that control the moisture content of fuels.

National Wildfire Coordinating Group: A group formed under the direction of the Secretaries of Agriculture and the Interior and comprised of representatives of the U.S. Forest Service, Bureau of Land Management, Bureau of Indian Affairs, National Park Service, U.S. Fish and Wildlife Service, and Association of State Foresters. The group's purpose is to facilitate coordination and effectiveness of wildland fire activities and provide a forum to discuss, recommend action, or resolve issues and problems of substantive nature. NWCG is the certifying body for all courses in the National Fire Curriculum.

Nomex ®: Trade name for a fire resistant synthetic material used in the manufacturing of flight suits, pants, and shirts used by firefighters (see Aramid).

Normal Fire Season: 1) A season when weather, fire danger, and number and distribution of fires are about average. 2) Period of the year that normally comprises the fire season.

O

Operations Branch Director: Person under the direction of the operations section chief who is responsible for implementing that portion of the incident action plan appropriate to the branch.

Operational Period: The period of time scheduled for execution of a given set of tactical actions as specified in the incident action plan. Operational periods can be of various lengths, although usually not more than 24 hours.

Overhead: People assigned to supervisory positions, including incident commanders, command staff, general staff, directors, supervisors, and unit leaders.

P

Pack Test: Used to determine the aerobic capacity of fire suppression and support personnel, and assign physical fitness scores. The test consists of walking a specified distance, with or without a weighted pack, in a predetermined period of time, with altitude corrections.

Peak Fire Season: That period of the fire season during which fires are expected to ignite most readily, to burn with greater than average intensity, and to create damages at an unacceptable level.

Personnel Protective Equipment (PPE): All firefighting personnel must be equipped with proper equipment and clothing in order to mitigate the risk of injury from, or exposure to, hazardous conditions encountered while working. PPE includes, but is not limited to: 8-inch high-laced leather boots with lug soles, fire shelter, hard hat with chin strap, goggles, ear plugs, aramid shirts and trousers, leather gloves, and individual first aid kits.

Preparedness: Condition or degree of being ready to cope with a potential fire situation

Prescribed Fire: Any fire ignited by management actions under certain, predetermined conditions to meet specific objectives related to hazardous fuels or habitat improvement. A written, approved prescribed fire plan must exist, and NEPA requirements must be met, prior to ignition.

Prescribed Fire Plan (Burn Plan): This document provides the prescribed burn boss information needed to implement an individual prescribed fire project.

Prescription: Measurable criteria that define conditions under which a prescribed fire may be ignited, guide selection of appropriate management responses, and indicate other required actions. Prescription criteria may include safety, economic, public health, and environmental, geographic, administrative, social, or legal considerations.

Prevention: Activities directed at reducing the incidence of fires, including public education, law enforcement, personal contact, and reduction of fuel hazards.

Project Fire: A fire of such size or complexity that a large organization and prolonged activity is required to suppress it.

Pulaski: A combination chopping and trenching tool, which combines a single-bitted axe-blade with a narrow adze-like trenching blade fitted to a straight handle. Useful for grubbing or trenching in duff and matted roots. Well-balanced for chopping.

R

Radiant Burn: A burn received from a radiant heat source.

Radiant Heat Flux: The amount of heat flowing through a given area in a given time, usually expressed as calories/square centimeter/second.

Rappelling: Technique of landing specifically trained firefighters from hovering helicopters; involves sliding down ropes with the aid of friction-producing devices.

Rate of Spread: The relative activity of a fire in extending its horizontal dimensions. It is expressed as a rate of increase of the total perimeter of the fire, as rate of forward spread of the fire front, or as rate of increase in area, depending on the intended use of the information. Usually it is expressed in chains or acres per hour for a specific period in the fire's history.

Reburn: The burning of an area that has been previously burned but that contains flammable fuel that ignites when burning conditions are more favorable; an area that has reburned.

Red Card: Fire qualification card issued to fire rated persons showing their training needs and their qualifications to fill specified fire suppression and support positions in a large fire suppression or incident organization.

Red Flag Warning: Term used by fire weather forecasters to alert forecast users to an ongoing or imminent critical fire weather pattern.

Rehabilitation: The activities necessary to repair damage or disturbance caused by wildland fires or the fire suppression activity.

Relative Humidity (RH): The ratio of the amount of moisture in the air, to the maximum amount of moisture that air would contain if it were saturated. The ratio of the actual vapor pressure to the saturated vapor pressure.

Remote Automatic Weather Station (RAWS): An apparatus that automatically acquires, processes, and stores local weather data for later transmission to the GOES Satellite, from which the data is re-transmitted to an earth-receiving station for use in the National Fire Danger Rating System.

