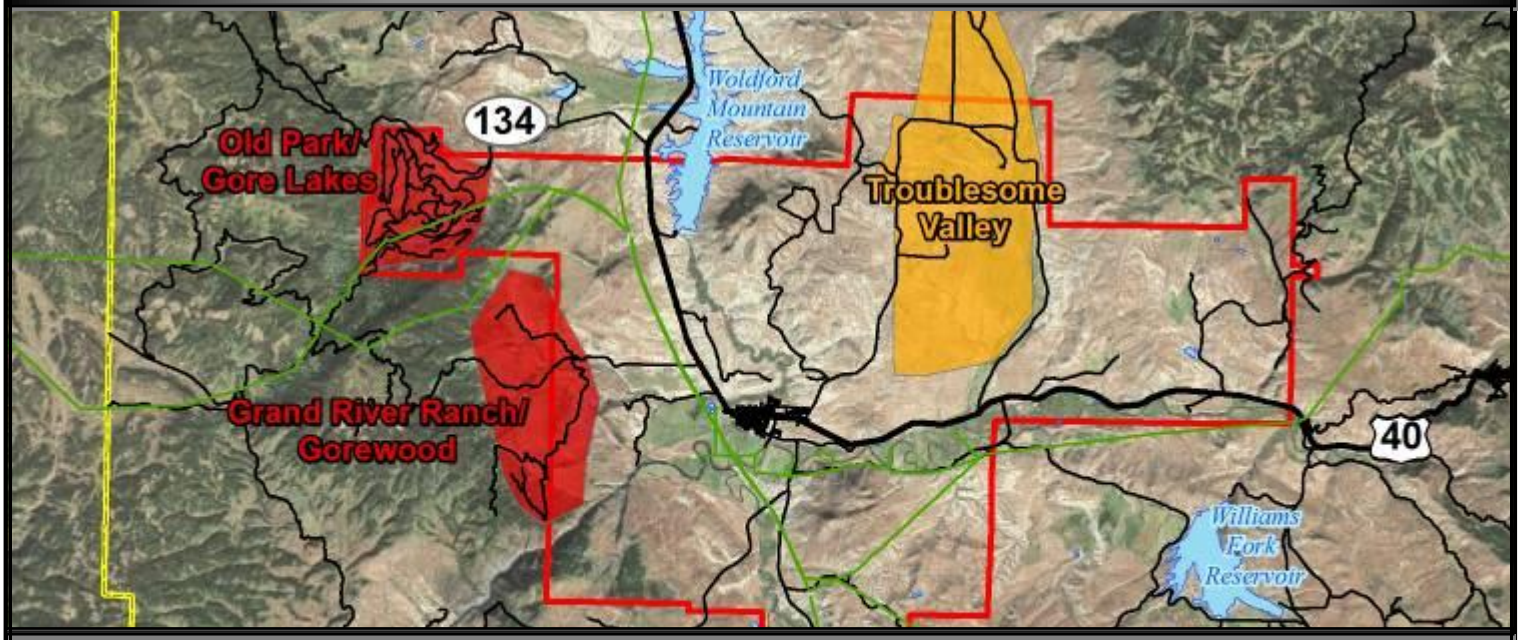
Kremmling Fire Protection District

Community Wildfire Protection Plan



ANCHOR POINT
FIRE MANAGEMENT
www.AnchorPointGroup.com

JULY 2011

KREMMLING FIRE RESCUE

KREMMLING FIRE PROTECTION DISTRICT
COMMUNITY WILDFIRE PROTECTION PLAN

July 2011

Prepared by the Kremmling Fire Protection District
In Coordination with the Kremmling FPD Stakeholder Group

With Professional Planning Assistance from
Anchor Point Group
3775 Iris Avenue Suite 2A
Boulder, CO 80301
(303) 665-3473
www.AnchorPointGroup.com

SIGNATURE PAGE

The following entities participated in the development of this plan and mutually agree on its contents.

_____	_____
Kremmling Fire Protection District	Date
_____	_____
Bureau of Land Management	Date
_____	_____
Colorado State Forest Service	Date
_____	_____
Grand County Office of Emergency Management	Date
_____	_____
United States Forest Service	Date

TABLE OF CONTENTS

TABLE OF FIGURES

LIST OF TABLES

EXECUTIVE SUMMARY

1. This document provides a comprehensive analysis of wildfire related hazards and risks in the Wildland-Urban Interface (WUI) areas covered by the Kremmling Fire Protection District (KFPD) and areas of the Lower Blue Fire Protection District (LBFPD) that could be covered by KFPD due to its closer proximity. Currently, the Lower Blue FPD has entered into an inter-governmental agreement with the Lake Dillon Fire Protection District (LDFPD) in which Lake Dillon responds to all incidents within the Lower Blue FPD area. Lake Dillon is the primary response agency to these areas with an automatic aid agreement with KFPD. The WUI is the area where human development and activity meets and intermixes with undeveloped, "wild" vegetation. The analysis is delivered in the form of a Community Wildfire Protection Plan (CWPP), and strives to follow the standards for CWPPs that have been established by the Healthy Forests Restoration Act (HFRA) and by the Colorado State Forest Service (CSFS).

2. Using the results of the analysis, recommendations have been generated that aid stakeholders in preventing and/or reducing the threat of wildfire to values in the study area. These recommendations are included throughout the report, wherever appropriate.

3. These recommendations, which include defensible space and fuels treatments, will facilitate the implementation of future mitigation efforts.

4. This report complements local agreements and existing plans for wildfire protection to aid in implementing a seamless, coordinated effort in determining appropriate fire management actions in the study area.

This CWPP provides a comprehensive assessment of the wildfire hazards and risks in the study area. Its goal is to reduce hazards through increased education about wildfires, hazardous fuels reduction, and improved levels of fire suppression response. Detailed recommendations for specific actions are included herein. It is important to note that the KFPD CWPP is a working document, and, as such, will need to be updated annually, and/or after a major "event" such as wildfire, flood, insect infestation or even significant new home development.

HOW TO USE THIS DOCUMENT

The main CWPP document provides much of the pertinent information for the study area as a whole and for individual communities. A general overview of the CWPP process is discussed first, followed by information more specific to the Kremmling area. This includes an analysis of fire department capabilities and specific community write-ups. Each set of community write-up pages can be regarded as an individual document. These pages can be delivered to a community independently of the overall document. Community and Areas of Special Interest (ASI) recommendations in the report address five broad categories, including: public education, structural ignitability/defensible space, water supply, access/evacuation, and street and home addressing. While many of the recommendations are general in nature, specific recommendations regarding landscape scale fuels treatments are in the Community Descriptions section of the report. With this format, each community has all the pertinent information available in three to four pages, separate from the overall document. Combined with Appendix A, an individual or community should have the information necessary to begin working.

Because much of the information contained in the report is extensive and/or technical in nature, detailed discussions of certain elements are contained in appendices:

Appendix A: Solutions and Mitigation
Appendix A gives both general and specific recommendations. General defensible space guidelines, which are applicable for every property, are described at length. Public education recommendations are also found in this appendix.

Appendix B: Project Collaboration
One of the main requirements of HFRA is to assure community participation. Public collaboration was achieved through stakeholder and public meetings, an online survey for residents, and an opportunity for the public to comment on the draft report. A summary of the collaborative process undertaken for this project are found here.

Appendix C: Guiding Documents
This document is designed to meet or exceed the standards that have been established for CWPPs by both the Healthy Forest Restoration Act and the Colorado State Forest Service. A summary of the two guidelines are found here.

Appendix D: County Maps
County maps taken from the Grand County 911 Address Atlas are provided to give homeowners, agencies and emergency personnel a better idea of each community specifically, and the entire fire protection district overall.

A CWPP is a living document; it should change based on the needs of the communities as projects are completed or additional projects are added. It is recommended that the stakeholder group involve the communities to identify projects and implement the CWPP.

INTRODUCTION

The Kremmling Fire Protection District CWPP is the result of a community-wide planning effort that included extensive field data gathering, compilation of existing documents and GIS data, and scientifically-based analyses and recommendations designed to reduce the threat of wildfire related damages to Values at Risk. This document incorporates new and existing information relating to wildfire which will be valuable to citizens, policy makers, and public agencies throughout western Grand County, Colorado. Participants in this project include the Kremmling Fire Protection District, United States Forest Service (USFS), Colorado State Forest Service (CSFS), Bureau of Land Management (BLM), local utility companies, interested landowners and Grand County.

The assessment portion of this document estimates the hazards and risks associated with wildland fire in proximity to WUI areas. This information, in conjunction with identification of the Values at Risk (page 7), defines areas of special interest and allows for prioritization of mitigation efforts. From the analysis of this data, solutions and mitigation recommendations are offered that will aid homeowners, land managers, and other interested parties in developing short-term and long-term planning efforts.

For the purposes of this report the following definitions apply:

Risk is considered to be the likelihood of an ignition occurrence. This is primarily determined by the fire history of the area.

Hazard is the combination of the Wildfire Hazard Rating (WHR) ratings of the WUI neighborhoods and the analysis of Fire Behavior Potential, as modeled from the fuels, weather, and topography of the study area. Hazard attempts to quantify the severity of undesirable fire outcomes to the Values at Risk.

Values at Risk are the intrinsic values identified by citizens as being important to the way of life in the study area (e.g. life safety, property conservation, access to recreation, cultural sites, and wildlife habitat).

This document has the following primary purposes:

- Provide a comprehensive, scientifically-based analysis of wildfire related hazards and risks in the WUI and areas of special interest within the KFPD response area.
- Using the results of the analysis, generate recommendations designed to prevent and/or reduce the damage associated with wildfire to values in the study area.
- Create a CWPP document which conforms to the standards for CWPPs established by HFRA and meets or exceeds the minimum standards established by the CSFS.

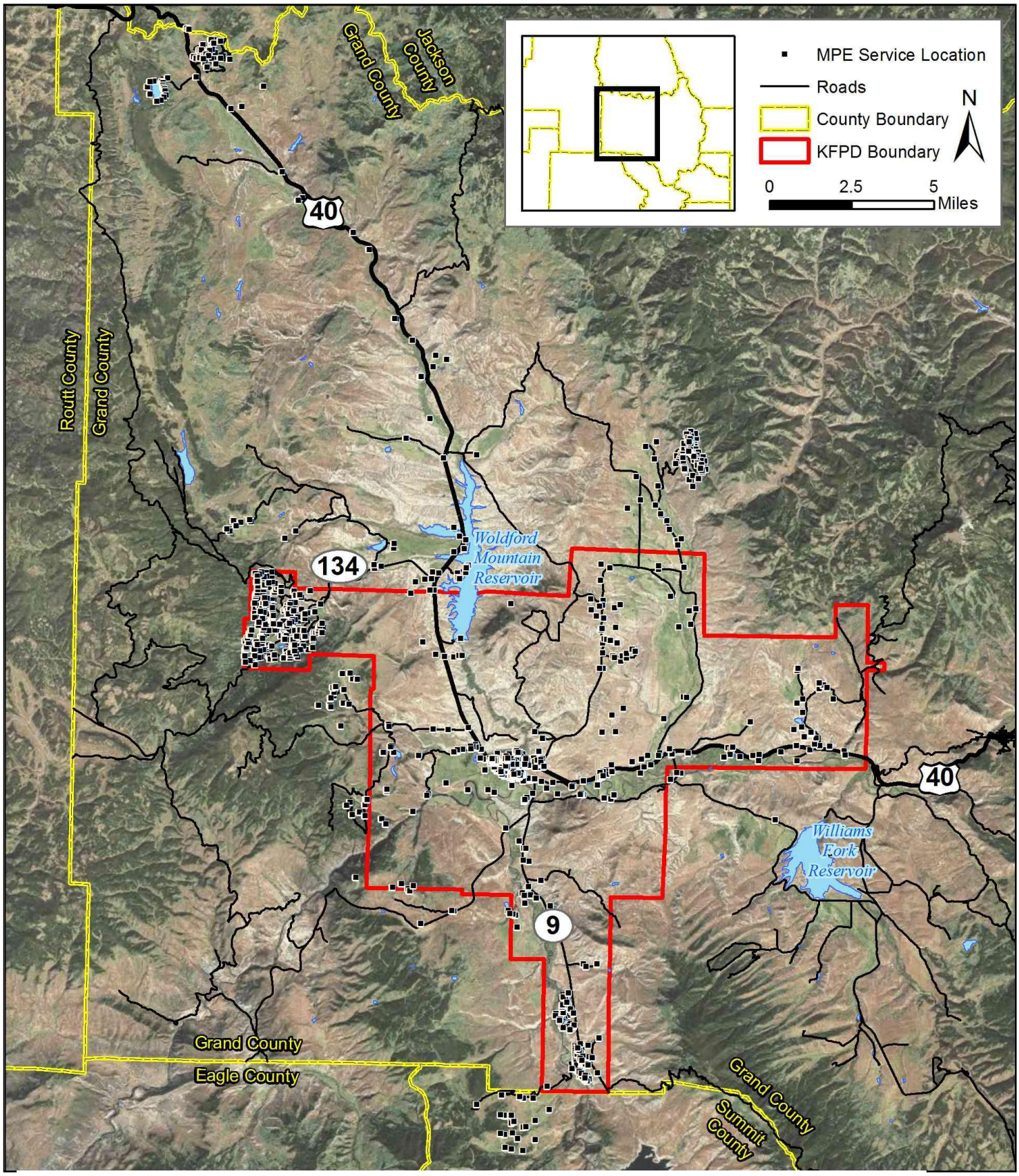


Figure 1. Overview graphic of the study area.

GOALS AND OBJECTIVES

Goals for this project include the following:

- Enhance life safety for residents and responders
- Mitigate undesirable fire outcomes to property and infrastructure
- Identify Communities at Risk and Values at Risk
    - Reduce fuel hazards and prevent fires in these communities
        - Consider fuels treatment prescriptions and locations
        - Continue fuels treatment projects already initiated
- Mitigate undesirable fire outcomes to the environment, watersheds, and quality of life
- Improve the district's position as it competes for grants

To accomplish these goals, the following objectives have been identified:

- Establish an approximate level of risk (the likelihood of a significant wildfire event in the study area)
- Provide a scientific analysis of the fire behavior potential of the study area.
- Group Values at Risk into areas that represent relatively similar hazard factors
- Identify and quantify factors that limit (mitigate) undesirable fire effects on the Values at Risk (hazard levels)
- Recommend specific actions that will reduce hazards to the Values at Risk

Other Desired Outcomes

1. Promote community awareness:

   Quantifying the community's hazards and risk from wildfire will facilitate public awareness and assist in creating public action to mitigate the defined hazards.

2. Improve wildfire prevention through education:

   Community awareness, combined with education, will help to reduce the risk of unplanned human ignitions. This type of education can also limit injury, property loss, and even unnecessary death.

3. Facilitate and prioritize appropriate hazardous fuel reductions:

   Organizing and prioritizing hazard mitigation actions will provide stakeholders with the tools and understanding to evaluate these projects to ensure that they are valuable and viable for the local community.

4. Promote improved levels of response:

   The identification of specific community planning areas and their associated hazard and risk rating, will improve the focus and accuracy of pre-planning and facilitate the implementation of cross-boundary, multi-jurisdictional projects.

COLLABORATION: LOCAL AGENCIES

The names of the initial representatives involved in the development of the Kremmling FPD CWPP are included in the table below, along with their organizations and various roles and responsibilities. For a more in-depth list of stakeholder involvement and information on the collaborative process, see *Appendix B*.

Name	Organization	Roles / Responsibilities
Tony Tucker, Chief	Kremmling Fire Protection District	Initiate stakeholder group, point of contact during the CWPP process; local information and expertise, including community risk and value assessment; development of community protection priorities.
Lynn Barclay, Fire Mitigation/Education Specialist	Bureau of Land Management	Initiate stakeholder group, point of contact during the CWPP process, approval of CWPP minimum standards, provided the funding for the CWPP through the Community Assistance Program.
Paul Cada, Assistant District Forester	Colorado State Forest Service	Initiate stakeholder group, point of contact during the CWPP process, approval of CWPP minimum standards, agency treatment information.
Sam Duerksen, Assistant Fire Management Officer	US Forest Service	Point of contact during the CWPP process, approval of CWPP minimum standards, agency treatment information.
Chris White, Urban Interface Specialist Rod Moraga, Fire Behavior Analyst Matt Lloyd, Forestry/Fire Technician Mark McLean, GIS Project Manager	Anchor Point Group	Development of the CWPP, decision-making, Community Risk and Value Assessment, development of community protection priorities, establishment of fuels and general wildfire mitigation recommendations.

Table 1. Initial CWPP Development Team

STUDY AREA OVERVIEW

The Town of Kremmling is a statutory town located at the confluence of Muddy Creek and the Blue and Colorado Rivers in western Grand County, Colorado. Located at an elevation of 7,364 feet, this rural, ranching community exhibits a degree of sprawl into the valley and adjacent mountains. The population of Kremmling is approximately 1,635 people, though many residents who associate themselves with the town live beyond the town limits. Like many small towns scattered throughout the Colorado mountains, Kremmling began as a trading post for ranchers and prospective miners.[1] Today, Kremmling is a popular tourist destination and self-contained community. Additional development throughout the study area has occurred over the years, as new homes and businesses have been built to accommodate growth. Other destinations in the area include the Arapaho, Routt and White River National Forests, an assortment of federal lands managed by the Bureau of Land Management, multiple local rivers and reservoirs, and a number of ski resorts within close reach.[2]

For the purposes of this project, four communities were identified directly within the KFPD, three were identified outside of the KFPD that Kremmling will still respond to, and one was identified within Lake Dillon's district that KFPD will respond to due to a closer proximity, resulting in eight total. These communities represent the most densely populated areas of the study area. Each community exhibits certain dominant hazards from a wildfire perspective. Fuels, topography, structural flammability, availability of water for fire suppression, egress and navigational difficulties, as well as other hazards both natural and manmade, are considered in the overall hazard ranking of these communities.

Construction type, condition, age, the fuel loading of the structure/contents, and position are contributing factors in making homes more susceptible to ignition under even moderate burning conditions. There is also the potential for rapid fire growth and spread in some areas due to steep topography, fast-burning or flashy fuel components, and/or other topographic features that contribute to channeling winds and the promotion of extreme fire behavior.

The community-level assessment for the entire study area has identified all of communities in the study area to be at high or very high risk. In these communities, a parcel-level analysis should be implemented as soon as possible to ensure the ongoing safety of residents and survivability of structures. Please refer to the graphics on the following pages for a color-coded hazard ranking reference.

In addition to the eight communities, four "areas of special interest" (ASI) have been identified: Blue Valley Ranch, Latigo Ranch, four communications towers, and a network of power lines and substations. Although these areas may or may not include residences, they contain critical infrastructure, buildings, and/or other structures that necessitate serious attention from a fire mitigation standpoint.