Resources: 1) Personnel, equipment, services, and supplies available, or potentially available, for assignment to incidents. 2) The natural resources of an area, such as timber, crass, watershed values, recreation values, and wildlife habitat.

Resource Management Plan (RMP): A document prepared by field office staff with public participation, and approved by field office managers that provides general guidance and direction for land management activities at a field office. The RMP identifies the need for fire in a particular area and for a specific benefit.

Resource Order: An order placed for firefighting or support resources.

Retardant: A substance or chemical agent that reduces the flammability of combustibles.

Run (of a fire): The rapid advance of the head of a fire with a marked change in fire line intensity and rate of spread from that noted before and after the advance.

Running: A rapidly spreading surface fire with a well-defined head.

S

Safety Zone: An area cleared of flammable materials used for escape in the event the line is outflanked, or in case a spot fire causes fuels outside the control line to render the line unsafe. In firing operations, crews progress so as to maintain a safety zone close at hand allowing the fuels inside the control line to be consumed before going ahead. Safety zones may also be constructed as integral parts of fuel breaks; they are greatly enlarged areas, which can be used with relative safety by firefighters and their equipment in the event of a blowup in the vicinity.

Scratch Line: An unfinished preliminary fire line hastily established or built as an emergency measure to check the spread of fire.

Severity Funding: Funds provided to increase wildland fire suppression response capability necessitated by abnormal weather patterns, extended drought, or other events causing abnormal increase in the fire potential and/or danger.

Single Resource: An individual, a piece of equipment and its personnel complement, or a crew or team of individuals with an identified work supervisor that can be used on an incident.

Size-up: To evaluate a fire to determine a course of action for fire suppression.

Slash: Debris left after logging, pruning, thinning or brush cutting; includes logs, chips, bark, branches, stumps, and broken understory trees or brush.

Sling Load: Any cargo carried beneath a helicopter and attached by a lead line and swivel.

Slop-over: A fire edge that crosses a control line or natural barrier intended to contain the fire.

Smokejumper: A firefighter who travels to fires by aircraft and parachute.

Smoke Management: Application of fire intensities and meteorological processes to minimize degradation of air quality during prescribed fires.

Smoldering Fire: A fire burning without flame and barely spreading.

Snag: A standing dead tree or part of a dead tree from which at least the smaller branches have fallen.

Spark Arrester: A device installed in a chimney, flue, or exhaust pipe to stop the emission of sarks and burning fragments.

Spot Fire: A fire ignited outside the perimeter of the main fire by flying sparks or embers.

Spot Weather Forecast: A special forecast issued to fit the time, topography, and weather of each specific fire. These forecasts are issued upon request of the user agency and are more detailed, timely, and specific than zone forecasts.

Spotter: In smokejumping, the person responsible for selecting drop targets and supervising all aspects of dropping smokejumpers.

Spotting: Behavior of a fire producing sparks or embers that are carried by the wind and start new fires beyond the zone of direct ignition by the main fire.

Staging Area: Locations set up at an incident where resources can be placed while awaiting a tactical assignment on a three-minute available basis. Staging areas are managed by the operations section.

Strategy: The science and art of command as applied to the overall planning and conduct of an incident.

Strike Team: Specified combinations of the same kind and type of resources, with common communications, and a leader.

Structure Fire: Fire originating in and burning any part or all of any building, shelter, or other structure.

Suppressant: An agent, such as water or foam, used to extinguish the flaming and glowing phases of combustion when direction applied to burning fuels.

Suppression: All the work of extinguishing or containing a fire, beginning with its discovery.

Surface Fuels: Loose surface litter on the soil surface, normally consisting of fallen leaves or needles, twigs, bark, cones, and small branches that have not yet decayed enough to lose their identity; also grasses, forbs, low and medium shrubs, tree seedlings, heavier branchwood, downed logs, and stumps interspersed with or partially replacing the litter.

Swamper: (1) A worker who assists fallers and/or sawyers by clearing away brush, limbs and small trees. Carries fuel, oil, and tools, and watches for dangerous situations. (2) A worker on a dozer crew who pulls winch line, helps maintain equipment, etc., to speed suppression work on a fire.

 \mathbf{T}

Tactics: Deploying and directing resources on an incident to accomplish the objectives designated by strategy.

Temporary Flight Restrictions (TFR): A restriction requested by an agency and put into effect by the Federal Aviation Administration in the vicinity of an incident, which restricts the operation of nonessential aircraft in the airspace around that incident.

Terra Torch ®: Device for throwing a stream of flaming liquid, used to facilitate rapid ignition during burn out operations on a wildland fire or during a prescribed fire operation.