[1] "Town of Kremmling," 2011, <http://www.townofkremmling.org/> (accessed March 34, 2011).
[2] "Kremmling, Colorado," 2011, <http://en.wikipedia.org/wiki/Kremmling,_Colorado> (accessed March 34, 2011).

DEFINING THE WILDLAND URBAN INTERFACE

For the purpose of this CWPP, the WUI in the Kremmling FPD was defined using a 1.5 mile buffer surrounding all homes within the study area. Due to homes located near Routt County and within Summit County, the buffer extends into these counties in addition to a large portion of western Grand County.

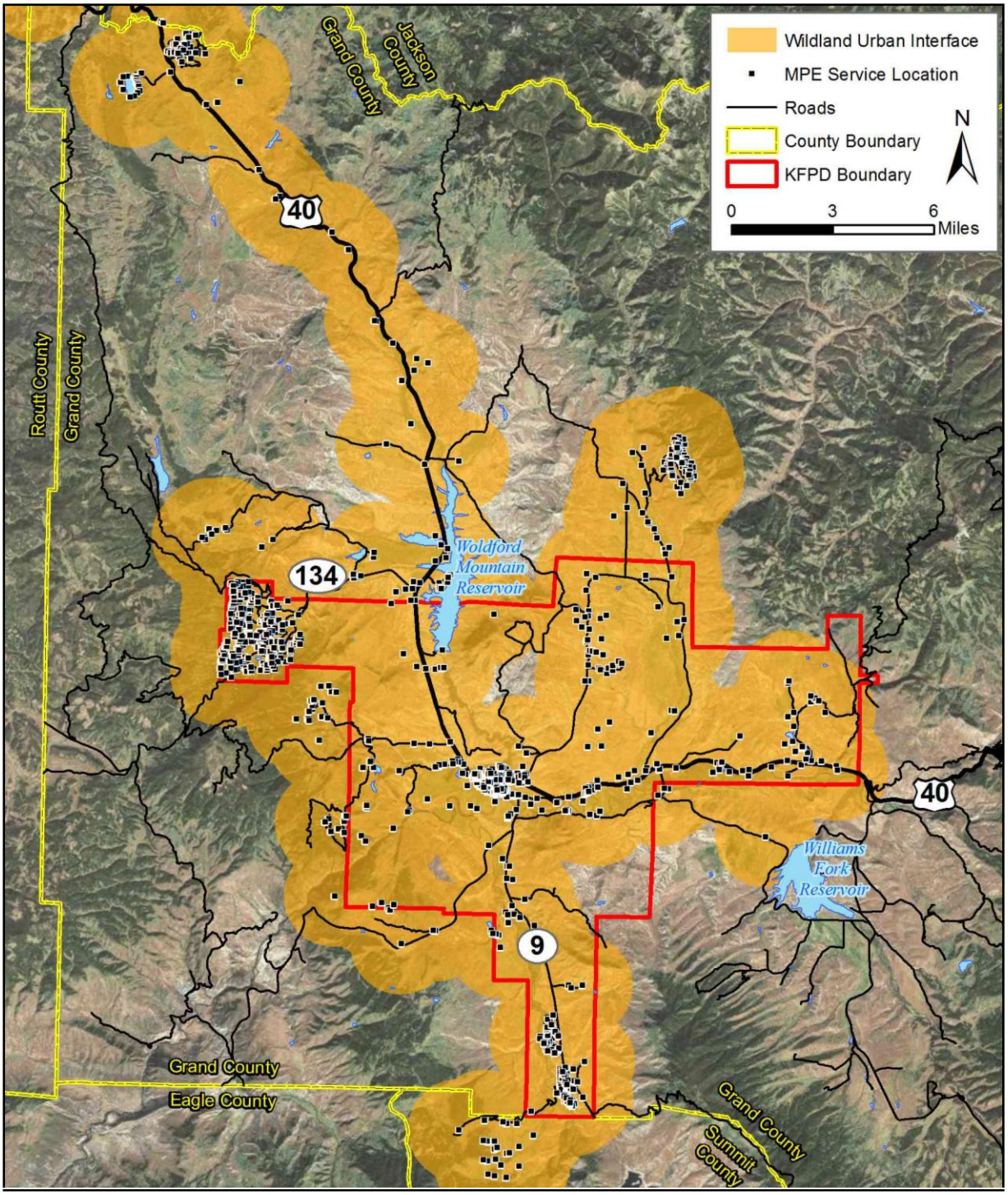


Figure 2. Area defined as "wildland-urban interface" for Kremmling Fire Protection District and the northern Summit County area.

VALUES AT RISK

LIFE SAFETY AND HOMES

The Town of Kremmling is a typical rural, mountain ranching community. The town itself is not directly threatened by wildfire, but could see increased traffic from area residents fleeing an advancing fire, as well as from local and outside resources responding to a wildfire.

Outside of the town itself, lot sizes are generally large, aside from a few scattered subdivisions. The risk of wildfire occurs mostly outside of the town area and stems from several different sources, including individuals recreating in adjacent federal lands, structure fires transitioning into the wildlands surrounding homes, seasonal burning, and natural causes, such as lightning.

Although large fires occurring in the study area are uncommon, when one occurs, it is likely to be under extreme weather conditions. There is a likelihood of rapid increases in fire intensity and spread within some of the communities due to dense and flashy fuels, large quantities of ember-cast and topographic features that could contribute to channeling winds and promotion of extreme fire behavior. These areas may represent a serious threat to life safety, due to difficult access and the likelihood of heavy smoke, heat, and/or long response times from suppression resources.

COMMERCE AND INFRASTRUCTURE

Economic Values

There are a diverse number of industries that comprise the Kremmling economy, including agriculture and ranching, mining and energy development, timber production and utilization, and tourism. All of these industries could be negatively impacted by the effects of a large wildfire, with tourism potentially being the most affected. Locally known as the “Sportsman’s Paradise of Colorado”, Kremmling receives a large number of area visitors due to its central location and abundance of outdoor recreational opportunities. Other important sources of employment and economic activity include a variety of distribution centers, local government, education, health care, and insurance and banking services. The town also serves people from a large surrounding area who come in for goods and services.[3]

Critical Infrastructure

The Kremmling FPD study area has a mix of private and public lands. Aside from the obvious negative impacts to tourism by wildfire, there is additional infrastructure within the study area that could be adversely affected. The Kremmling airport, which lies within the town limits, could be affected by smoke production from a large wildfire. Incoming and outgoing air traffic could be delayed or detoured if the airport was utilized for wildfire operations. Area reservoirs serve as recreations areas, in addition to sources of drinking water. Ash and associated runoff from a wildfire could reduce water quality and impact recreationists. Other important infrastructure include an abundance and wide-distribution of power lines, transportation systems which includes railways and three major highways, and vital communication towers. The impact of wildfire to infrastructure within the study area must be a consideration for wildfire prevention and planning. Additional infrastructure information is located in the Areas of Special Interest and Critical Infrastructure section located on page 59.

[3] Kremmling Chamber of Commerce. http://www.kremmlingchamber.com/index.html. Accessed on March 20, 2011.

Natural Gas Pipelines

There is a natural gas pipeline that runs east heading out of Kremmling parallel to Highway 40 and then southeast after passing Williams Fork Reservoir. In general, gas lines are not considered to be at risk from wildfire but do constitute an exposure during work/repair times. Firefighting equipment should be readily available near all welding operations. When welding, cutting, or other hot work is performed in locations where anything other than a minor fire might develop, a person should be designated as a fire watch. Firefighters and command personnel will also need to be aware of pipeline locations in order to avoid tracking over pipelines with heavy equipment. Local utilities should be notified in the event of an adjacent wildfire if heavy equipment is to be used to suppress the fire.

Railroads

Railroads could serve as a source of ignition within the area. Track grinding operations, sparks from the wheels and/or improperly maintained turbo chargers can easily ignite fine flashy fuels along the sides of the tracks. There are tracks that are run east out of town along Highway 40 and southwest along the Colorado River. Mowing and thinning out other vegetation along the railroad lines is imperative to reduce the risk of fire spreading into the communities.

Oil and Gas Fields

The BLM is currently in the process of developing leases for parcels for oil and gas development in the Kremmling area. Leasing on area lands is constantly changing, and the latest information should be updated in the CWPP as necessary.

Oil and gas fields present a unique and complex situation to responding firefighters. Roads to sites are often narrow, surrounded by flammable vegetation and convey high amounts of large truck traffic. Sites contain highly flammable and/or hazardous materials, including poisonous gases and explosives. Surface and underground pipelines are also common around sites, and will need to be identified and avoided by dozers, engines and other heavy equipment. All oil and gas companies should include the fire protection district in future development and planning activities.[4]

Electric Distribution Lines, Transmission Lines and Substations

See page 59.

[4] Southwest Colorado Oil and Gas Safety Working Group.
"http://gacc.nifc.gov/rmcc/dispatch_centers/r2drc/Handbook_Oil_&_Gas_Well.pdf." 20 March, 2009.

ENVIRONMENTAL RESOURCES

Natural Resources

Natural resources potentially at risk for wildfire in the study area include wetlands, endangered species, and imperiled natural plant communities. Wildfire can have damaging impacts to plant and animal life by fragmenting and reducing habitat. Reduced habitat decreases foraging area and limits protection for ground animals, thereby increasing predator pressures. There are several state and federally listed threatened species and species of concern found within the study area, including lynx *(Felis canadensis)*, wolverine *(Gulo gulo)* and the Boreal toad (*Bufo boreas boreas)*.[5] Preventing catastrophic wildfires is in the best interest of native vegetation, animals and humans alike.

Watershed and River Concerns

The Kremmling study area lies within the Colorado Headwaters Watershed, which is part of the larger Upper Colorado River Basin. In addition to a number of smaller creeks, the two main rivers within this watershed are the Blue and Colorado Rivers. The Blue River is dependent on water released from the Dillon Reservoir, which in turn is filled from the annual area snowmelt. The headwaters of the Colorado River begin along the Continental Divide within Rocky Mountain National Park, and are also heavily dependent on high-elevation snowmelt. Thus, discharge varies seasonally for both rivers depending on snowpack depth and sustained air temperatures. Water sourced from these two rivers supplies millions of end users, from local irrigators to Front Range communities to neighboring states. In order to protect water quality, it is vital to minimize impacts upstream that could affect downstream and local users. Wildfires can cause substantial erosion, thereby impacting aquatic and terrestrial life, creating filter clogging problems at water treatment plants and potentially impacting water quality.[6]

Vegetation associated with riparian areas present in the watershed provide valuable habitat for mammals, fishes, amphibians, reptiles and birds. There are currently four federally listed threatened fish species found within the watershed area. Indirect impacts to watershed ecosystems associated with wildfire include the use of retardants, soil damage from fire apparatus, and post-fire runoff. Taking action to prevent wildfire in these areas is critical for maintaining biodiversity and ecosystem function.

The Colorado and Blue Rivers and area streams, lakes and reservoirs also serve as important recreation areas. Popular activities include fly-fishing, white water rafting, canoeing, ice fishing and boating. It is important to minimize the effects of wildfires to these areas in order to maintain the local aesthetics and ecology, which are important to residents and visitors alike.

[5] CO Division of Wildlife. http://wildlife.state.co.us/WildlifeSpecies/SpeciesOfConcern. Accessed on March 20, 2011.
[6] US Geological Survey. Water Quality in the Upper Colorado River Basin. USGS Circular 1213. 1998.

CURRENT RISK SITUATION

The surrounding federal lands report an active, but far from extreme, fire history. Fire occurrences for the Yampa Ranger District of the Routt National Forest were calculated from the US Forest Service Personal Computer Historical Archive for the 28-year period from 1970-1997. Data for lands managed by the Bureau of Land Management in western Grand County are from the Kremmling Field Office. Fire occurrences on for the fire protection district are from 2002 to the present.

Yampa Ranger District (USFS)

Figure 3 shows the number of fires (red bars) and the total acres burned (blue hatched bars) on the Yampa Ranger District for each year. The number of annual fires ranges from zero to 13 fires per year, with an average of around five. Between 1970 and 1997 there were only two fires that burned more than 100 acres in the ranger district. The total number of acres burned was the greatest in 1989, when three fires accounted for approximately 240 acres burned. Since the data only includes fire data up to 1997, it does not contain the large fire years since then. Among the fires that have occurred in the study area since 1997 include the 4,400 acre Green Creek Fire which burned in the nearby Sarvis Creek Wilderness area.

The graphic in the upper right shows the percentage and number of fires occurring in each month of the year between 1970 and 1997. Historically, July has had the greatest number of fires, followed by August and October. The fewest fires occurred between the months of November and May, a fact which reflects the seasonal conditions for the area. Autumn and winter fires within the ranger district have occurred infrequently. Fires outside of the summer months are typically wind driven and can have rapid rates of spread.

The figure on the bottom left shows the size class distribution of fires. Approximately 90% of the reported fires were less than 10 acres in size. These statistics reflect the widely held opinion that, throughout the Western United States, the vast majority of fires are controlled during initial attack.

The bottom middle figure shows the number of fire caused by each factor. The most common cause of ignitions is lightning; however, the next most common causes are campfires and smoking. It should be noted that these numbers are for national forest areas only, which lack the concentrated development and many other risk factors present in the portions of the study area where private land is dominant. While natural causes remain the primary cause, there are multiple camping areas and places used as shooting ranges throughout the Kremmling area. Increased utilization of forest service property increases the chance of ignition. Educating the public using the campgrounds and monitoring of these areas will reduce this risk.

Finally, the bottom right box represents the number of starts for each day that a fire start was recorded. Nearly all fires (87) occurred on days that only had one start. Only four days had two starts per day, and no days had more than two starts.

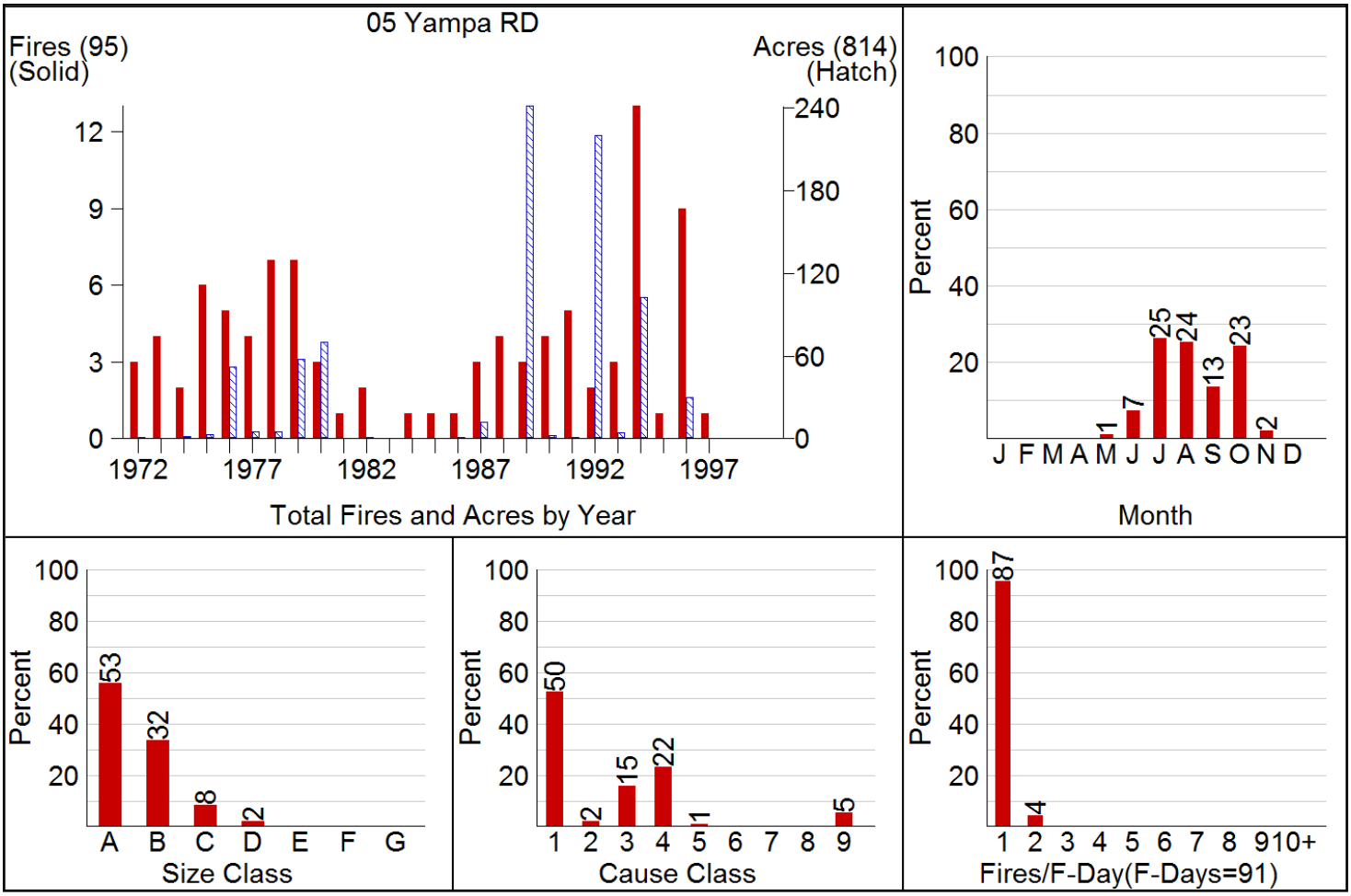


Figure 3. USFS fire statistics (Yampa Ranger District).

Size Class (acres)	A <1/4	B 1/4-9	C 10-100	D 100-299	E 300-999	F 1000-4999	G 5000+		
Cause Class	1 Lightning	2 Equipment	3 Smoking	4 Campfire	5 Debris Burning	6 Railroad	7 Arson	8 Children	9 Misc.

Table 2. Explanation of fire statistics table.

Kremmling Field Office (BLM)

Table 3 shows the large fires (greater than 50 acres) that occurred on BLM lands in western Grand County from 1983-2010. The average number of fires in the study area on BLM lands is 3.9 fires/year for all fires, including large and small.

Year	Acres	Location	Cause
1988	1,104	Seven miles east of Kremmling	Human
1988	310	Southeast of Parshall	Human
1989	188	Nine miles northeast of Kremmling	Human
1989	250	North of Parshall	Natural
1994	50	Radium area	Natural
1999	80	Radium area	Human
1999	356	Parshall/Byers Canyon	Human
2007	75	Granby saw mill	Human
2010	190	Rifle range east of Parshall	Human
2010	342	Nine miles northeast of Kremmling	Human

Table 3. Large fires greater than 50 acres on BLM lands.

Kremmling Fire Protection District

Date	Acres	Location
4/16/02	4	County Road 311 Off of County Road 3
4/24/02	3	N40 DEGREES 02 MINUTES 607 SECONDS W106
4/29/02	1	N 403 NORTH 9TH STREET ST N
5/2/02	< 1	MM 193 HIGHWAY 40
6/3/02	< 1	HWY 134 at MM 17.5
6/21/02	< 1	HWY 134 & FOREST SERVICE ROAD 100
7/12/02	4	Cliff Gulch East Fork of Troublesome
7/17/02	< 1	Diamond Mountain
8/05/02	< 1	LAT 40 DEGREES 04' 0" LONG 106 DEGREES
10/12/02	3	County Road 2413 in Big Horn Park
6/22/03	< 1	Grand River Ranch County Road 14S N40*
7/13/03	1	Grand Cnty Rd. 26 MM4.5 N40-14'-34.3"
5/26/04	< 1	12428 County Road 3 Hoffan Residence
6/15/04	< 1	County Road 1 just past Yust Ranch
6/17/04	< 1	Gorewood Subdivision
7/17/04	1	Carter Mountain
7/27/04	< 1	Grand River Ranch/Gorewood Sub-Division
5/3/05	4	C.D.O.W. Highway 40 M.M. 196.5
5/20/05	1	12422 County Road 3 Aspen Canyon Ranch
5/21/05	1	Logging Road off of County Road 373
7/22/05	1	Radium Area on County Road 1
7/23/05	1	Old Park Sub Division
7/29/05	1	Piney Ridge Road off of County Road 14S
5/18/06	< 1	Hwy 9, M.M. 135
5/22/06	8	Williams Fork - Horseshoe Campground
6/14/06	25	Williams Fork Area
6/14/06	< 1	Grand County Road 33 & 39 Junction
6/19/06	10	Copper Creek Subdivision Area
6/21/06	< 1	East of Wolford Mtn., West of CR 22
7/17/06	< 1	Ferral residence on CR 37
7/22/06	< 1	County Road 373
3/18/07	1	County Road #1 Near Pump House Road
4/20/07	3	3325 County Road 2415 Big Horn Park
7/1/07	16	Buffalo Park
7/10/07	1	Byers Canyon Rifle Range
7/17/07	1	End of GCR 111
7/28/07	< 1	CR 107 off of CR 1
8/21/07	4	MM 175 Hwy 40, N 40 D - 10' - 33.5"
8/30/07	1	Hwy 40 near 6 mile junction, Mile Marker
8/2/08	< 1	N 40 D, 06' 57.2" W 106 D, 08', 22.9"
9/8/09	< 1	CR 1, Pump House
5/7/11	2	Highway 9 /9615 Hwy 9

Table 4. All fires within the FPD area since 2002.

MOUNTAIN PINE BEETLE

A CWPP is not designed to be an ecosystem management plan, nor is it a plan dedicated to insect and disease issues. However, because of the intensity of the mountain pine beetle (*Dendrocotnus ponderosae* Hopkins) epidemic and the impact this could have on life safety and fire behavior, it is important to include it in this document to educate the public. The MPB has become a prominent forest pest in lodgepole pine stands on the west and east side of the Continental Divide in Northern Colorado. With over two million acres of trees killed since 1996, the forests around Kremmling are among the areas where trees have long since been attacked and killed. Trees are attacked by MPB during the summer months and into the early fall. By the following summer, successfully attacked trees will begin to fade. From a fire perspective, it is at the 'red needle' phase that the forest is at the greatest risk in the event of an ignition. The probability of having an ignition source (lightning or human caused) does not increase, but the probability of a tree igniting does. The dry needles catch fire more easily and fire may spread quickly through the crowns, especially considering the high winds common to the area. Because there is less moisture and therefore less heat when burning, fire in a beetle-killed stand extinguishes more readily. Within 3-5 years, the needles will fall off of the trees. Crown fire risk is significantly diminished at this point, since there are no needles in the crown to support active burning. However, the risk of surface fire increases due to an increase in understory plants following the opening of the canopy and because of increased blow-down associated with the shallow root system of lodgepole pine. Without removal of the wood, the downed trees create a heavy fuel load on the forest floor that could generate intense wildfire behavior. Moreover, the combination of gusty winds and high levels of recreational use in the Kremmling area creates a dangerous situation, as trees could potentially fall on individuals utilizing forested areas or block access along system roads used by the public, emergency responders and utility companies.[7]

There is no way to combat the MPB outbreak at this point, since it has mostly passed. Instead, the best option is to remove trees that are dead, especially in areas of high recreation use, near homes and infrastructure, and near roads. Please note that sufficiently large remaining live trees may still be susceptible to blow-down. With mortality rates reaching upwards of 90% in most stands, the future composition of the forests is unknown.

For more information on the mountain pine beetle and how to stay safe in areas of beetle-kill, please contact the Colorado State Forest Service, USFS Yampa Ranger District and/or the BLM Kremmling Field Office. Other information is also available at:

http://csfs.colostate.edu/cowood/library/05_Beating_the_Blues.pdf

http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5195701.pdf

[7] Romme, W.H., J. Clement, J. Hicke, D. Kulakowski, L.H. MacDonald, T.L. Schoennagel, and T.T. Veblen (2006). Recent forest insect outbreaks and fire risk in Colorado forests: A brief synthesis of relevant research. Colorado Forest Research Institute, Report (refereed), 24 pp. Available as a PDF: http://www.cfri.colostate.edu/reports.htm

OTHER AGENCY TREATMENTS

The Bureau of Land Management, the Colorado State Forest Service, and the US Forest Service all have planned and completed projects in the vicinity. A snapshot of most of these efforts and planned treatments is captured in Figure 4. Many of the treatments pictured are proposed, and the proposed Anchor Point treatments found in each community section are often based on completion of these agency projects. Homeowners and the individual communities within the study area can supplement these efforts with their own wildland fire mitigation treatments, which are detailed in the Community Ignitability Analysis

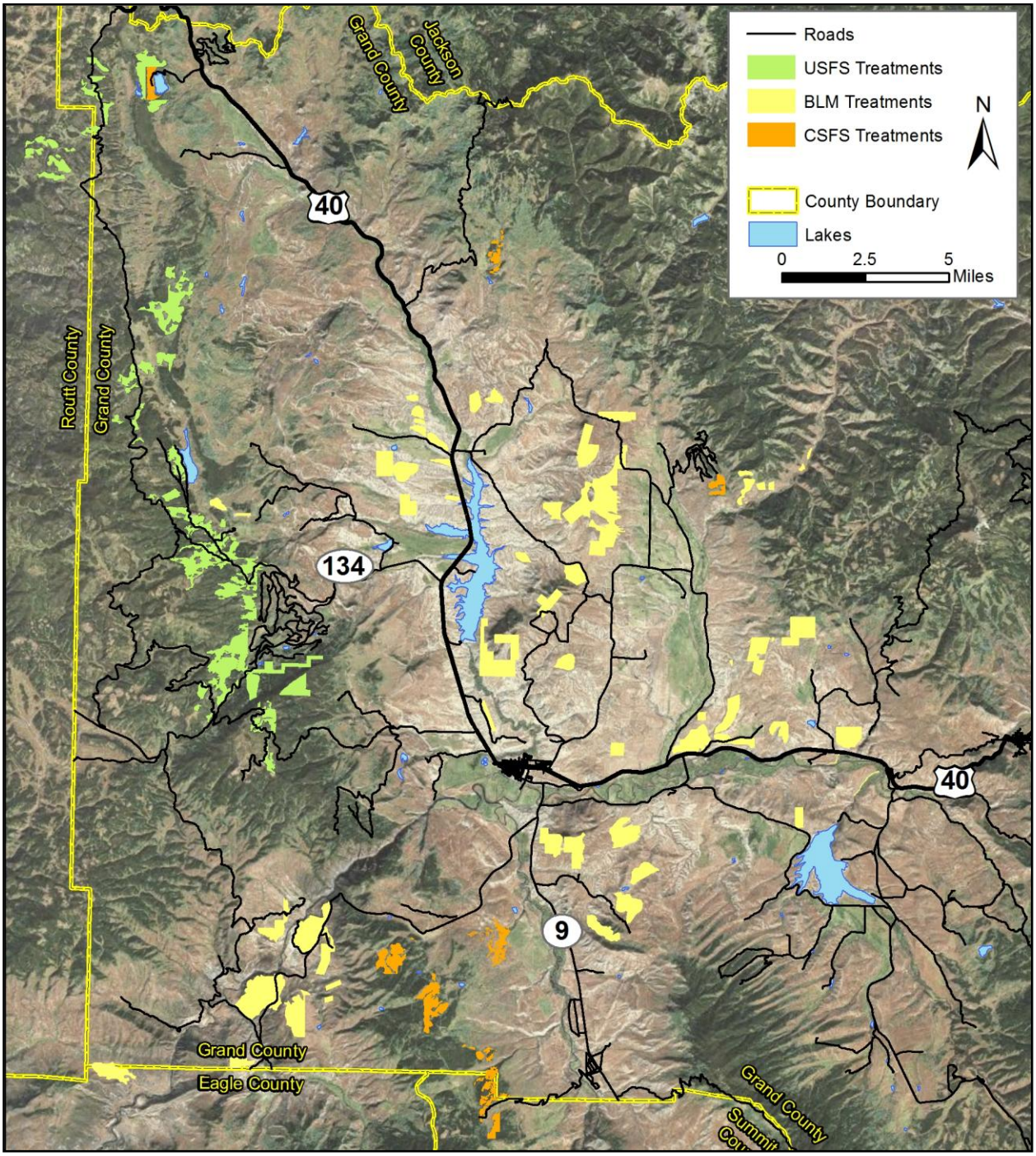


Figure 4. Other treatments occurring within the study area.

FIRE BEHAVIOR DISCUSSION

The Kremmling Fire Protection District has had few wildland fires greater than 10 acres. Fires are relatively infrequent and usually small. However, under the right conditions (low relative humidity, high winds and temperatures, and drought) extreme fire behavior is possible, especially with the ongoing mountain pine beetle epidemic. The probability of a large fire is low, but when these environmental conditions align, the potential for a large, intense fire is greatly increased. Adding in the current infrastructure and home construction, the area has a high to very high risk from wildfire. If such an event were to happen, it is likely that the community would experience multiple structure losses.

FUELS

The Kremmling Fire Protection District area is typical of montane and upper montane ecosystems. Vegetation ranges from grass and shrub meadows to dense high-elevation conifer forests. The central portion of the study area surrounding Highway 9 and Highway 40 is primarily grass and sage, with scattered areas of other shrubs and juniper trees. These areas will exhibit rapid rates of spread, especially under high wind events. Flame lengths in are expected to generally be less than four feet, which means that they are controllable by handcrews and wildland fire engines.

Moving higher up, scattered aspen stands intermix with the grass and shrub meadows. Aspen is not normally seen as a hazardous vegetation type, though stands have been known to burn under drought conditions. In the higher elevations of the study area are lodgepole pine, Engelmann spruce and subalpine fir. Fire intervals in these areas are in the hundreds of years, and these areas are not normally at a high risk of active fire behavior unless persistent drought conditions align with low relative humidity and high winds. However, once a fire has started in these fuels, it can be very difficult to stop, as high winds and dense vegetation will allow active crown fire behavior to occur and spread rapidly.

This threat could be exacerbated by heavy accumulations of dead and downed trees following the mountain pine beetle epidemic. While scientists and fire managers are not yet certain whether these fuels create a greater than normal threat, it should be assumed that suppression in these areas will nevertheless be more difficult and hazardous because of the abundance and location of these fuels sources. While the possibility of active crown fire behavior will be reduced, the potential for surface fire could increase. As trees fall and the canopy opens, grasses, forbs and seedlings will grow in the openings between trees. These fuels can spread fire to and among downed logs, and create the potential for hot-burning, fast-moving fires. As recently witnessed in the 530 acre Church's Park Fire near Fraser, suppression under these conditions can be very difficult, and may require the use of heavy equipment and/or aerial fire resources. Firefighters in areas of large amounts of beetle-kill will need to constantly assess the fire behavior and weather conditions before beginning and continuing suppression actions. More information can be found in Appendix A, in the Fuels/Landscaping section on page A17.

WEATHER

The weather analysis for the area shows that there are very few days that support large fire growth. At higher elevations, the temperatures are lower and the relative humidity is higher. The daily window of opportunity for ignition is short. The season is also short with winter snows coming earlier to these areas. The biggest concern is drought or low snowpack coupled with high winds. Generally, forests above 9,000 feet burn when there is prolonged drought.

High winds are the main cause of large fire events in the study area. The study area is surrounded by various mountain ranges and valleys that funnel and speed up winds from all directions. Stronger wind speeds of 10-15 mph are not uncommon year-round. The study area is also known for gusty winds, which can exceed 40 mph on a windy day. Many fuels, such as the large grass and sage meadows that exist, will only support active fire behavior when fuels are sufficiently dried out, and especially during windy conditions. Moreover, strong, gusty winds can penetrate densely forested stands and transition the fire from the ground into the tree canopies.

TOPOGRAPHY

Elevation in the study area varies from about 7,000 to 11,000 feet. Much of the area surrounding Kremmling is mountainous with steep, narrow canyons and drainages. These narrow, steep chutes will funnel winds and further increase the rate of spread of a fire. Many homes in the study area are located atop ridges, above chimneys, in steep drainages, or located mid-slope. These areas are particularly at risk. Slopes in the study area are sometimes greater than 45 degrees, or 100%. At 30 percent slope, rate of fire spread doubles compared to rates at level ground. Firefighting effectiveness is greatly reduced in these areas as a result.[8]

The position on the slope where a fire starts can make a significant difference in how fast the fire spreads and grows. Steep slopes increase fire behavior as a result of preheating the uphill fuels. A fire originating on the top of the slope can be expected to have the most minimal fire behavior, as it backs down the hill with low flame lengths and rates of spread. This is typically where lightning strikes and single tree ignitions occur but do not often spread. The biggest concern would be a fire starting at the base of the slope and then spreading quickly up hill, especially under extreme weather conditions. Discarded cigarettes, overheating cars or accidents, and debris burning can act as ignition sources in these areas. A fire starting lower down could easily move up into and around the various communities in the study area, potentially threatening egress routes.

[8] Dennis, Frank C. “Fuel Break Guidelines for Forested Subdivisions and Communities.” Colorado State Forest Service, 2005.

LOCAL PREPAREDNESS AND FIRE RESPONSE CAPABILITIES

KREMMLING FIRE PROTECTION DISTRICT

Station 1: 1320 Eagle Avenue

Station 2: *Planned, Old Park Subdivision*

Station One has the following apparatus:

- Type 1 Engine structure fires only
- Type 1 Engine 4x4, can be used for wildland fires if necessary
- Type 3 Engine / Tactical Tender (2,500 gal. CAFS)
- Type 6 Engine (300 gal., Class A Foam)
- Type 6 Engine (150 gal., Class A Foam)
- Rescue truck

Station Two is built, but does not yet currently have any apparatus.

Training

Members of the Kremmling FPD participate in an active training program. All firefighters have been required to take the entry-level wildland fires courses S130/190 and annual wildland fire refresher training (RT-130) since 1996. Many department members also choose to take the annual work-capacity pack test at the arduous level. A variety of other wildland classes are also available to department members, including those put on by the Grand County Training Officers, which is a collaborative effort put on by all of the FPDs in Grand County. Most department members have taken S-131 (Firefighter Type 1) and S-290 (Intermediate Wildland Fire Behavior). Many have also taken and been certified in the S-212 class (Wildland Fire Chain Saws). In-house department trainings occur every Tuesday throughout the year, which often involves a degree of wildland training, especially in the summer months. Members also participate in an annual engine academy, which typically begins before the start of the wildland fire season, and normally includes a number of different stations and activities designed to prepare members for the upcoming season.

PPE

All personal protective equipment (PPE) is provided to firefighters. This includes Nomex pants and shirts, web gear, and a new-generation fire shelter. Boots and wildland fire packs are not provided, but firefighters are given an allowance to help offset the cost.

Communications

Communications occur on both 800 mhz and Very High Frequency (VHF). The department will also soon be transitioning to a Digital Trunked Radio (DTR) system. Communication with federal firefighters currently occurs only on VHF, while most local firefighting agencies use 800 mhz systems. Kremmling Fire is dispatched out of Hot Sulphur Springs for all local calls and out of the Craig Interagency Dispatch Center for any federally managed wildfires.

Equipment

Kremmling is well-equipped to handle wildland fires. All trucks that will respond to a wildland call have wildland firefighting tools, including access to chainsaws. The station is currently looking to expand into its other station in the Old Park subdivision, which may necessitate the purchase of another Type 6 engine and a new rescue truck.

Stations and Response

Since the Kremmling FPD currently only has one station in town, and a large area to cover, response times to many subdivisions could be long. Moreover, many of the areas that KFPD responds to are actually outside of the fire protection district boundary.

Water Supply

The availability and location of water resources is a critical problem throughout the study area. Because of the rural location of many communities, fire hydrants are few and far between, except in areas close to the Town of Kremmling. While some homes have cisterns available for fire department use, they are often small in capacity. Creeks and ponds are available in many areas, but they require time and effort be spent in the process of drafting water from them. Moreover, shuttle trips will need to be setup to bring water back to the fire area, which takes personnel and apparatus away from the firefighting effort. See the individual community/planning area write-ups for details on water supply within the community/planning area, and how the water supply might be improved in these areas.

RECOMMENDATIONS

The Kremmling Fire Protection District has done a good job of providing a baseline of wildland qualifications that all their firefighters must achieve. Other recommendations below can further improve the wildland fire response and capability of the district.

FIREFIGHTER TRAINING AND PERSONNEL

- Continue to provide structural and medical training opportunities to meet district needs.
- Continue to provide wildland fire classes that department members may have yet to take, including S-215 Fire Operations in the Urban Interface, S-290 Intermediate Fire Behavior, I-200 and I-300 Basic and Intermediate ICS.
- Encourage Type 3 Incident Management Team participation.
- Encourage personnel to seek higher qualifications and participate in out-of-district fire assignments.
- Encourage and work on providing training opportunities with adjacent districts.
- Organize and facilitate an annual wildfire interface training exercise within the communities outlined in this CWPP. Encourage multi-agency participation.
- Find ways to improve recruitment and retention within the district.

EQUIPMENT AND RESOURCES

- Continue to provide standard wildland “Personal Protective Equipment”, in compliance with National Fire Protection Association (NFPA) 1977 standards.
- In order to improve firefighting response and preparedness, purchase a new Type 6 engine and rescue truck, which will allow other apparatus to be moved to the planned station in the Old Park Subdivision
- Apparatus should be equipped with portable water storage, and engine checks including drafting tests should be performed at least monthly.
- Obtain grant funding to provide all firefighters who actively participate in wildland fire calls with an approved and functioning wildland fire pack.