Test Fire: A small fire ignited within the planned burn unit to determine the characteristic of the prescribed fire, such as fire behavior, detection performance, and control measures.

Timelag: Time needed under specified conditions for a fuel particle to lose about 63 percent of the difference between its initial moisture content and its equilibrium moisture content. If conditions remain unchanged, a fuel will reach 95 percent of its equilibrium moisture content after four timelag periods.

Torching: The ignition and flare-up of a tree or small group of trees, usually from bottom to top.

Two-way Radio: Radio equipment with transmitters in mobile units on the same frequency as the base station, permitting conversation in two directions using the same frequency in turn.

Type: The capability of a firefighting resource in comparison to another type. Type 1 usually means a greater capability due to power, size, or capacity.

U

Uncontrolled Fire: Any fire that threatens to destroy life, property, or natural resources,

Underburn: A fire that consumes surface fuels but not trees or shrubs. (See Surface Fuels.)

V

Vectors: Directions of fire spread as related to rate of spread calculations (in degrees from upslope).

Volunteer Fire Department (VFD): A fire department of which some or all members are unpaid.

 \mathbf{W}

Water Tender: A ground vehicle capable of transporting specified quantities of water.

Weather Information and Management System (WIMS): An interactive computer system designed to accommodate the weather information needs of all federal and state natural resource management agencies. Provides timely access to weather forecasts, current and historical weather data, the National Fire Danger Rating System (NFDRS), and the National Interagency Fire Management Integrated Database (NIFMID).

Wet Line: A line of water, or water and chemical retardant, sprayed along the ground, that serves as a temporary control line from which to ignite or stop a low-intensity fire.

Wildland Fire: Any nonstructure fire, other than prescribed fire, that occurs in the wildland.

Wildland Fire Implementation Plan (WFIP): A progressively developed assessment and operational management plan that documents the analysis and selection of strategies and describes the appropriate management response for a wildland fire being managed for resource benefits.

Wildland Fire Situation Analysis (WFSA): A decision-making process that evaluates alternative suppression strategies against selected environmental, social, political, and economic criteria. Provides a record of decisions.

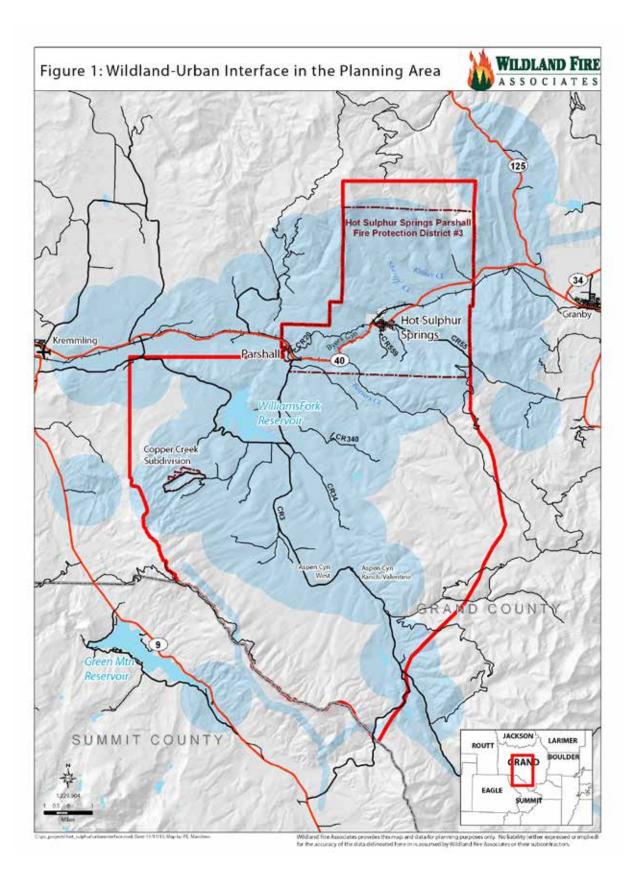
Wildland Fire Use: The management of naturally ignited wildland fires to accomplish specific prestated resource management objectives in predefined geographic areas outlined in fire management plans.

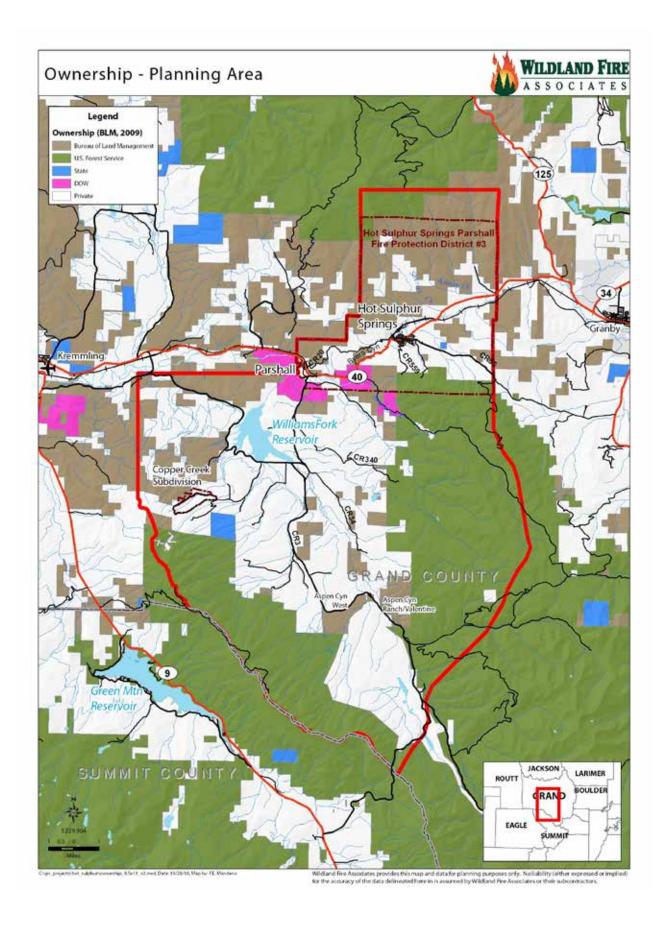
Wildland Urban Interface: The line, area or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels.

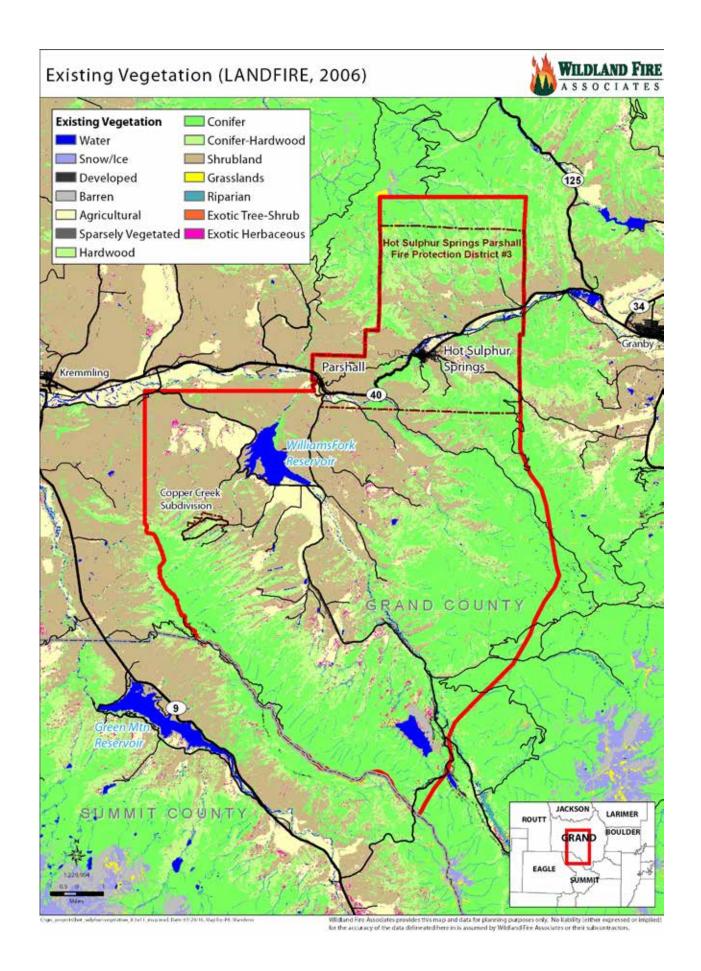
Wind Vectors: Wind directions used to calculate fire behavior.