WATER SUPPLY AND MAPPING

- All available water sources should continue to be marked by GPS and posted on a map that is available to local and incoming suppression resources. This should be updated as needed to maintain an up-to-date list.
- Create additional year-round water storage resources in the district such as ponds, cisterns and tanks.
- Dry hydrant locations should be found along creeks and in any permanent water supply found within the communities.
- Dry and municipal hydrants in the district should be inspected and tested annually.
- Develop wildfire pre-planning response plans for the fire protection district and communities that are covered by, but are outside of the fire protection district boundary. Maps in these plans should include roads, evacuation routes, home locations, fuelbreaks, and available water sources.

COMMUNITY ANALYSIS AND RECOMMENDATIONS

PURPOSE

The purpose of this section is to examine the communities in greater detail. Of the eight WUI communities defined in the KFPD study area, none were found to represent an extreme hazard. Six were rated as very high hazard, and two were rated as high hazard (Table 4). It is important to remember these communities are rated relative to what is customary for this specific type of interface. While adhering to proven methodology, an attempt is made to approach each community as a unique entity with its own characteristics, so that the most accurate, safe, and useful assessments possible are provided.

Very High	High
Big Horn Park	Blue Valley Acres 1 & 2
Grand River Ranch / Gorewood	Troublesome Valley
Lake Agnes	
Old Park / Gore Lakes	
Rabbit Ears Village	
Spring Creek / Shadow Creek*	

Table 5. Community hazard ratings within the study area

* The community of Spring Creek / Shadow Creek is actually part of the Lower Blue FPD which is currently covered by the Lake Dillon FPD.
For more information on the Lake Dillon FPD and the Summit County CWPP, please visit:
http://ldfr.org/content
http://csfs.colostate.edu/pages/documents/SummitCountyCWPPRevision2010.pdf

COMMUNITY ASSESSMENT METHODOLOGY

The community level methodology for this assessment uses a Wildfire Hazard Rating (WHR) that was developed specifically to evaluate communities within the Wildland Urban Interface (WUI) for their relative wildfire hazard.[9] The WHR model combines physical infrastructure such as structure density and roads, fire behavior components like fuels, topography, rate of spread and flame length, with the field experience and knowledge of wildland fire experts. Modeled values for flame length and rate of spread during extreme weather conditions are incorporated into the rating sheet for each community. It has been proven and refined by use in rating thousands of neighborhoods throughout the United States.

Defined communities are the centerpiece of a CWPP. The definition of a community, for the purposes of a CWPP, has been refined by Anchor Point over the last ten years while producing these plans. In doing so, State and Federal requirements/definitions have been taken into consideration. The Colorado State Forest Service requires that each community have representation during the planning process. This representation can be a fire department official, an HOA leader or an involved community member. Because each community has to have representation, it must be a cohesive enough unit to support a single representative. Thus, a community should be a single geographic area that shares similar infrastructure, vegetation, topography, and as a result, similar recommendation needs. Lot/parcel sizes should be small enough that actions taken by individual residents will likely have an effect on their neighbor's fire risk, and may motivate further action. Close proximity is an easy way to encourage collaboration, and often a community will include multiple smaller subdivisions.

Each community write-up can be regarded as an individual document. These pages can be delivered to a community independently of the overall document. As a result, you will see specific recommendations, if existing, for each community listed first, followed by recommendations that apply to all communities, such as defensible space. While seemingly repetitive, with this format, each community has all the pertinent information available in three pages, separate of the overall document. Not every community has a specific landscape-scale fuels project identified; see Blue Valley Acres 1 and 2 and Troublesome Valley for example. In these communities, and in all of the communities, defensible space is highest priority fuels treatment recommended. Defensible space is determined to be the greatest benefit for the least cost for landowners in all communities, regardless of whether landscape-scale fuelbreaks are recommended. This does not mean that a larger, landscape-scale project within the community/planning area could not be beneficial for the area, but it was not identified as the most important step in protecting life safety and values at risk. Identifying larger projects in the surrounding influence zones will be meaningful for obtaining grants to help fund all of the projects, especially the small acreage projects. Although large fuelbreaks are not always as effective for individual home protection as defensible space, if carried-out correctly, they can act as anchor points for suppression activities to begin.

While the graphics provide general information regarding the overall hazard and risk rating for specific communities, they are not adequate to describe fully the specific information that went towards forming the rating. At a minimum, it is necessary to review the individual community write-ups and recommendations. True understanding can only be attained by reading the accompanying text, in addition to looking at the graphics.

[9] White, C. "Community Wildfire Hazard Rating Form" *Wildfire Hazard Mitigation and Response Plan*, Colorado State Forest Service, 1986. Ft. Collins, CO.

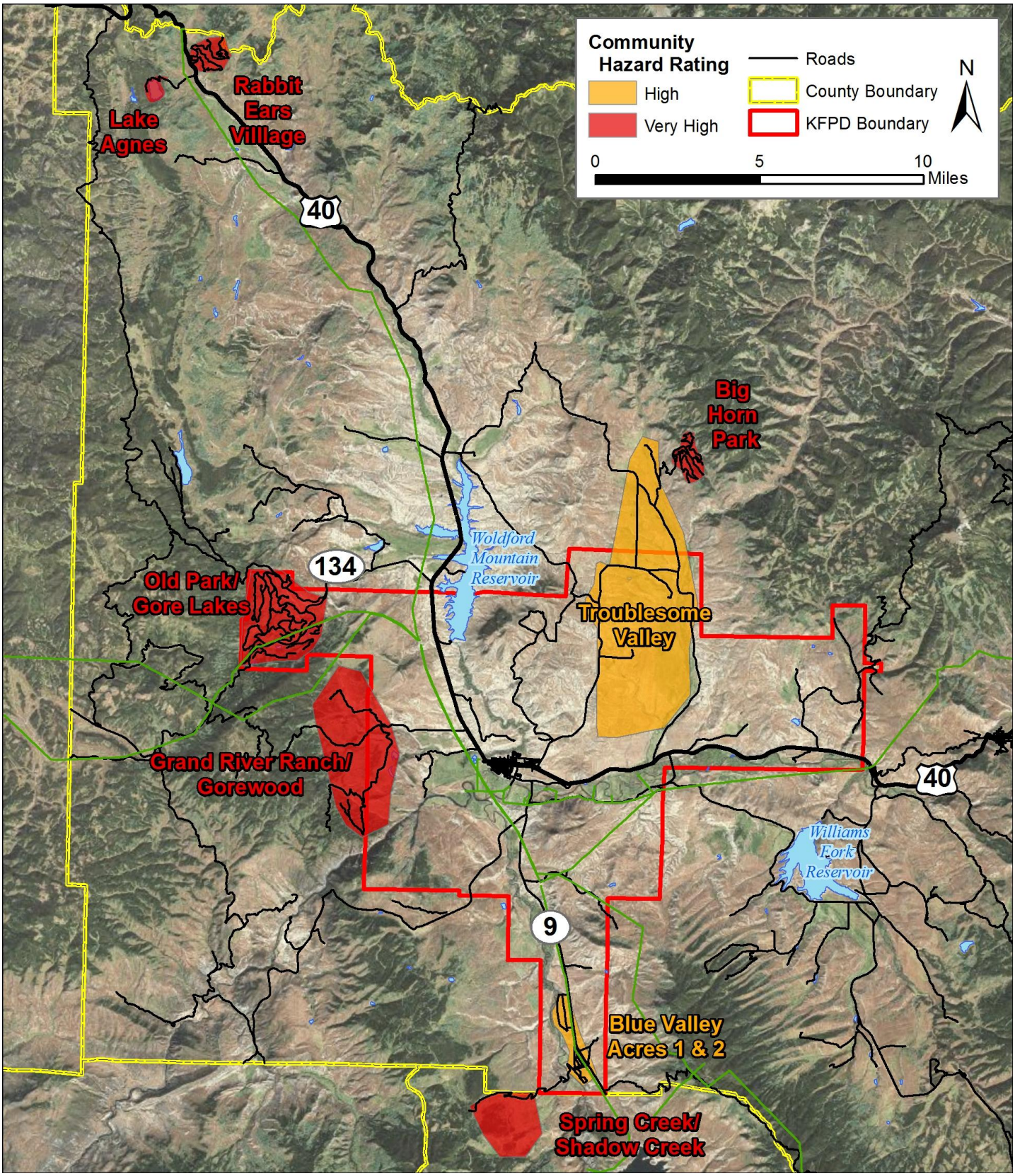


Figure 5. WUI communities including ratings.

WUI COMMUNITIES IN THE KREMMLING FPD STUDY AREA

1. Lake Agnes

Hazard Rating: Very High

Lake Agnes is a primarily seasonal community located north of Kremmling off of Highway 40. There is only one way in and out the community via County Road 186 through an electronic gate below the community. This dirt road goes in and wraps around the lake, though it is blocked in one area on the south side of the lake by a chain gate. Most driveways in the community are narrow, and many lack adequate turnarounds for fire apparatus. Homes are located on the ridgeline above the lake on the east side, and primarily next to the lake on the west side. The community is heavily forested, and consists primarily of lodgepole pine and spruce-fir. Most homes in the community have high fire resistant roofing, and have a mix of combustible and noncombustible siding and deck construction. Many of the homes have done some defensible space implementation, but not all, and those that have could use more work. There is also a large fuelbreak that has been cut on the western side of the lake, where dead lodgepole pine trees were removed. Addressing is poor throughout the community: hard to see or nonexistent in some areas, non-reflective, inconsistent and made from combustible materials. There are power lines that run below the community, and propane tanks are buried underground. The community is located far from the fire station in Kremmling, so response times will exceed 30 minutes from station. Further, the community is not actually part of the fire protection district, but Kremmling Fire will respond to the area. There are no hydrants in the community, though there are areas where apparatus could draft from the lake. Other noteworthy hazards that exist include campfires of recreating visitors to the lake's two lodges and cabins, a non-year-round population, high winds and lightning.

The community of Lake Agnes is at a higher elevation, so fire return intervals are in the hundreds of years. Spruce-fir and lodgepole pines stands surround the entirety of the lake, with aspen and sage meadows lower down near the entrance to the community. The majority of the larger lodgepole pine trees in the community are dead, and many of them have been removed on the western side of the lake. Steep slopes surround the community, and the homes on the eastern edge are located on a steep ridgeline. Rates of spread will be high in the sage below the community, but much lower in the thick lodgepole and spruce-fir stands. However, flame lengths in these areas could easily exceed 11 feet under extreme weather conditions, and would require aerial fire resources for suppression. While the area could experience extreme

fire behavior, it would most likely be following drought, combined with high temperatures, low relative humidity, high winds and an ignition source.
For all of the homes in the study area, properly implemented defensible space and Firewise home construction are the most important recommendations for home survivability. Due to limited firefighting resources, especially during the early stages of an expanding wildfire incident, high home density, and/or long response times, individual firefighting entities may not be able to stay and protect each individual home. In order to survive a passing flame front, a home will need good defensible space and home construction. Often, homeowners will assume that because they have adequately constructed their home from noncombustible materials and have cleared vegetation around the structure, that firefighters will be able to save their home. However, defensible space needs to be maintained and re-assessed throughout the fire season. The following fuels treatment and general wildfire mitigation recommendations provide a good start for properly protecting one's individual home and the community as a whole. More in-depth information on home construction, defensible space, preparedness planning and evacuation, infrastructure and water supply can be found in Appendix A.

Table 6. Lake Agnes Fuels Treatment Recommendations

Name	Priority	Description	Methods*	Acres**
Defensible Space	1	Defensible space around individual homes. See Appendix A for details.	Hand felling and limbing near homes; mowing; limited mechanical treatments; sage treatments	200' around the home
North Fuelbreak	2	Continue the thinning that has already been started around the northern edge of the lake. Concentrate efforts on the area where the main road comes into the community and remove all dead lodgepole pine trees.	Hand felling and limbing near homes; mechanical treatments away from homes where slopes allow	74
South Fuelbreak	2	Continue the fuelbreak that has already been started around the southern and eastern edge of the lake. Concentrate efforts near homes, removing all dead lodgepole pine trees.	Hand felling and limbing near homes; mechanical treatments away from homes where slopes allow	21

*****Mechanical treatments in timbered areas include all varieties of logging equipment.
****** Defensible space distances will vary by property based on slope and fuels. Acreages for fuel treatments are based on a +300' wide fuelbreak. Actual acres treated may vary once project is implemented.

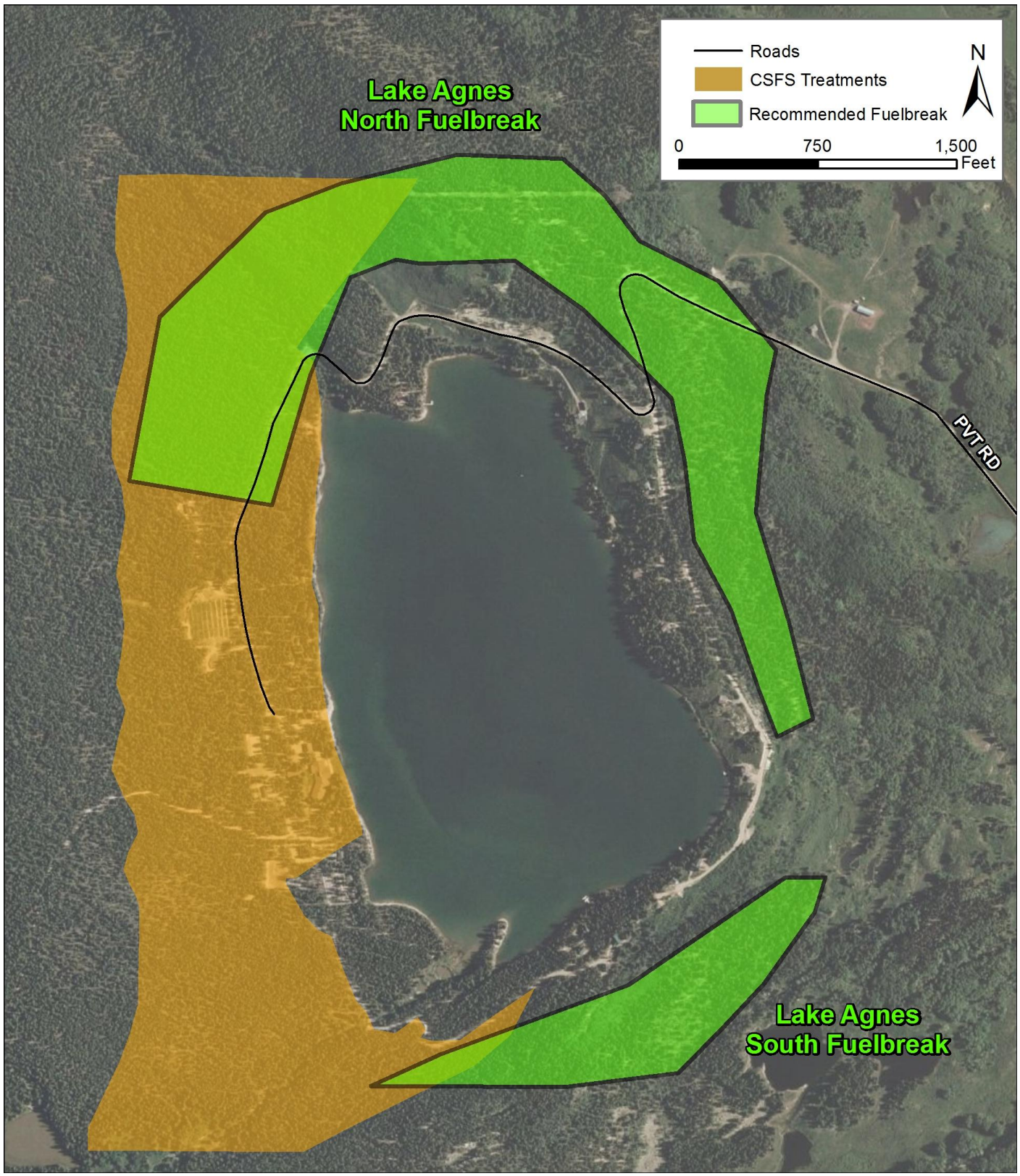


Figure 6. Lake Agnes Fuels Treatment Recommendations

Table 7. Lake Agnes General Wildfire Mitigation Recommendations

Category	Priority	Description
Home Construction	1	Discourage the use of combustible materials for decks, siding and roofs, especially where homes are upslope from heavy vegetation.
		Replace any shake-shingle or slab-wood siding and roofs with non-combustible types.
		Open areas below decks and projections should be enclosed or screened to prevent the ingress of embers and kept clean of flammable materials, especially where such openings are located on slopes above heavy fuels.
Landscaping/Fuels	2	Remove all standing dead lodgepole trees that are near structures, power lines and roads.
		Clean leaf and needle litter from roofs and gutters and away from foundations.
		Thin vegetation along side roads and driveways. This is especially important for narrow driveways and road segments, and for any areas where ravines with heavy fuels are below the access. Focus on removing vegetation in drainages that cross roads.
		Remove wood piles and any flammable yard clutter to at least 30 feet from structures and propane tanks. Wood piles should be located uphill or even with homes; never downhill.
		Encourage individual landowners to mow fuels near homes and along roadways and fence lines during times of high fire danger.
Preparedness Planning/Evacuation	3	Add reflective addressing to all driveways or homes. A good guideline is to use all metal white markers that are 4” in width on a green background. These should be placed three to five feet above ground.
		Develop a community plan to provide proper maintenance to all community roads.
		Develop an evacuation plan for the community, including identifying escape routes and an evacuation center.
		Develop safety brochures that can be distributed and made available to guests in the summer months.
Infrastructure	4	Provide adequate turnarounds for fire apparatus throughout the community.
		Ensure that all gates in the community are removable and/or have access codes that are known to all residents and the FPD.
		Identify all water sources within the community, including hydrants, cisterns and ponds, and make sure that they are visible, maintained and operable.

For more detailed recommendations on how to enhance the safety of your home and community, please refer to Appendix A. See also the Ready, Set, Go! Program in Appendix A, page A21.

2. Rabbit Ears Village

Hazard Rating: Very High

The Rabbit Ears Village community is located off of Highway 40, near the junction with Highway 14. There are two ways in and out of the area, both of which are adjacent to one another off of the highway and blocked by electronic gates. Roads in the community are less than 20' wide and dirt. Many side roads are one way in and out, and some driveways are long and narrow. Homes generally have adequate turnarounds for fire apparatus. Most of the homes in the community are located in sage/grass meadows, or in aspen stands. Most homes in the community have high fire resistant roofs and noncombustible siding and deck construction. Due to the type of vegetation present, most homes have good defensible space due to clearing around the building envelope, though not all especially in the upper areas of the community. Addressing is poor throughout the community: hard to see or nonexistent in some areas, non-reflective, inconsistent and made from combustible materials. There is one overhead power line that runs through the community, and a nearby substation. The community is a considerable distance from the fire station in Kremmling, so response times will be at least 30 minutes. Moreover, the community is not actually part of the fire protection district, but Kremmling Fire will respond to the area. Other potential hazards include high winds, lightning and a seasonal population.