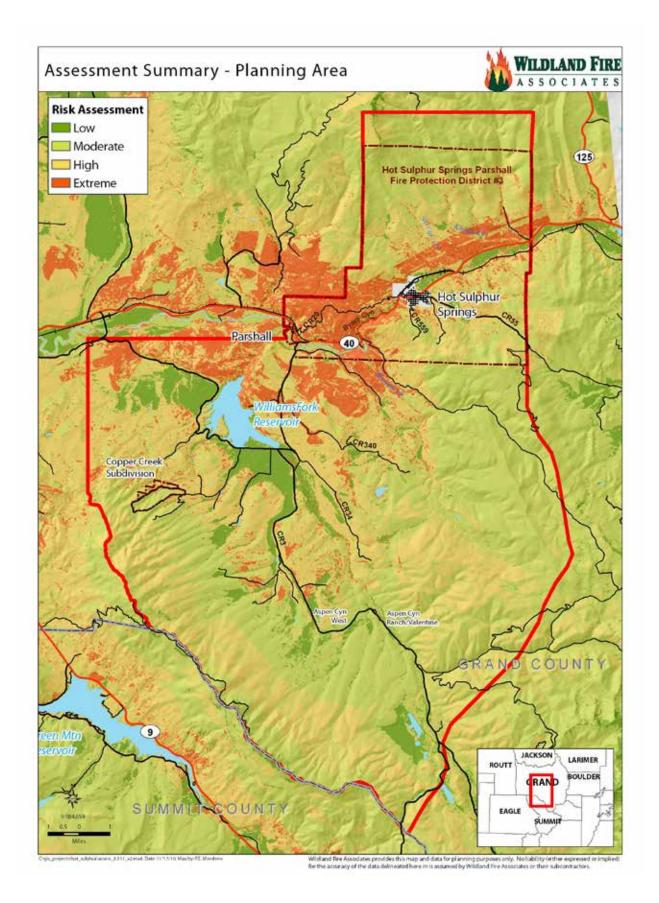
Appendix B

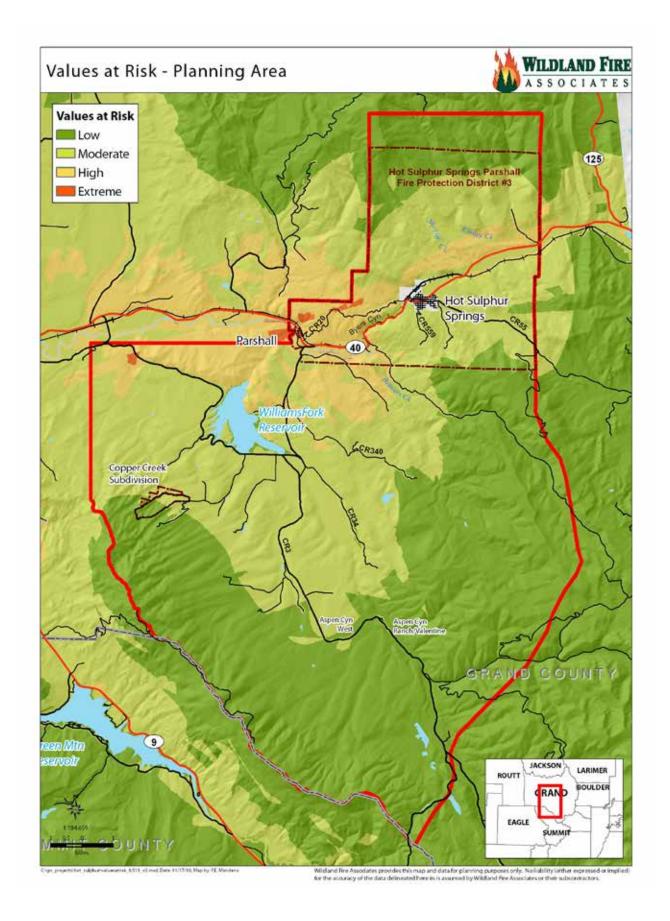
Maps

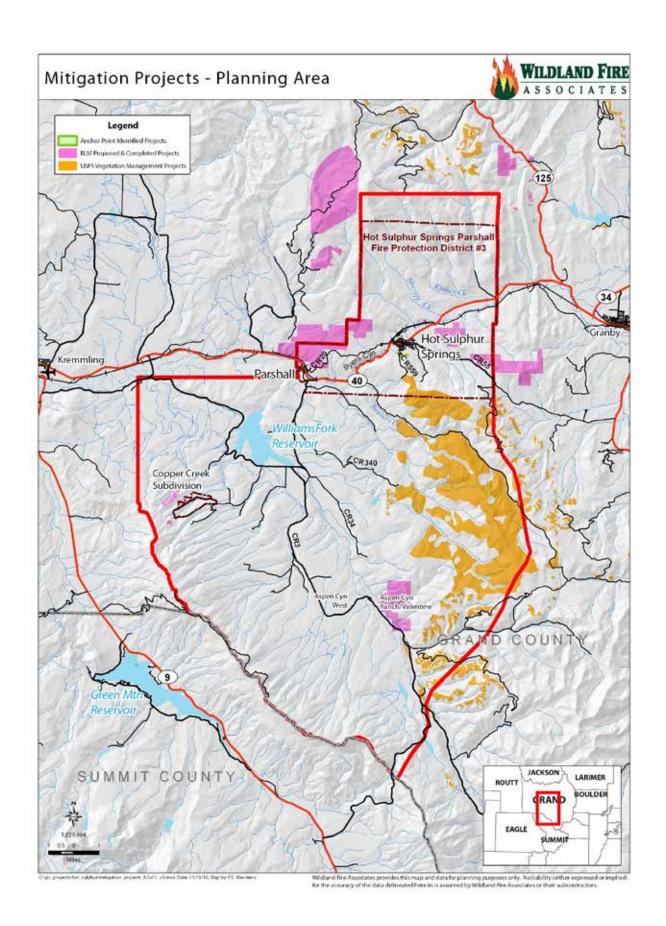












Appendix C

Evacuation Plans

Grand County EMS (2006), Grand County CWPP, Evacuation Plan, Page 22.