The dominant vegetation types in the community are sage and grass meadows and stands of aspen. The majority of homes and infrastructure occur in these areas. Also present, are areas of contiguous spruce-fir and lodgepole pine in the upper areas of the community. Rates of spread can be expected to be higher on steep slopes and within drainages present throughout the community, especially since these areas often align with predominant winds and light, flashy fuels. Decreased rates of spread and significantly higher flame lengths can be expected in the forested areas at the top of the community. In these areas, flame lengths could easily exceed 11 feet under extreme weather conditions, with torching and active crown fire also possible.

For all of the homes in the study area, properly implemented defensible space and Firewise home construction are the most important recommendations for home survivability. Due to limited firefighting resources, especially during the early stages of an expanding wildfire incident, high home density, and/or long response times, individual firefighting entities may not be able to stay and protect each individual home. In order to survive a passing flame front, a home will need good defensible space and home construction. Often, homeowners will assume that because they have adequately constructed their home from noncombustible materials and have cleared vegetation around the structure, that firefighters will be able to save their home. However, defensible space needs to be maintained and re-assessed throughout the fire season. The following fuels treatment and general wildfire mitigation recommendations provide a good start for properly protecting one's individual home and the community as a whole. More in-depth information on home construction, defensible space, preparedness planning and evacuation, infrastructure and water supply can be found in Appendix A.

Table 8. Rabbit Ears Village Fuels Treatment Recommendations

Name	Priority	Description	Methods*	Acres**
Defensible Space	1	Defensible space around individual homes. See Appendix A for details.	Hand felling and limbing near homes; mowing; limited mechanical treatments; sage treatments	200' around the home
Roadway Fuelbreak (Along Lower Bear Mountain Road)	2	Remove vegetation below the main roadway area on the western side of the community. This will slow or stop a fire from advancing into the community from an ignition along the highway.	Mowing; sage treatments	4

*****Mechanical treatments in timbered areas include all varieties of logging equipment. Sage treatment options are discussed in Appendix A, page A16.

****** Defensible space distances will vary by property based on slope and fuels. Acreages for fuel treatments are based on a +300' wide fuelbreak. Actual acres treated may vary once project is implemented.

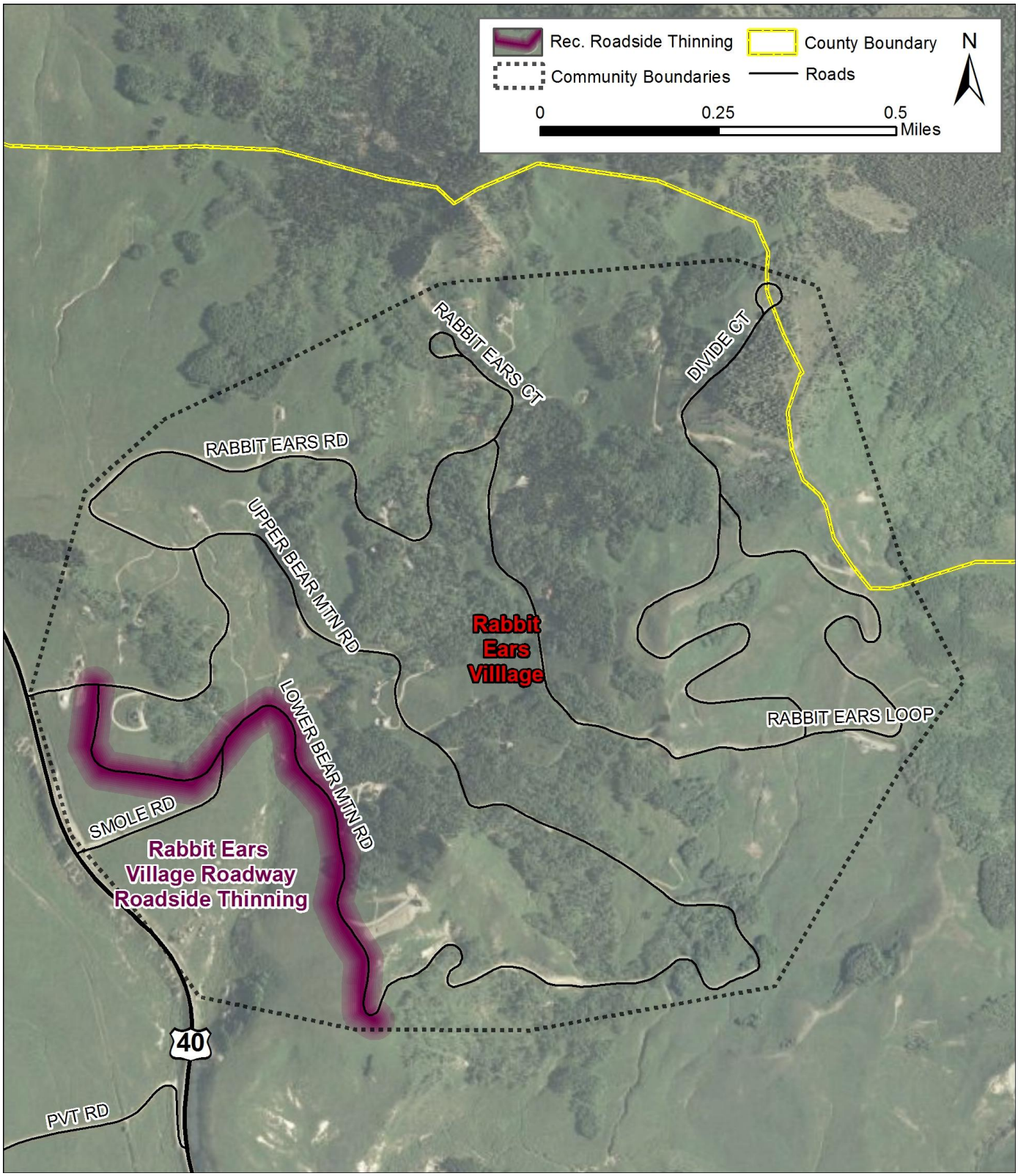


Figure 7. Rabbit Ears Village Fuels Treatments

Table 9. Rabbit Ears Village General Wildfire Mitigation Recommendations

Category	Priority	Description
Home Construction	1	Discourage the use of combustible materials for decks, siding and roofs, especially where homes are upslope from heavy vegetation.
		Replace any shake-shingle or slab-wood siding and roofs with non-combustible types.
		Open areas below decks and projections should be enclosed or screened to prevent the ingress of embers and kept clean of flammable materials, especially where such openings are located on slopes above heavy fuels.
Landscaping/Fuels	2	Remove all standing dead lodgepole trees that are near structures, power lines and roads.
		Clean leaf and needle litter from roofs and gutters and away from foundations.
		Thin vegetation along side roads and driveways. This is especially important for narrow driveways and road segments, and for any areas where ravines with heavy fuels are below the access. Focus on removing vegetation in drainages that cross roads.
		Remove wood piles and any flammable yard clutter to at least 30 feet from structures and propane tanks. Wood piles should be located uphill or even with homes; never downhill.
		Encourage individual landowners to mow fuels near homes and along roadways and fence lines during times of high fire danger.
Preparedness Planning/Evacuation	3	Add reflective addressing to all driveways or homes. A good guideline is to use all metal white markers that are 4” in width on a green background. These should be placed three to five feet above ground.
		Develop an evacuation plan for the community and individual subdivisions, including identifying escape routes and an evacuation center.
		Where available, large safety zones should be maintained and identified in all evacuation planning. These safety zones will need to be of adequate size and quality in order to be effective
Infrastructure	4	Provide adequate turnarounds for fire apparatus throughout the community.
		Ensure that all gates in the community are removable and/or have access codes that are known to all residents and the FPD.
		Identify all water sources within the community, including hydrants, cisterns and ponds, and make sure that they are visible, maintained and operable.

For more detailed recommendations on how to enhance the safety of your home and community, please refer to Appendix A. See also the Ready, Set, Go! Program in Appendix A, page A21.

3. Big Horn Park

Hazard Rating: Very High

The community of Big Horn Park is located northeast of Kremmling off of County Road 24. The area contains numerous homes scattered throughout an open valley and on and around the ridgeline above. There is only one way into the community via County Road 2415, which is blocked at the entrance by an electric gate. There are a number of different loop roads and side roads throughout the community, some of which dead-end at a few homes, and these are not maintained by the county. Most areas have adequate turnarounds for fire apparatus, but not all. Further, many driveways within the community are gated and locked, which makes access difficult and time-consuming for fire personnel. Lot sizes are smaller in the community compared to others in the study area, creating a higher housing density. There are a variety of home construction types in the community, though most have high-fire resistant roofs. There is a mixture of siding and deck construction materials throughout the community, with many homes being constructed of combustible materials. Steep slopes, ravines and mid-slope locations are all topographic features that make the community increasingly at risk from wildfire. Most homes in the community have some sort of defensible space, though certainly not all, and many homeowners have cleared the dead lodgepole pine trees on their property. Open decks are common, with wood and other debris stored underneath. Addressing is poor throughout the community: hard to see or nonexistent in some areas, non-reflective, inconsistent and made from combustible materials. Utility lines are above ground and residents use wood or propane for heating. Aside from a few small ponds, there is no water available to firefighters. Response times to the community will range from 25 to 35 minutes from station due to the long distance from Kremmling. Moreover, the community is not actually part of the fire protection district, but Kremmling Fire will respond to the area.

The main vegetation types in the community are aspen, lodgepole pine and sage/grass meadows. Many of the larger lodgepole trees found in the community are dead, and should be removed in areas where they still currently exist. Rates of spread will be high in areas of grass and sage, especially in areas where high winds, drainages and steep slopes align. The steep hillside leading into the community and the main upward sloping drainage in which most of the homes are will act to further push fire into and throughout the community. A fire starting in this drainage would limit access and egress, and would likely spread onto federal lands to the east. Under extreme weather conditions and high winds, fast moving fires and flame lengths over eight feet are possible.

For all of the homes in the study area, properly implemented defensible space and Firewise home construction are the most important recommendations for home survivability. Due to limited firefighting resources, especially during the early stages of an expanding wildfire incident, high home density, and/or long response times, individual firefighting entities may not be able to stay and protect each individual home. In order to survive a passing flame front, a home will need good defensible space and home construction. Often, homeowners will assume that because they have adequately constructed their home from noncombustible materials and have cleared vegetation around the structure, that firefighters will be able to save their home. However, defensible space needs to be maintained and re-assessed throughout the fire season. The following fuels treatment and general wildfire mitigation recommendations provide a good start for properly protecting one's individual home and the community as a whole. More in-depth information on home construction, defensible space, preparedness planning and evacuation, infrastructure and water supply can be found in Appendix A.

Table 10. Big Horn Park Fuels Treatment Recommendations

Name	Priority	Description	Methods*	Acres**
Defensible Space	1	Defensible space around individual homes. See Appendix A for details.	Hand felling and limbing near homes; mowing; limited mechanical treatments; sage treatments	200' around the home
County Road 2415 Roadside Thinning	2	In order to slow or stop a fire from moving up-drainage into the community and/or cutting of the egress route, fuel loadings should be reduced along the both sides of the road.	Hand felling and limbing due to slope, some mowing/mechanical on top; sage treatments	30
Big Horn Park Drainage Fuelbreak (South of the Community)	2	In order to slow fire spread up-drainage into the community, a fuelbreak should be created below the community in the main drainage area. This project will connect with a proposed CSFS fuels treatment.	Hand felling and limbing in areas of steep slopes; mechanical treatments where useable; sage treatments	32

*****Mechanical treatments in timbered areas include all varieties of logging equipment. Sage treatment options are discussed in Appendix A, page A16.

****** Defensible space distances will vary by property based on slope and fuels. Acreages for fuel treatments are based on a +300' wide fuelbreak. Actual acres treated may vary once project is implemented.

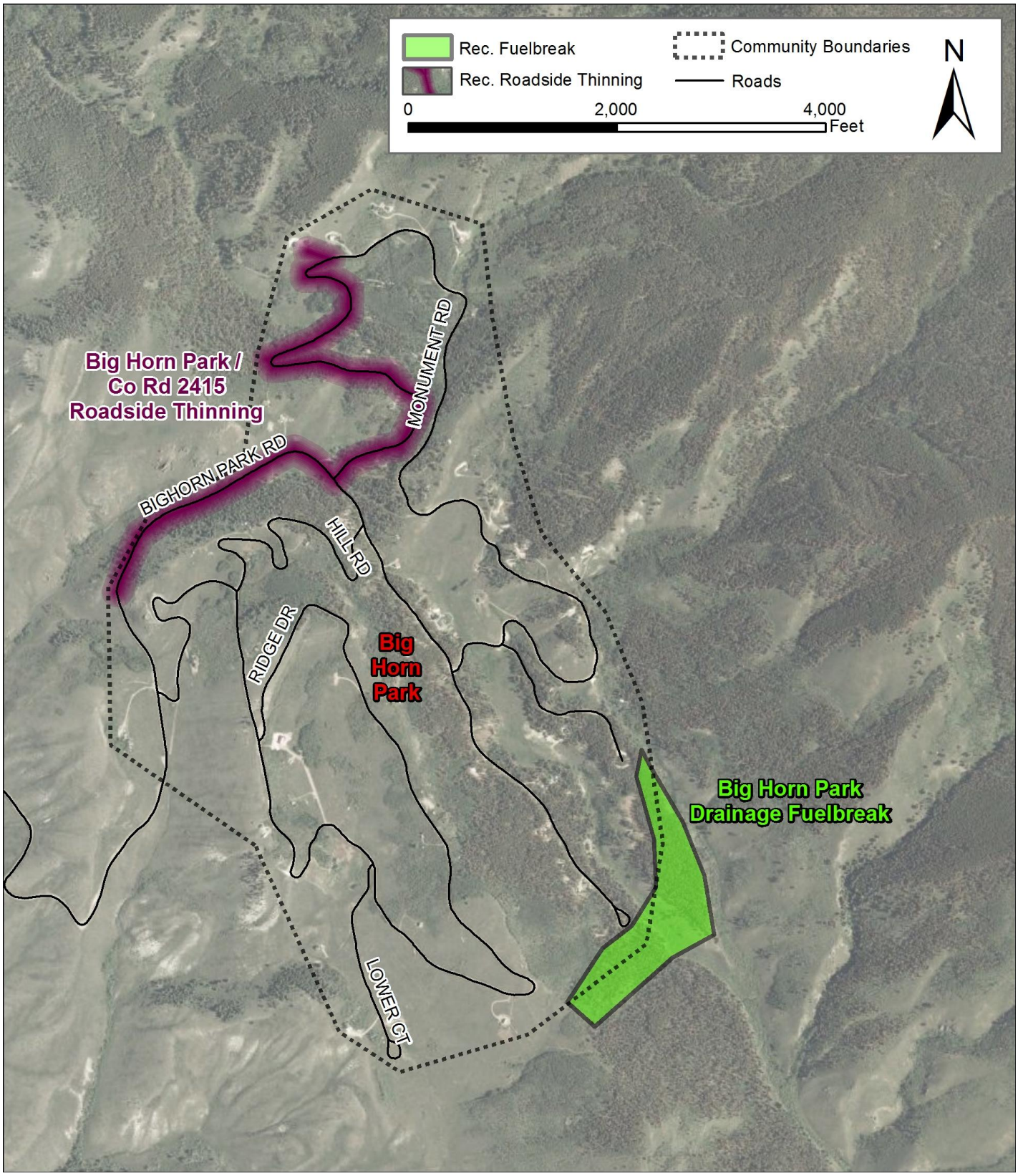


Figure 8. Big Horn Park Fuels Treatments

Table 11. Big Horn Park General Wildfire Mitigation Recommendations

Category	Priority	Description
Home Construction	1	Discourage the use of combustible materials for decks, siding and roofs, especially where homes are upslope from heavy vegetation.
		Replace any shake-shingle or slab-wood siding and roofs with non-combustible types.
		Open areas below decks and projections should be enclosed or screened to prevent the ingress of embers and kept clean of flammable materials, especially where such openings are located on slopes above heavy fuels.
Landscaping/Fuels	2	Remove all standing dead lodgepole trees that are near structures, power lines and roads.
		Clean leaf and needle litter from roofs and gutters and away from foundations.
		Thin vegetation along side roads and driveways. This is especially important for narrow driveways and road segments, and for any areas where ravines with heavy fuels are below the access. Focus on removing vegetation in drainages that cross roads.
		Remove wood piles and any flammable yard clutter to at least 30 feet from structures and propane tanks. Wood piles should be located uphill or even with homes; never downhill.
		Encourage individual landowners to mow fuels near homes and along roadways and fence lines during times of high fire danger.
Preparedness Planning/Evacuation	3	Add reflective addressing to all driveways or homes. A good guideline is to use all metal white markers that are 4” in width on a green background. These should be placed three to five feet above ground.
		Develop a community plan to provide proper maintenance to all community roads.
		Develop an evacuation plan for the community and individual subdivisions, including identifying escape routes and a meeting area.
		Where available, large safety zones should be maintained and identified in all evacuation planning. These safety zones will need to be of adequate size and quality in order to be effective
Infrastructure	4	Provide adequate turnarounds for fire apparatus throughout the community.
		Ensure that all gates in the community are removable and/or have access codes that are known to all residents and the FPD.
		Identify all water sources within the community, including hydrants, cisterns and ponds, and make sure that they are visible, maintained and operable.

For more detailed recommendations on how to enhance the safety of your home and community, please refer to Appendix A. See also the Ready, Set, Go! Program in Appendix A, page A21.

4. Troublesome Valley
Hazard Rating: High


The Troublesome Valley community is located on between County Roads 2 and 22, northeast of Kremmling. Both county roads provide access to the different side roads in the community. County Road 22 is mostly paved throughout, while County Road 2 is well-maintained dirt. Side roads are good gravel, and most have multiple ways in and out. All areas have adequate turnarounds for fire apparatus. Generally, homes have high fire resistant roofing and a mix of noncombustible and combustible siding, including slab-wood. Due to the vegetation present, most homes have good defensible space due to the clearing around the building envelope. However, some homes have flammable debris and wood around the house that contacts the grass and sage in the area. Addressing is poor throughout the community: hard to see or nonexistent in some areas, non-reflective, inconsistent and made from combustible materials. Power lines run overhead in the community, and many residents heat their homes with propane or wood. The community is relatively close to Kremmling, so response times should be between 10 to 15 minutes once fire personnel reach the station. There are no hydrants in the community, and the only water sources are a couple of small ponds which could be drafted from. Other risks factors include adjacent agricultural burning and high winds.

The community is covered entirely by sage and grass. Given an ignition source and high winds, these light, flashy fuels will act to quickly spread fire throughout the community area. Though much of the community area is relatively flat, there are a number of steep hillsides and a network of small, narrow drainages that will further exacerbate fire spread. Due to the vegetation present, flame lengths are predicted to be less than four feet. However, fast rates of spread can be expected due to high winds in the area, steep terrain and drainages, and an abundance of light, flashy fuels. Homeowners in the area will greatly benefit by keeping an area free of vegetation around homes and other structures.

For all of the homes in the study area, properly implemented defensible space and Firewise home construction are the most important recommendations for home survivability. Due to limited firefighting resources, especially during the early stages of an expanding wildfire incident, high home density, and/or long response times, individual firefighting entities may not be able to stay and protect each individual home. In order to survive a passing flame front, a home will need good defensible space and home construction. Often, homeowners will assume that because they have adequately constructed their home from noncombustible materials and

have cleared vegetation around the structure, that firefighters will be able to save their home. However, defensible space needs to be maintained and re-assessed throughout the fire season. The following fuels treatment and general wildfire mitigation recommendations provide a good start for properly protecting one's individual home and the community as a whole. More in-depth information on home construction, defensible space, preparedness planning and evacuation, infrastructure and water supply can be found in Appendix A.

Table 12. Troublesome Valley Fuels Treatment Recommendations

Name	Priority	Description	Methods*	Acres**
Defensible Space	1	Defensible space around individual homes. See Appendix A for details.	Mowing; sage treatments	100' around the home

***** Sage treatment options are discussed in Appendix A, page A16.
****** Defensible space distances will vary by property based on slope and fuels.

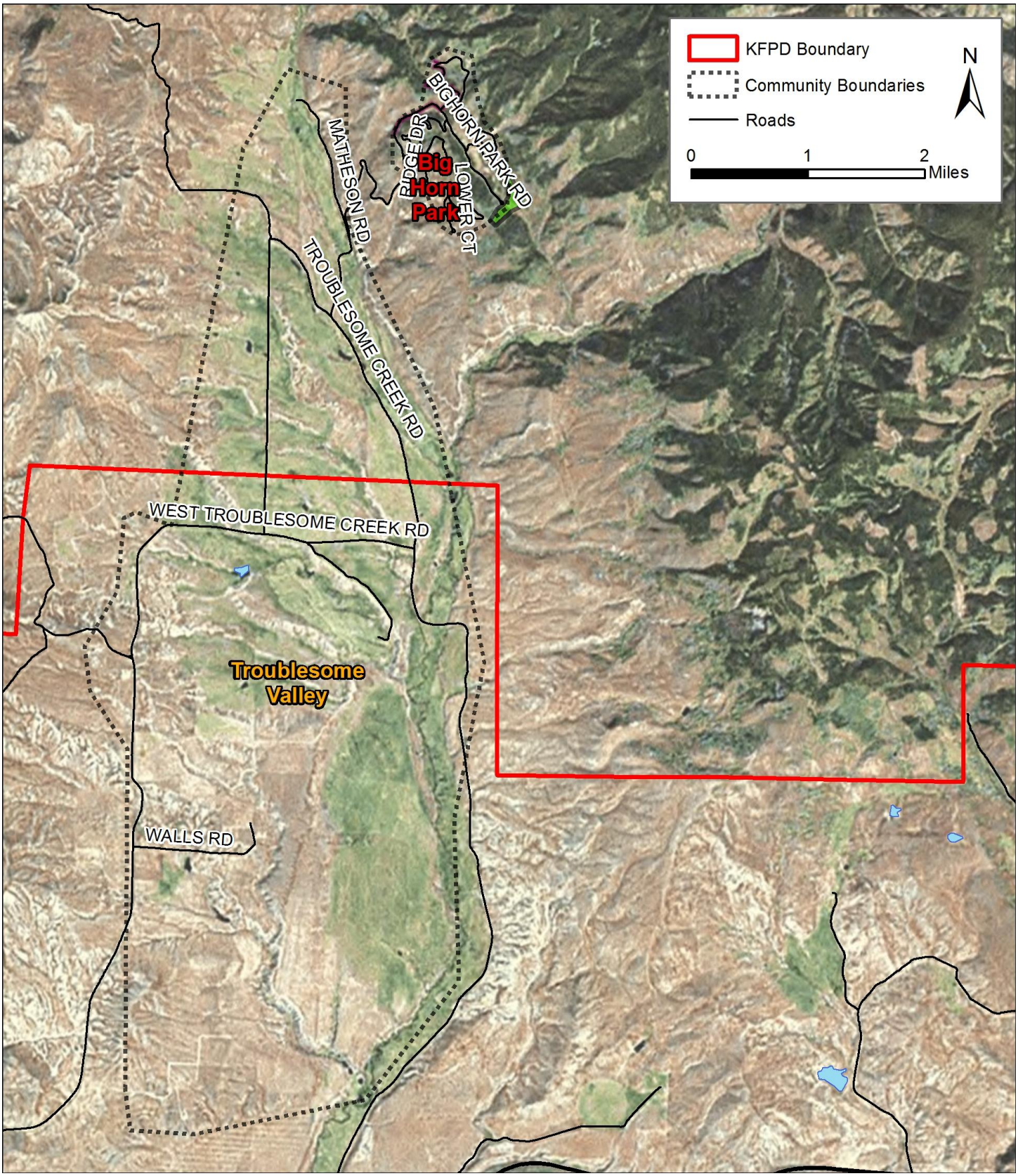


Figure 9. Troublesome Valley

Table 13. Troublesome Valley General Wildfire Mitigation Recommendations

Category	Priority	Description
Home Construction	1	Discourage the use of combustible materials for decks, siding and roofs, especially where homes are upslope from heavy vegetation.
		Replace any shake-shingle or slab-wood siding and roofs with non-combustible types.
		Open areas below decks and projections should be enclosed or screened to prevent the ingress of embers and kept clean of flammable materials, especially where such openings are located on slopes above heavy fuels.
Landscaping/Fuels	2	Remove all standing dead lodgepole trees that are near structures, power lines and roads.
		Clean leaf and needle litter from roofs and gutters and away from foundations.
		Thin vegetation along side roads and driveways. This is especially important for narrow driveways and road segments, and for any areas where ravines with heavy fuels are below the access. Focus on removing vegetation in drainages that cross roads.
		Remove wood piles and any flammable yard clutter to at least 30 feet from structures and propane tanks. Wood piles should be located uphill or even with homes; never downhill.
		Encourage individual landowners to mow fuels near homes and along roadways and fence lines during times of high fire danger.
Preparedness Planning/Evacuation	3	Add reflective addressing to all driveways or homes. A good guideline is to use all metal white markers that are 4” in width on a green background. These should be placed three to five feet above ground.
		Develop a community plan to provide proper maintenance to all community roads.
		Develop an evacuation plan for the community and individual subdivisions, including identifying escape routes and an evacuation center.
		Where available, large safety zones should be maintained and identified in all evacuation planning. These safety zones will need to be of adequate size and quality in order to be effective
Infrastructure	4	Provide adequate turnarounds for fire apparatus throughout the community.
		Identify all water sources within the community, including hydrants, cisterns and ponds, and make sure that they are visible, maintained and operable.

For more detailed recommendations on how to enhance the safety of your home and community, please refer to Appendix A. See also the Ready, Set, Go! Program in Appendix A, page A21.

5. Old Park / Gore Lakes
Hazard Rating: Very High

The Old Park/Gore Lakes community is located northwest of Kremmling, on both sides of Highway 134 on the way up to Gore Pass. There are multiple access points into the Old Park Subdivision, but only one way in and out on the various branches of the Gore Lakes side. Roads throughout are good gravel, and greater than 22' wide. Most areas have adequate turnarounds for fire apparatus, though a number of driveways are blocked by metal gates and others have road archways that are low enough that they may need to be cut or removed in order for fire personnel to access homes with large trucks. There is a wide variety of vegetation types in the community, with homes present in all. Most homes have adequate defensible space, especially lower down in the community, but not all in the upper areas with lodgepole pine and spruce-fir. There are a wide variety of construction types in the community, but most have high fire resistant roof construction, aside from a few shake-shingle roofs. Siding and deck materials are a mix of combustible and noncombustible. Addressing is poor throughout the community: hard to see or nonexistent in some areas, non-reflective, inconsistent and made from combustible materials. Overhead power lines criss-cross the community throughout, and could be a potential fire hazard during an extreme wind event, or during a large wildfire. Many homes in the community use propane or wood for heat, and some had vegetation surrounding propane tanks and wood stacked against the house. There are no hydrants in the community, though there are areas where apparatus could draft from seasonal streams and from the many ponds located throughout. Response times to the area are expected to be 20 to 30 minutes from the station. Additional risk factors include high winds and relatively high housing densities.

There are a wide variety of vegetation types within the community, including grass and shrub meadows, juniper, aspen, lodgepole pine and spruce-fir. Rates of spread will be high in lower sections of the community around Highway 134, where grass, sage and juniper predominate. Lower rates of spread, but much higher flame lengths can be expected in areas of lodgepole pine and spruce-fir. Torching and active crown fire is possible in the more densely forested western and southern sections of the community. However, extreme weather conditions would be required for these areas to actively burn. Steep slopes within the community will act to further increase fire spread, especially in the northeast section of the community and among the many small drainages that run throughout. Most of the large lodgepole pines trees still left in the community are dead, though some landowners have cleared many of these out. The US Forest Service has also logged along adjacent agency roads to clear these trees out.

For all of the homes in the study area, properly implemented defensible space and Firewise home construction are the most important recommendations for home survivability. Due to limited firefighting resources, especially during the early stages of an expanding wildfire incident, high home density, and/or long response times, individual firefighting entities may not be able to stay and protect each individual home. In order to survive a passing flame front, a home will need good defensible space and home construction. Often, homeowners will assume that because they have adequately constructed their home from noncombustible materials and have cleared vegetation around the structure, that firefighters will be able to save their home. However, defensible space needs to be maintained and re-assessed throughout the fire season. The following fuels treatment and general wildfire mitigation recommendations provide a good start for properly protecting one's individual home and the community as a whole. More in-depth information on home construction, defensible space, preparedness planning and evacuation, infrastructure and water supply can be found in Appendix A.

Table 14. Old Park / Gore Lakes Fuels Treatment Recommendations

Name	Priority	Description	Methods*	Acres**
Defensible Space	1	Defensible space around individual homes. See Appendix A for details.	Hand felling and limbing near homes; mowing; limited mechanical treatments; sage treatments	200' around the home
Connect Current and Re-Enter Previous FS Fuels Treatments (Old Park/Gore Lakes Fuelbreak)	2	There are a number of recently completed and old USFS treatments surrounding the perimeter of the community. These treatments should be connected and/or re-entered so that a continuous fuelbreak is created around the community.	Hand treatments on steep slopes and where access is poor; mechanical treatments where applicable	1,900

*****Mechanical treatments in timbered areas include all varieties of logging equipment. Sage treatment options are discussed in Appendix A, page A16.

****** Defensible space distances will vary by property based on slope and fuels. Acreages for fuel treatments are based on a +300' wide fuelbreak. Actual acres treated may vary once project is implemented.

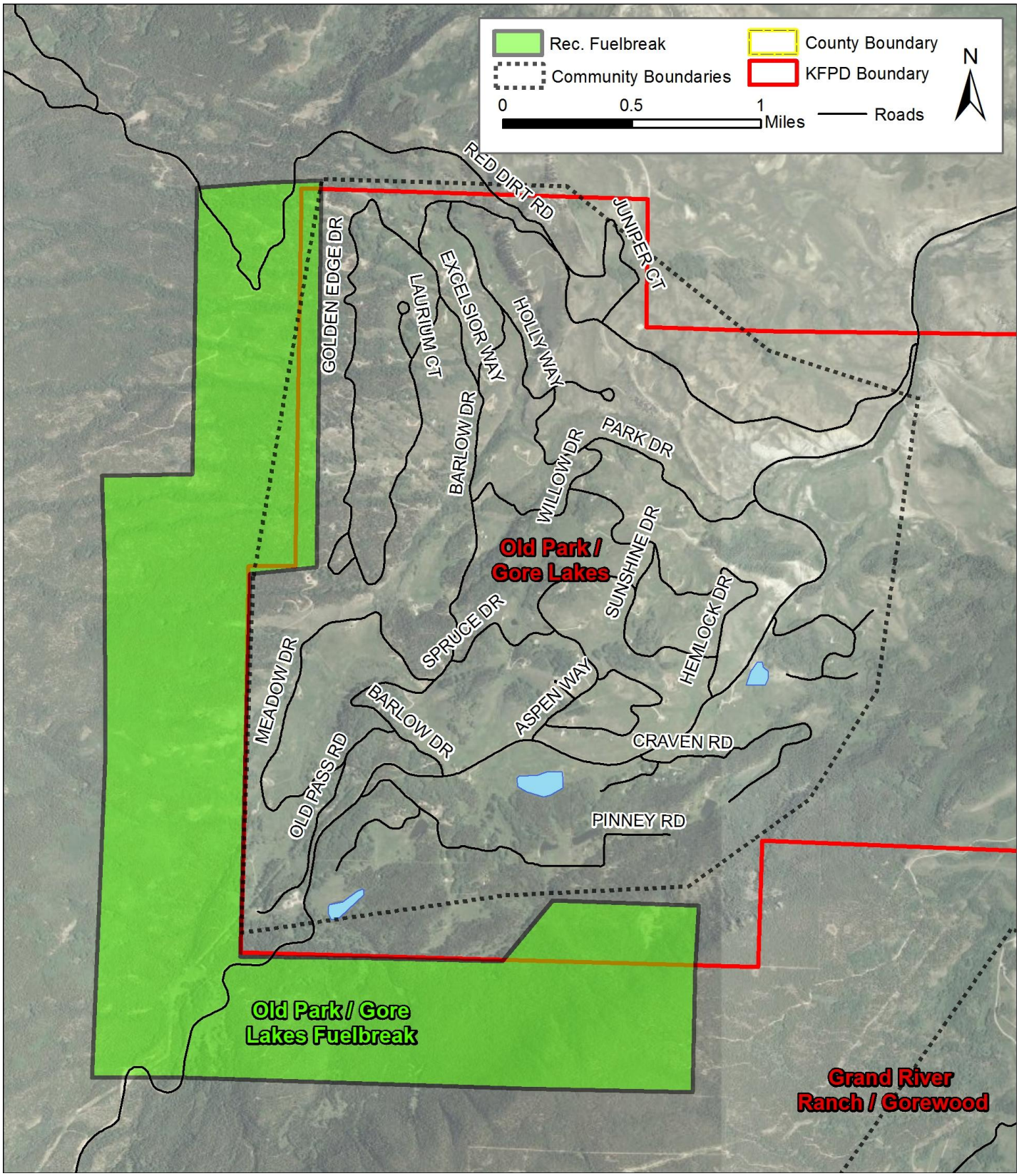


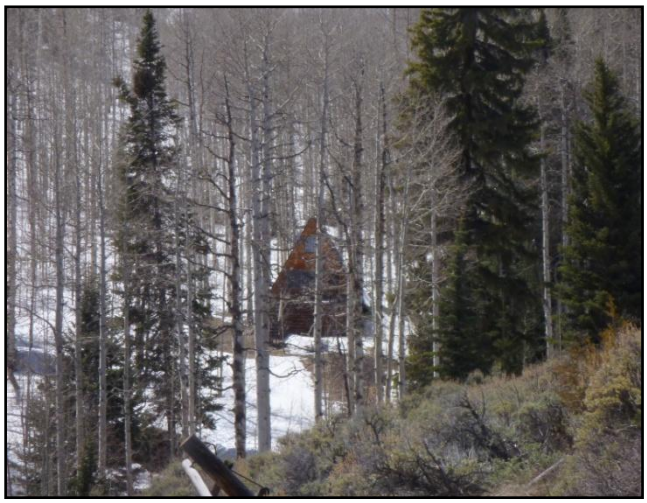
Figure 10. Old Park / Gore Lakes Fuelbreak

Table 15. Old Park / Gore Lakes General Wildfire Mitigation Recommendations

Category	Priority	Description
Home Construction	1	Discourage the use of combustible materials for decks, siding and roofs, especially where homes are upslope from heavy vegetation.
		Replace any shake-shingle or slab-wood siding and roofs with non-combustible types.
		Open areas below decks and projections should be enclosed or screened to prevent the ingress of embers and kept clean of flammable materials, especially where such openings are located on slopes above heavy fuels.
Landscaping/Fuels	2	Remove all standing dead lodgepole trees that are near structures, power lines and roads.
		Clean leaf and needle litter from roofs and gutters and away from foundations.
		Thin vegetation along side roads and driveways. This is especially important for narrow driveways and road segments, and for any areas where ravines with heavy fuels are below the access. Focus on removing vegetation in drainages that cross roads.
		Remove wood piles and any flammable yard clutter to at least 30 feet from structures and propane tanks. Wood piles should be located uphill or even with homes; never downhill.
		Encourage individual landowners to mow fuels near homes and along roadways and fence lines during times of high fire danger.
Preparedness Planning/Evacuation	3	Add reflective addressing to all driveways or homes. A good guideline is to use all metal white markers that are 4” in width on a green background. These should be placed three to five feet above ground.
		Develop an evacuation plan for the community and individual subdivisions, including identifying escape routes and an evacuation center.
		A ‘No Outlet’ sign should identify all dead end streets.
		Where available, large safety zones should be maintained and identified in all evacuation planning. These safety zones will need to be of adequate size and quality in order to be effective
Infrastructure	4	Provide adequate turnarounds for fire apparatus throughout the community.
		Ensure that all gates in the community are removable and that archways are high enough for access by fire apparatus.
		Identify all water sources within the community, including hydrants, cisterns and ponds, and make sure that they are visible, maintained and operable.

For more detailed recommendations on how to enhance the safety of your home and community, please refer to Appendix A. See also the Ready, Set, Go! Program in Appendix A, page A21.

6. Grand River Ranch / Gorewood
Hazard Rating: Very High



The Grand River Ranch/Gorewood community is located west of Kremmling, off of Highway 40. The Grand River Ranch Subdivision encompasses the majority of the community area. There are multiple ways in and out on good dirt roads, though due to large parcel sizes in the hundreds of acres, response times could be long. There is gated access into the subdivision, and most homes have individual gates or gated access roads. The fire department has the code or key for many of these gates, but not all. Most homes have decent defensible space implementation. Turnarounds at most houses are adequate for fire apparatus. Home construction varies, but most homes have high fire resistant roofs. Addressing in the area is often hard to see, is inconsistent, and usually made of combustible materials. Most residents are seasonal, which could make evacuations difficult. There are a number of small ponds in the area for water, as well as large underground cisterns at some homes. Further, most of the homes are sprinklered inside, and sometimes outside, the home.