Evacuation is an important component of this CWPP. One of the most commonly asked questions from the public concerns evacuation plans or strategies. The CWPP recognizes safe and timely evacuation as a top priority in citizen protection. Citizen protection is the capability to plan for and execute the safe and effective evacuation and sheltering of an at risk population to an area of safe refuge. The desired outcome is safe refuge and providing for essential services and allowing for citizen re-entry when appropriate. The key components for successful evacuation include law enforcement, firefighters, Grand County Communications Dispatch, Red Cross, local media, pre-determined refuge/shelter sites, and citizen cooperation. Any ordered evacuation will be under the direction of the Incident Command System and the Incident Commander.

In the event that a wildfire requires evacuation of a certain geographical area the following steps will be implemented upon direction from the Incident Commander:

- 1. Red Cross will be notified and mobilized.
- 2. Pre-determined sites will be activated. (example: West Grand or East Grand School Facilities)
- 3. Local and State Law Enforcement alerted with coordination coming from the Grand County Sheriffs Office. If needed via Mutual Aid Agreements, other law enforcement entities will respond. (Example: Colorado Division of Wildlife, United States Forest Service, National Park Service and other adjacent County law enforcement.
- Grand County Communications Dispatch will activate the "Reverse 911 System" for the affected geographic area. The "System" will communicate to land lines with a customized informational message with evacuation routes and refuge/shelter site(s) and will operate with a (3) message process;
 - **1. READY** = Identify and decide what to evacuate with. (Example: important papers, family pictures, pets etc.).
 - 2. **SET** = Pack and load vehicle.
 - **3. GO** = Evacuate.
- 5. Red Cross will coordinate citizen accountability when possible.
- 6. At the discretion of the Incident Commander, citizen re-entry allowed when appropriate and safe.

In the event of threatening wildland fire, it is important to recognize that it is highly unlikely a county wide evacuation would ever become necessary. The more likely scenario would be the evacuation only of certain populated areas threatened by wildland fire.

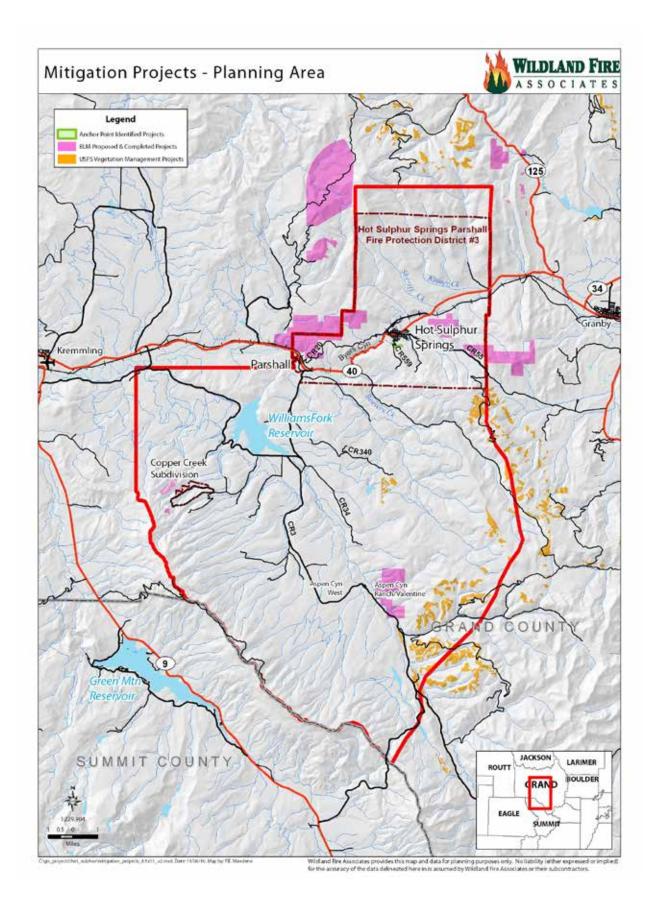
Appendix D

Project Descriptions

Table 1: Listing of Current and Proposed Projects – Planning Area

rable in Electing of Carrent and Frepocea Frequency						
Acres	Start Date	Responsible Party				
12	2010	Anchor Point				
N/A	2010	Gr. Co. Road & Bridge				
5,000	2011	USDA FS				
		Sulphur Ranger District,				
		Arapaho National Forest				
175	2009	BLM				
200	2011	BLM				
153	2011	BLM/Routt National				
		Forest				
	Acres 12 N/A 5,000 175 200	Acres Start Date 12 2010 N/A 2010 5,000 2011 175 2009 200 2011				