The smaller Gorewood Subdivision is located in the southwest corner of the community area. There is currently only one way in and out of the subdivision on a long, narrow dirt road that is gated at the entrance. Homes lack defensible space and most do not have adequate turnarounds for fire apparatus. Home construction varies widely, but most homes have high fire resistance roofs. All homes are only for seasonal use. Addressing is poor throughout the community: hard to see or nonexistent in some areas, non-reflective, inconsistent and made from combustible materials. Lot sizes are small, so density is much higher than in Grand River Ranch. Response times for the community as whole will be approximately 15 to 25 minutes and longer for homes in Gorewood due to its location at the end of the main road. Other noteworthy areas of concern for both subdivisions in the community are high winds and steep hillsides and drainages, which will act to increase fire spread.

There is a wide variety of vegetation types in the community, including grass/sage meadows, scattered juniper trees, aspen, lodgepole pine and spruce-fir. Grass and shrubs predominate lower down near the entrances to the community, while forested sections occur near most of the homes. Rapid rates of spread can be expected in grass and shrub areas, especially on steep hillsides and in drainages. Lower rates of spread and high flame lengths can be expected in forested sections, though these areas are only likely to burn when drought conditions align with

low relative humidity and high winds. Topography in the area is also likely to aid in fire spread. There are a number of steep, heavily vegetated drainages that run into and throughout the community, and of special concern is the drainage that runs up from the Colorado River into the community area, where the subdivision of Gorewood lies. The area to the north and west where heavily forested, steep hillsides run up from Highway 134 is also a concern.

For all of the homes in the study area, properly implemented defensible space and Firewise home construction are the most important recommendations for home survivability. Due to limited firefighting resources, especially during the early stages of an expanding wildfire incident, high home density, and/or long response times, individual firefighting entities may not be able to stay and protect each individual home. In order to survive a passing flame front, a home will need good defensible space and home construction. Often, homeowners will assume that because they have adequately constructed their home from noncombustible materials and have cleared vegetation around the structure, that firefighters will be able to save their home. However, defensible space needs to be maintained and re-assessed throughout the fire season. The following fuels treatment and general wildfire mitigation recommendations provide a good start for properly protecting one's individual home and the community as a whole. More in-depth information on home construction, defensible space, preparedness planning and evacuation, infrastructure and water supply can be found in Appendix A.

Table 16. Grand River Ranch / Gorewood Fuels Treatment Recommendations

Name	Priority	Description	Methods*	Acres**
Defensible Space	1	Defensible space around individual homes. See Appendix A for details.	Hand felling and limbing near homes; mowing; limited mechanical treatments; sage treatments	200' around the home
Golden Edge Drive Evacuation Route Thinning	2	Reduce fuel loadings along both sides of the road, taking into consideration fuels and home location. This will aid in the egress of residents by reducing fire intensity and smoke.	Hand felling and limbing; limited mechanical in certain areas	80
Golden Edge Drive Evacuation Route Development and Thinning	2	Creating a second way to get back to the main road will shorten evacuation times and provide another way out should the main road out get cut off. Fuel along this road addition should be thinned.	Hand felling and limbing; limited mechanical in certain areas	4

*****Mechanical treatments in timbered areas include all varieties of logging equipment. Sage treatment options are discussed in Appendix A, page A16.

****** Defensible space distances will vary by property based on slope and fuels. Acreages for fuel treatments are based on a +300' wide fuelbreak. Actual acres treated may vary once project is implemented.

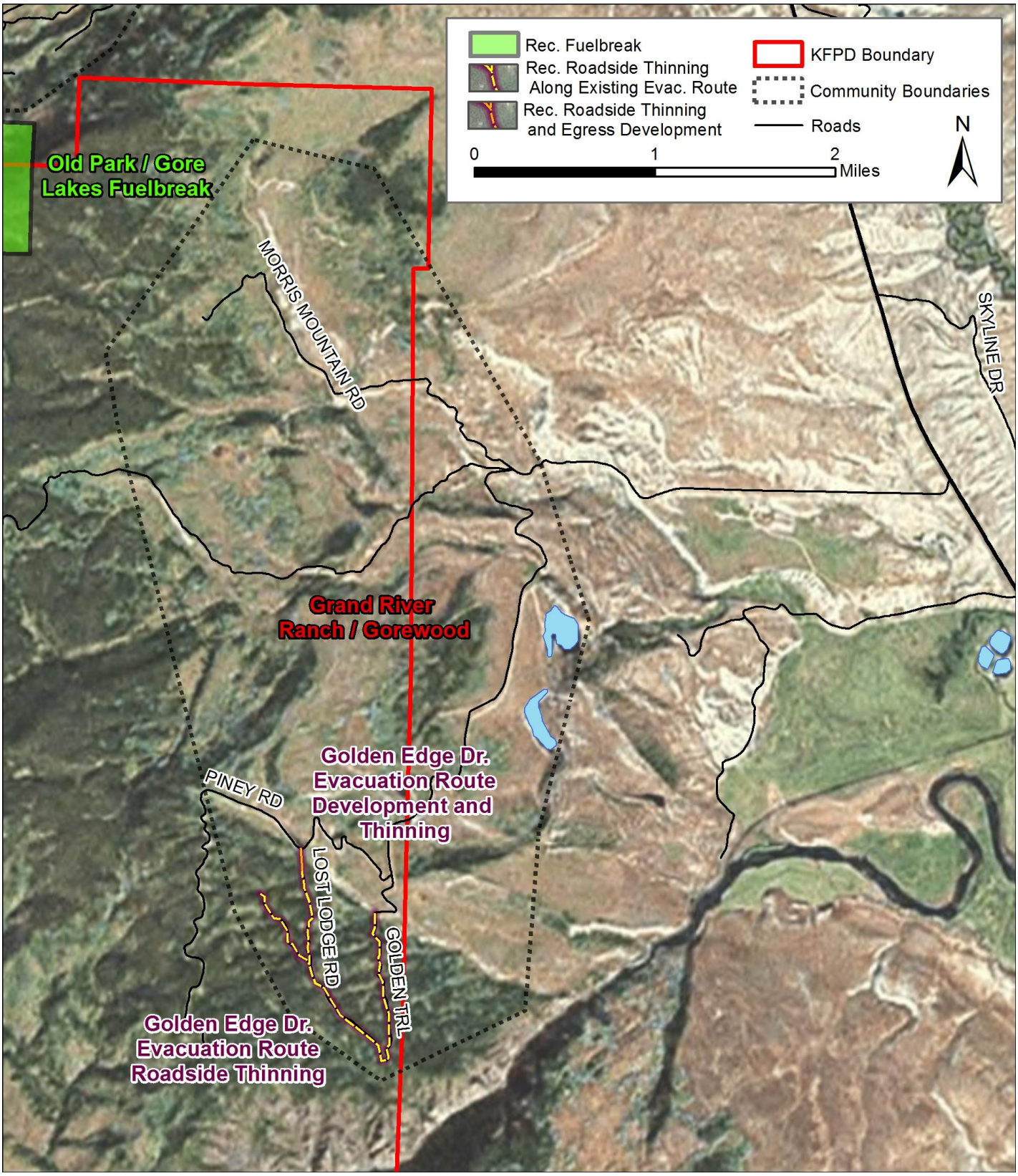


Figure 11. Grand River Ranch / Gorewood Fuels Treatment Recommendations

Table 17. Grand River Ranch / Gorewood General Wildfire Mitigation Recommendations

Category	Priority	Description
Home Construction	1	Discourage the use of combustible materials for decks, siding and roofs, especially where homes are upslope from heavy vegetation.
		Replace any shake-shingle or slab-wood siding and roofs with non-combustible types.
		Open areas below decks and projections should be enclosed or screened to prevent the ingress of embers and kept clean of flammable materials, especially where such openings are located on slopes above heavy fuels.
Landscaping/Fuels	2	Remove all standing dead lodgepole trees that are near structures, power lines and roads.
		Clean leaf and needle litter from roofs and gutters and away from foundations.
		Thin vegetation along side roads and driveways. This is especially important for narrow driveways and road segments, and for any areas where ravines with heavy fuels are below the access. Focus on removing vegetation in drainages that cross roads.
		Remove wood piles and any flammable yard clutter to at least 30 feet from structures and propane tanks. Wood piles should be located uphill or even with homes; never downhill.
		Encourage individual landowners to mow fuels near homes and along roadways and fence lines during times of high fire danger.
Preparedness Planning/Evacuation	3	Add reflective addressing to all driveways or homes. A good guideline is to use all metal white markers that are 4” in width on a green background. These should be placed three to five feet above ground.
		Develop an evacuation plan for the community and individual subdivisions, including identifying escape routes and a meeting area.
		Where available, large safety zones should be maintained and identified in all evacuation planning. These safety zones will need to be of adequate size and quality in order to be effective
Infrastructure	4	Provide adequate turnarounds for fire apparatus throughout the community.
		Ensure that all gates in the community are removable and/or have access codes that are known to all residents and the FPD.
		Identify all water sources within the community, including hydrants, cisterns and ponds, and make sure that they are visible, maintained and operable.

For more detailed recommendations on how to enhance the safety of your home and community, please refer to Appendix A. See also the Ready, Set, Go! Program in Appendix A, page A21.

7. Blue Valley Acres 1 and 2
Hazard Rating: High


The Blue Valley Acres community includes the Blue Valley 1 and 2 Subdivisions, and is located off of Highway 9, south of Kremmling. There are multiple ways in and out of the community on gravel roads that are in need of improvement. There is a network of loop roads and side roads that access all of the homes in the community, all of which have reflective, non-combustible signing. The vast majority of homes have adequate turnarounds for fire apparatus. Overall, the entirety of the community is flat, though there are homes on the western edge of the community that are located directly adjacent to the steep sides of the Blue River valley. The vegetation is mostly grass and sage, though there are trees in drainages and along the Blue River corridor. Roofs have high fire resistance throughout the community, though siding and deck construction is a mix of combustible and noncombustible construction. Some homes have shake-shingle and slab-wood siding, both of which are especially flammable. Most homes in the community have adequate defensible space due to clearing of sage and grass around the building envelope, though some homes do have flammable debris against and around the house, including large piles of wood. Addressing is poor throughout the community: hard to see or nonexistent in some areas, non-reflective, inconsistent and made from combustible materials. There are no hydrants in the Blue Valley 1 Subdivision, though there are some in Blue Valley 2, which are fed from a spring-fed tank. These hydrants are tested, though not annually. Water could also be drafted and shuttled from the nearby Blue River, with return times averaging around five to 10 minutes. Response times to the community will be 15 to 20 minutes from station short due to the community's locations near the highway and proximity to Kremmling.

The primary vegetation types in the community are sage and grass meadows. These light, flashy fuels will burn fast and spread fire quickly. The majority of the community area is flat, though the main drainage that separates the two subdivisions and the steep hillside leading up into the community from the Blue River are steep and will greatly increase fire spread. Due to the vegetation present, flame lengths will be generally less than four feet. However rapid rates of spread are expected due to high winds, some steep terrain and an abundance of light, flashy fuels. Homes in the area will greatly benefit by keeping an area free of vegetation around homes and other structures.

For all of the homes in the study area, properly implemented defensible space and Firewise home construction are the most important recommendations for home survivability. Due to limited firefighting resources, especially during the early stages of an expanding wildfire incident, high home density, and/or long response times, individual firefighting entities may not be able to stay and protect each individual home. In order to survive a passing flame front, a home will need good defensible space and home construction. Often, homeowners will assume that because they have adequately constructed their home from noncombustible materials and have cleared vegetation around the structure, that firefighters will be able to save their home. However, defensible space needs to be maintained and re-assessed throughout the fire season. The following fuels treatment and general wildfire mitigation recommendations provide a good start for properly protecting one's individual home and the community as a whole. More in-depth information on home construction, defensible space, preparedness planning and evacuation, infrastructure and water supply can be found in Appendix A.

Table 18. Blue Valley Acres Fuels Treatment Recommendations

Name	Priority	Description	Methods*	Acres**
Defensible Space	1	Defensible space around individual homes. See Appendix A for details.	Hand felling and limbing near homes; mowing; limited mechanical treatments; sage treatments	200' around the home

***** Sage treatment options are discussed in Appendix A, page A16.

****** Defensible space distances will vary by property based on slope and fuels.

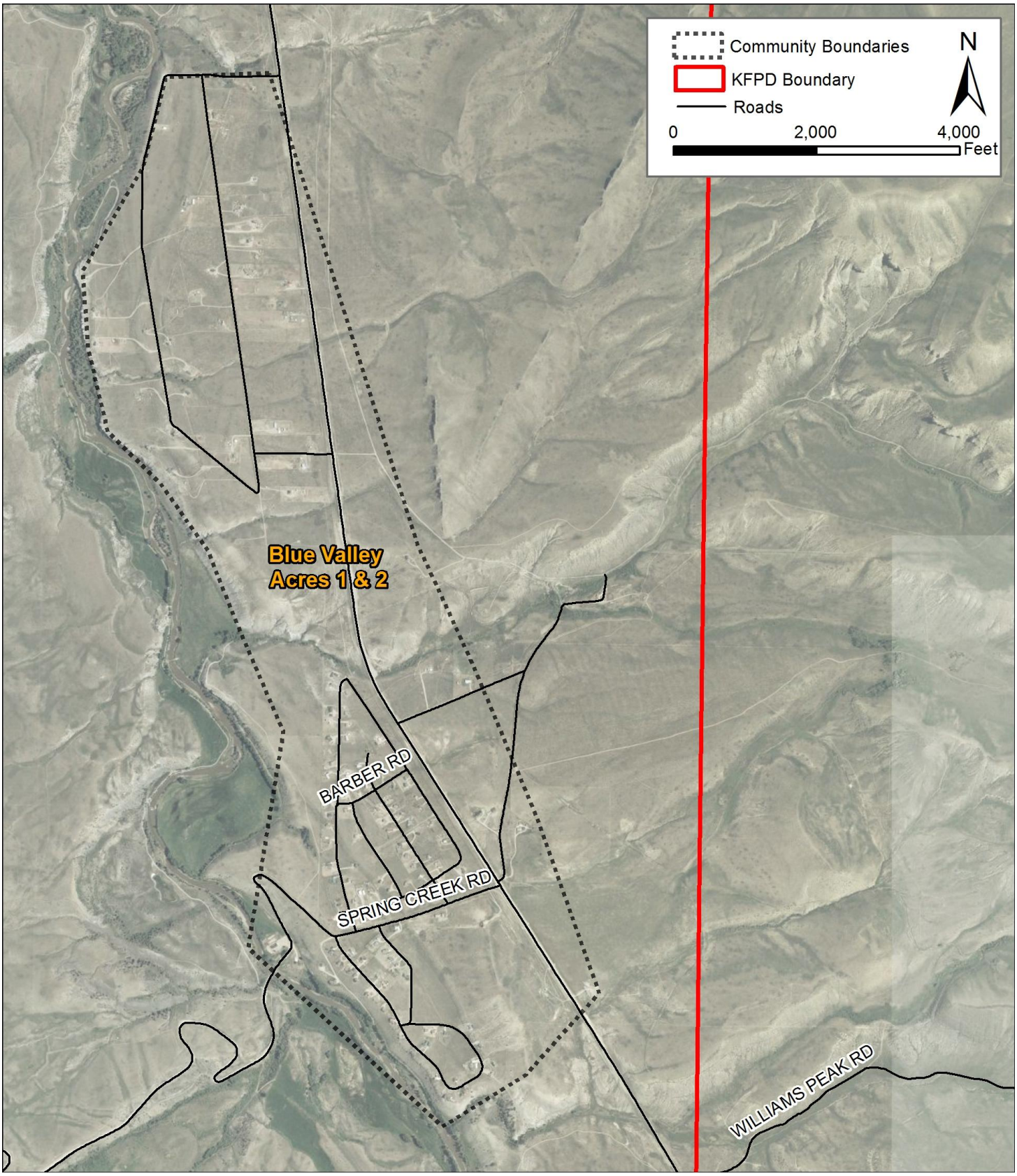


Figure 12. Blue Valley Acres 1 & 2

Table 19. Blue Valley Acres General Wildfire Mitigation Recommendations

Category	Priority	Description
Home Construction	1	Discourage the use of combustible materials for decks, siding and roofs, especially where homes are upslope from heavy vegetation.
		Replace any shake-shingle or slab-wood siding and roofs with non-combustible types.
		Open areas below decks and projections should be enclosed or screened to prevent the ingress of embers and kept clean of flammable materials, especially where such openings are located on slopes above heavy fuels.
Landscaping/Fuels	2	Clean leaf and needle litter from roofs and gutters and away from foundations.
		Thin vegetation along side roads and driveways. This is especially important for narrow driveways and road segments, and for any areas where ravines with heavy fuels are below the access. Focus on removing vegetation in drainages that cross roads.
		Remove wood piles and any flammable yard clutter to at least 30 feet from structures and propane tanks. Wood piles should be located uphill or even with homes; never downhill.
		Encourage individual landowners to mow fuels near homes and along roadways and fence lines during times of high fire danger.
Preparedness Planning/Evacuation	3	Add reflective addressing to all driveways or homes. A good guideline is to use all metal white markers that are 4” in width on a green background. These should be placed three to five feet above ground.
		Maintain and repair county roads within the community to improve access for fire apparatus.
		A ‘No Outlet sign’ should identify all dead end streets.
		Develop an evacuation plan for the community and individual subdivisions, including identifying escape routes and a meeting area.
Infrastructure	4	Provide adequate turnarounds for fire apparatus throughout the community.
		Identify all water sources within the community, including hydrants, cisterns and ponds, and make sure that they are visible, maintained and operable.

For more detailed recommendations on how to enhance the safety of your home and community, please refer to Appendix A. See also the Ready, Set, Go! Program in Appendix A, page A21.

8. Shadow Creek / Spring Creek
Hazard Rating: Very High

The Spring Creek/Shadow Creek community is located west of Highway 9 on the Spring Creek Road. There are multiple ways in and out of the community, though the back loop portion that connects the two subdivisions is currently blocked by a locked gate. Many side roads with the community are long and one way in and out. Main roads are dirt and decently maintained, but some side roads are currently poorly maintained. There is a mixture of metal and shake-shingle roofs in the community, the latter of which is flammable and susceptible to ember fallout. Siding and deck construction is mostly noncombustible. Some of the homes in the area have decent defensible space, but the majority situated in timbered areas lack any defensible space implementation. Moreover, there are four small cabins located south of the community area which are utilized by both residents and visitors. These cabins are of particular concern because they are accessed by a narrow, poorly maintained dirt road, have no defensible space, and there are no landlines or cell service in the area.