Updated: October 11, 2010



Anchor Point Project South of Hot Sulphur Springs (Edited)

Purpose

Project objectives are:

- ▼ Reduce wildfire hazards within the project area and to adjacent communities.
- **▼** Remove trees previously killed by the mountain pine beetle.
- ▼ Enhance ingress and egress access for homeowners and fire apparatus.
- ✔ Promote regeneration within cut areas of conifer species and aspen.
- Create or retain local jobs.

General Description of Work

Contract crews will utilize salvage clearcuts and low thinning to target trees for removal. Residual trees will be subject to the specifications in **Sections 1.** Extra effort will be made to avoid damage to any residual trees. Logs will be skidded to approved landings, and then removed for utilization. See **Section 3** below for utilization requirements. All non-utilized material will be subject to the slash requirements found in **Section 4**. All work will be monitored and approved by the Contract Administrator.

Unit Description

Location and description: The Hot Sulphur Springs fuels reduction project is located south of the town of Hot Sulphur Springs, CO (see attached location map). The Project area is located on private property divided between three landowners. The project area is divided into two units, both of which have been flagged in pink flagging. The total size for both units is 12 acres.

Legal Description: 34.50 AC SW4NW4 11 1N 78 TOURS, WASHINGTON & ARGENTINE; 24.59AC+/- SE4NW4 SEC 11, T1N, R78W LESS CAMP TOURS, WASHINGTON & ARGENTINE; LOTS 22 - 30, 38, CAMP WASHINGTON, BLOCK 10, LOTS 10 - 35, CAMP ARGENTINE; CAMP WASHINGTON/TOURS/ARGENTINE SUBDIVISION LOT 8-9 CAMP ARGENTINE. Township 1N, Range 78W, Section 11.

Access: Access for this project is via County Road 559, south out of Hot Sulphur Springs. Both units are accessed off of the county road. Where needed, landings (size and location) will be approved by the Contract Administrator. Where applicable, log loading off adjacent roads will be

utilized only if approved by the Contract Administrator. All roads are subject to specifications outlined in the **Road**

Construction/Rehabilitation Standards Section

Prescription

1. Harvest Units: All live lodgepole pine trees greater than 20' in height will be cut. All live aspen and live conifer species other than lodgepole pine will be retained. All dead trees regardless of size or species will be cut. All live lodgepole trees, regardless of size, within 20 feet of the roadway will be cut. Within treatment areas, an emphasis will be placed on retaining healthy regeneration (less than 20' in height) in pockets of conifer species where possible. Contract crews will design activities to minimize impact to retained trees.



Grand County Road and Bridge Department Mitigation Program

The Hazard Tree Removal Project along the Grand County Road Right-of-Way in the eastern half of the county has been completed. The total project cost was \$413,000. Natural Resources has received \$257,000 in tree removal grants from the state and Grand County applied for and received additional grant funding for 2010 to complete the remaining areas in west Grand County the fall of 2010. The funding was received and they resumed the program.

The table below contains a listing of the roads in or near the planning area to be treated and other dada regarding the program.

Grand County Road Department Mitigation Program

orania county read population in ingular region.						
CR	TREES	MILEAGE	DENSITY	COMMENTS		
37/372	241	4.0	60	DD		
34	174	4.0	44	All trees from mm 3.2 to 4.0		
315	18	0.1	180	Fr end of winter maintenance to cattle guard		
30	603	5.8	104	DD		
3	229	7.0	33	From mm 15 to top of Ute Pass; mileage is est.		
20	873	1.0	873	DD		

Total 2138 21.9

Appendix F

Fire Suppression Resources

Mutual aid zones have been established for Grand County for initial attack purposes only. The zones are countywide for all agencies except the NPS, which is limited to one mile either side of the boundary of Rocky Mountain National Park. The Mutual Aid period has been defined as not to exceed 24 hours and will end at midnight of the first burn period when the Incident Commander determines that the fire cannot be controlled within 24 hours of the original ignition time.

Grand County Dispatch will act as dispatch for county and fire protection districts initial attack response.

Fort Collins Interagency Dispatch Center is responsible for dispatching and coordination of Rocky Mountain National Park and Arapaho National Forest resources.

Craig Interagency Dispatch Center is responsible for dispatching and coordination of all other resources within Grand County, beyond the county sheriff's initial attack response.

The resource list for Hot Sulphur Springs – Parshall Fire Protection District and the closest available resources to their fire protection district are outlined below.

Hot Sulphur Springs-Parshall Fire Protection District

```
1-1000 gal. Type 4 Engine 288 (CSFS)
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1-1000 gal. Type 1 All Wheel Drive Engine 287

1-3000 gal. Type 1 Water Tender 286

Qualified and Current Firefighters: 19 firefighters/15 Red Card Holders

Granby Fire Department

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1-1000 gal. Type 3 Engine 321
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1- 250 gal. Type 6 Engine 341

Qualified and Current Firefighters: 45 Firefighters/30 Red Card Holders

Grand County EMS

6-4X4 Ambulances 1-4X4 Medic Rescue Truck

Kremmling Fire Department

```
1-1000 gal. Type 3 Engine w/foam 415 (CSFS)
```

1- 200 gal. Type 6 Engine w/foam 413

1-2500 gal. Type 3 Engine w/foam 414

Qualified and Current Firefighters: 20 Firefighters/12 Red Card Holders

Northwest Colorado Fire Management Unit Craig (BLM)

- 1-20 person Type 1 Crew, Craig Hot Shots
- 1- 750 gal. Type 4 Engine, 5 person crew, Engine 419
- 1- 200 gal. Type 6 Engine, 3 person crew, Engine 611
- 1- 200 gal. Type 6 Engine, 3 person crew, Engine 612
- 1-3000 gal. Type 2 Water Tender 1

USDA Forest Service, Sulphur District

- 1 300 gal. Type 6 engine 681
- 1- 50 gal. Patrol Unit P78
- 1-Pacific Mark III pump kit Shadow Mountain Village Fire Cache

Qualified and Current Firefighters:

Last Updated: November 15, 2010

Appendix G

Mountain Pine Beetle

According to Colorado State University researchers, during a dry season when needles, branches, and down wood are dry enough to catch fire, fire behavior in mountain pine beetle-impacted lodgepole pine forests is likely to progress as follows:

Red Needle Stage

Within 8 to 10 months after a successful beetle attack, pine needles, which contain flammable chemicals, dry out and turn red to reddish brown. The needles can remain on trees for 3 to 5 years. With these dry fuels, if wind, low humidity, or high temperatures exist, relatively benign ground fires could transition into independent crown fires (fires in tops of trees).

Gray Tree Stage

Once the dry needles fall off the trees, it is hard for trees to ignite. Fire behavior is expected to be much more subdued and predictable for this period of time, and the stand will not sustain a crown fire. The increase in available large fuels could result in slower-moving but potentially more intense fires that are hard to control. The number of standing dead trees (snags) greatly increases during this stage, creating a hazard for firefighters.

Down-and-Dead Stage

As trees weaken and fall down, logs and large branches accumulate on the ground. These heavy fuels increase the risk of hot surface fires that are hard to control. The heavy fuels likely will be in contact with lighter, flashy fuels like grasses, flowers, and seedling trees that grow more vigorously as a result of the added sunlight and moisture available in dead stands. The combined increase in surface temperature and decrease in fuel moisture may also increase the probability of both human and natural fire ignitions. Wildfires can be intense, long, and difficult to suppress and may cause severe soil damage. Falling trees and large fuels on the ground threaten firefighter safety. These fuels also create special challenges for fireline construction and firefighter access.

As homeowners, landowners, and land managers remove trees that were killed by the mountain pine beetle, they are opening the once-shaded forest floor to colonization by other plant species, including brush, grass, other species of evergreens, aspen, and invasive species. In the early phases as the site is colonized by new species, the new plants can be very flammable, especially during certain times of the year. For example, grasses, which are often the first to colonize an area, are especially flammable early in the spring prior to green up and in the fall after they cure. Under the right set of circumstances - high winds,

low humidity, and steep slopes – a fire in fine fuels, such as grass, can spread very rapidly.

Kaufmann, et al. (2008) believe that soils are not disturbed and protective ground cover is not reduced when mountain pine beetles kill lodgepole pine trees. If anything, understory plants may grow more vigorously in the increased light and with the higher available soil moisture and nutrients. Where tree mortality is high, annual streamflow may increase and the timing of water delivery may be changed because of reduced canopy interception of precipitation and reduced water uptake by the trees.

Soils in an area impacted by a high-intensity wildfire could become subject to heavy erosion as demonstrated by the aftermath of the 1996 Buffalo Creek Fire and the more recent Hayman Fire.