Addressing is present in the community, but is made of wood, which could burn, and is non-reflective and could be hard to see during smoky or nighttime conditions. Street signs are a mix of wood and metal construction. There are overhead power lines that run through the community, which could be a potential fire hazard during an extreme wind event, or during a large wildfire. There are small hydrants in the Shadow Creek subdivision, but no source of water in the Spring Creek subdivision. The community is actually part of the Lower Blue FPD, and is currently covered by the Lake Dillon FPD, but Kremmling Fire will respond to the area due to its closer proximity. It is a considerable distance from the fire stations in Kremmling or in Lake Dillon, so response times may exceed 20 minutes. Additional risk factors include high winds, a non year-round population, and low archways across roads which may need to be removed or cut in order for fire apparatus to access the house.

The community is divided between areas of open, grassy meadows and densely forested sections. The majority of homes are found in these areas, where spruce-fir and lodgepole pine predominate, with scattered areas of aspen. Open meadows may burn under both moderate and extreme weather scenarios, and rapid rates of spread can be expected when these fields dry out in the summer and fall. Rates of spread are lower in forested areas, but flame lengths could easily exceed 11 feet under extreme weather conditions. However, forested stands are not likely to experience active fire behavior unless drought is combined with high temperatures,

low relative humidity, and high winds. One area of potential concern for the community is the steep, heavily forested drainage south of the community where an active, up-drainage moving fire could quickly push fire into the community. Since most homes in forested areas lack defensible space, this is of particular concern.

For all of the homes in the study area, properly implemented defensible space and Firewise home construction are the most important recommendations for home survivability. Due to limited firefighting resources, especially during the early stages of an expanding wildfire incident, high home density, and/or long response times, individual firefighting entities may not be able to stay and protect each individual home. In order to survive a passing flame front, a home will need good defensible space and home construction. Often, homeowners will assume that because they have adequately constructed their home from noncombustible materials and have cleared vegetation around the structure, that firefighters will be able to save their home. However, defensible space needs to be maintained and re-assessed throughout the fire season. The following fuels treatment and general wildfire mitigation recommendations provide a good start for properly protecting one's individual home and the community as a whole. More in-depth information on home construction, defensible space, preparedness planning and evacuation, infrastructure and water supply can be found in Appendix A.

Table 20. Shadow Creek / Spring Creek Fuels Treatment Recommendations

Name	Priority	Description	Methods*	Acres**
Defensible Space	1	Defensible space around individual homes and cabins. See Appendix A for details.	Hand felling and limbing near homes; mowing; limited mechanical treatments; sage treatments	200' around the home
Spring Creek Road Evacuation Route Thinning	2	Reduce fuel loads along both sides of the roadway in timbered areas to aid in the egress of residents. Side roads leading onto the main road should also be thinned due to the number of houses present.	Hand felling and limbing near homes; limited mechanical treatments where safe	60

*****Mechanical treatments in timbered areas include all varieties of logging equipment.
****** Defensible space distances will vary by property based on slope and fuels. Acreages for fuel treatments are based on a +300' wide fuelbreak. Actual acres treated may vary once project is implemented.

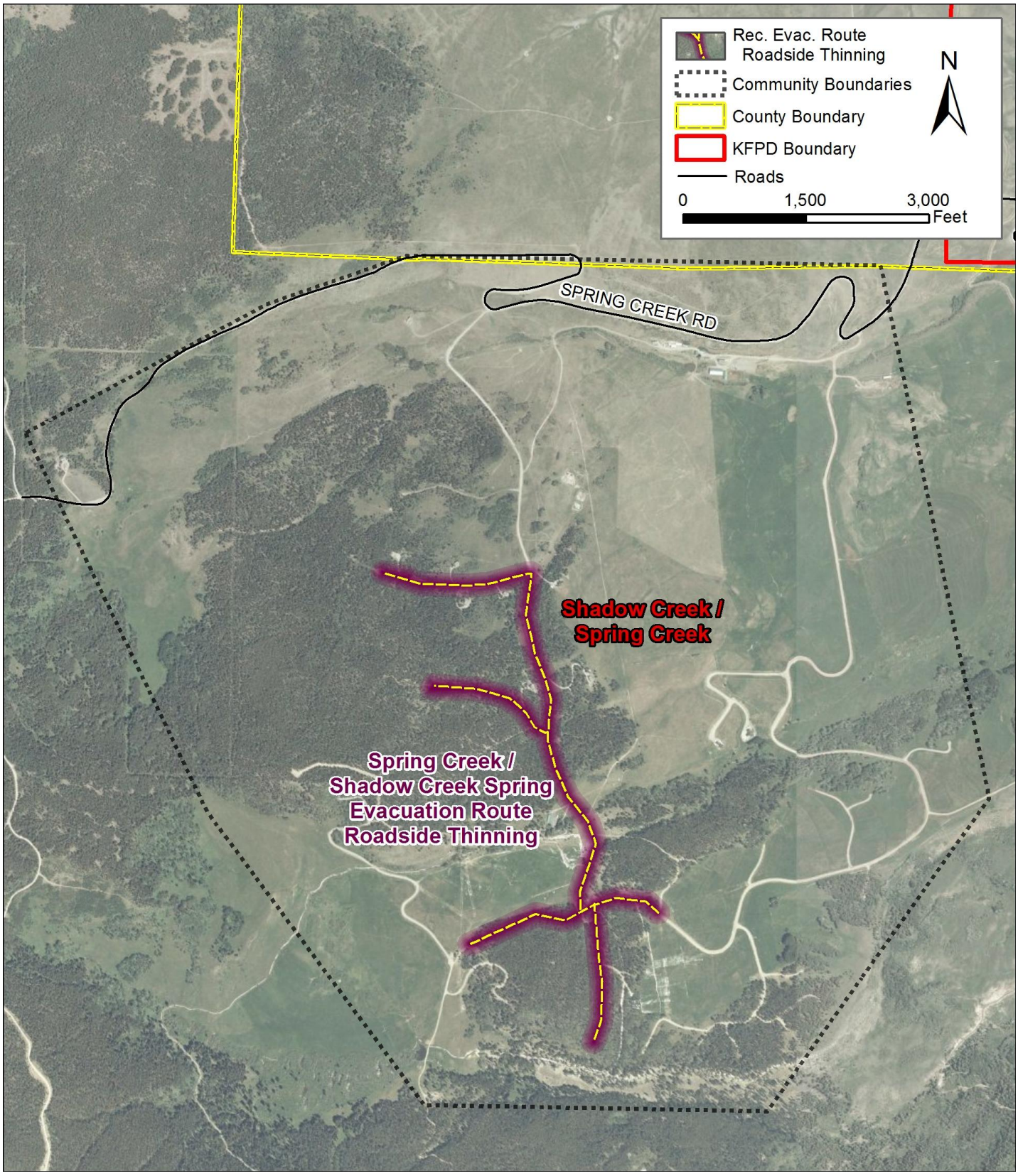


Figure 13. Spring Creek / Shadow Creek Fuels Treatments

Table 21. Shadow Creek / Spring Creek General Wildfire Mitigation Recommendations

Category	Priority	Description
Home Construction	1	Discourage the use of combustible materials for decks, siding and roofs, especially where homes are upslope from heavy vegetation.
		Replace any shake-shingle or slab-wood siding and roofs with non-combustible types.
		Open areas below decks and projections should be enclosed or screened to prevent the ingress of embers and kept clean of flammable materials, especially where such openings are located on slopes above heavy fuels.
Landscaping/Fuels	2	Remove all standing dead lodgepole trees that are near structures, power lines and roads.
		Thin vegetation along side roads and driveways. This is especially important for narrow driveways and road segments, and for any areas where ravines with heavy fuels are below the access. Focus on removing vegetation in drainages that cross roads.
		Remove wood piles and any flammable yard clutter to at least 30 feet from structures and propane tanks. Wood piles should be located uphill or even with homes; never downhill.
		Encourage individual landowners to mow fuels near homes and along roadways and fence lines during times of high fire danger.
Preparedness Planning/Evacuation	3	Add reflective addressing to all driveways or homes. A good guideline is to use all metal white markers that are 4” in width on a green background. These should be placed three to five feet above ground.
		Add road signs that are made of reflective, noncombustible materials, and ensure that they are easily understood.
		Develop an evacuation plan for the community and individual subdivisions, including identifying escape routes and a meeting area.
		Develop a notification and evacuation system for the Shadow Creek cabins
		Where available, large safety zones should be maintained and identified in all evacuation planning. These safety zones will need to be of adequate size and quality in order to be effective
Infrastructure	4	Provide adequate turnarounds for fire apparatus throughout the community and improve the access road to the Shadow Creek cabins
		Ensure that all gates in the community are removable and/or the code is available and that archways are high enough for access by fire apparatus.
		Identify all water sources within the community, including hydrants, cisterns and ponds, and make sure that they are visible, maintained and operable.

For more detailed recommendations on how to enhance the safety of your home and community, please refer to Appendix A. See also the Ready, Set, Go! Program in Appendix A, page A21.

AREAS OF SPECIAL INTEREST AND CRITICAL INFRASTRUCTURE

Areas of Special Interest (ASIs) are places within the CWPP study area that could be threatened from wildfire and have a social or economic value which is not based on residential development. Unlike communities, ASIs are not given hazard ratings. Frequent candidates for ASIs include recreation areas, such as parks, reservoirs, ski areas, and defined open space. Guest ranches, church camps, RV parks and other large acreage recreational camps that have a significant, but temporary population are typically included as an ASI. Also included is critical infrastructure, such as communication arrays, that are vital to the local community. ASIs and critical infrastructure are identified separately from communities because of their lack of or low permanent population densities.

A variety of critical infrastructure occurs throughout the study area, and any impact to these areas could have severe economic and safety implications. Specific to the Kremmling area, critical infrastructure includes the airport, numerous area reservoirs, natural gas pipelines, major power lines, substations, vital communication towers, railroads, and oil and gas field infrastructure. Critical infrastructure that occurs near wildland fuels is included in Table 24, with recommendations for reducing wildfire risk in the accompanying write-up. Information on other types of infrastructure in the Kremmling area can be found in the Values at Risk section at the beginning of the document on pages 7-8.

Recommendations for ASIs and Critical Infrastructure follow the accompanying write-ups. These recommendations are not inclusive, and should be utilized in conjunction with those planned by local utility companies and guest ranches.

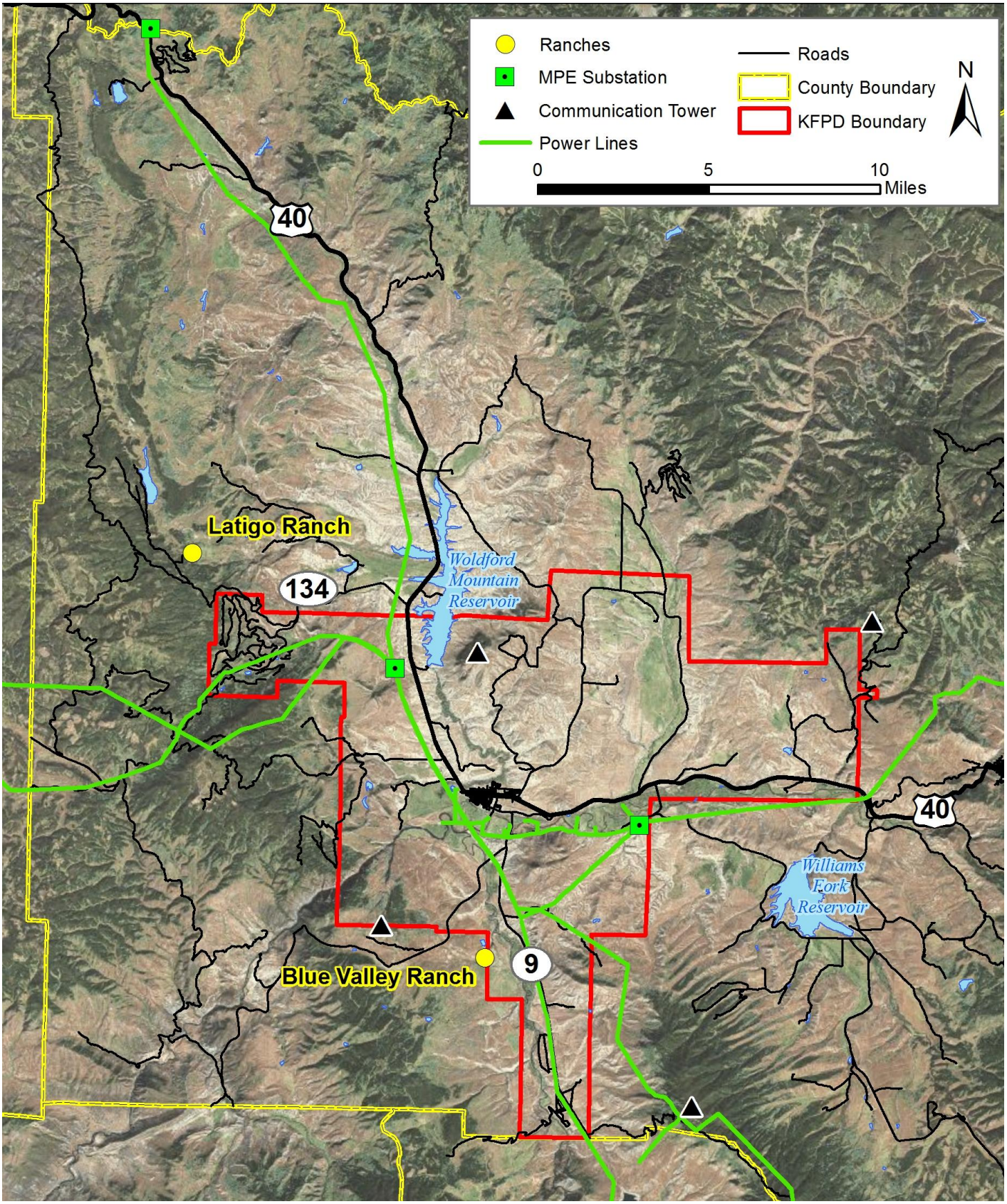


Figure 14. Areas of Special Interest and Critical Infrastructure within the study area.

BLUE VALLEY RANCH

This privately owned wildlife conservation and production-agriculture ranch is located south of the Town of Kremmling and west of Highway 9. It covers approximately 25,000 acres and includes many structures and outbuildings on the property. Due to its size, the property has a variety of vegetation, including riparian areas along the Blue River, sage and grass-filled meadows, aspen, lodgepole pine and spruce-fir forest. There are multiple ponds throughout the ranch. The ranch is managed by a number of personnel, including some who live on-site at the ranch. The property has a good prescribed burn program, and burns hundreds of acres annually. Located on the ranch is a variety of equipment, including some fire apparatus.

Table 22. Blue Valley Ranch General and Fuels Treatment Recommendations

Name	Priority	Description	Methods*	Acres**
Defensible Space	1	Defensible space around individual structures. See Appendix A for details.	Mowing; sage treatments	100' around the perimeter
Home Construction	2	Follow the recommended Home Construction guidelines found in Appendix A.	n/a	n/a
Landscaping/Fuels	3	Follow the recommended Landscaping/Fuels guidelines found in Appendix A.	n/a	n/a
Preparedness Planning	4	Follow the recommended Preparedness Planning guidelines found in Appendix A.	n/a	n/a

***** Sage treatment options are discussed in Appendix A.
****** Defensible space distances will vary by property based on slope and fuels.

LATIGO RANCH

Latigo Ranch is a privately owned dude ranch located off of the Red Dirt Road and County Road 1911. This popular tourist destination offers a variety of recreational activities, and includes on-site accommodations for guests, as well as the owners' residences. There are also a number of outbuildings on the property, as well as horses which are utilized by guests. There is a small pond and creek on the property near the structures, which could be drafted from in the event of a wildfire.

Table 23. Latigo Ranch General and Fuels Treatment Recommendations

Name	Priority	Description	Methods	Acres*
Defensible Space	1	Defensible space around individual structures. See Appendix A for details.	Hand felling and limbing near homes; mowing	100+' around structures
Home Construction	2	Follow the recommended Home Construction guidelines found in Appendix A.	n/a	n/a
Landscaping/Fuels	3	Follow the recommended Landscaping/Fuels guidelines found in Appendix A.	n/a	n/a
Preparedness Planning	4	Follow the recommended Preparedness Planning guidelines found in Appendix A.	n/a	n/a

*****Mechanical treatments in timbered areas include all varieties of logging equipment.
****** Defensible space distances will vary by property based on slope and fuels.

CRITICAL INFRASTRUCTURE

Communication towers, power lines and substations serve a vital function during emergency operations. Many areas that contain these important pieces of infrastructure are currently at risk to wildland fire. The at-risk facilities are shown below in Table 24.

Table 24. Assets At-Risk

Name of Asset
Grouse Mountain Communication Site
Lawson Ridge Communication Site
San Toy Mountain Communication Site
Wolford Mountain Communication Site
Substations (3)
Major power lines

Table 25. Critical Infrastructure General and Fuels Treatment Recommendations

Name	Priority	Description	Methods	Acres*
Defensible Space	1	Extended defensible space is recommended for all infrastructure located near hazardous fuels	Hand felling and limbing near homes; mowing; sage treatments	~200', will vary depending on topography
Thin Below Powerlines	2	Reduce fuels below power lines in areas of heavy fuel loadings	Hand felling and limbing; and mechanical treatments where slope and access allows	n/a
Preparedness Planning	3	All infrastructure locations should be mapped in an easily-readable format and available for all incoming resources.	n/a	n/a

*****Mechanical treatments in timbered areas include all varieties of logging equipment. Sage treatment options are discussed in Appendix A.
****** Defensible space distances will vary by property based on slope and fuels. Acreages for fuel treatments are based on a +300' wide fuelbreak. Actual acres treated may vary once project is implemented.

CONCLUSIONS AND NEXT STEPS

The Kremmling FPD CWPP is a comprehensive analysis of wildfire related hazards and risks in the Wildland-Urban Interface (WUI) areas in western Grand County, Colorado. This document follows the standards for CWPPs that have been established by the Healthy Forest Restoration Act of 2003, as well as the most recent Colorado State Forest Service guidelines.

The results of the analysis were used to determine a variety of fuel reduction projects throughout the study area. While these are recommendations made by Anchor Point Group LLC, the stakeholders can also use these results to guide in decision making for additional fuel reduction projects. Recommendations focus on reducing the threat of wildfire to values within the study area. Additional recommendations are presented throughout the main document, as well as in Appendix A.

Public land management agencies, private landowners and resident concerns and comments were used to generate this document. The KFPD CWPP is a multi-year, guiding document that will facilitate the implementation of future mitigation efforts. The CWPP is a living document, meaning it changes and evolves through time. Consequently, it should be revisited at least annually to assess the relevance and progress on the given recommendations. There is no official way to amend a CWPP, but any changes must be collaborative and include stakeholder representation.

ESTABLISH A FIRE WISE COUNCIL

Perhaps the most important next step is to establish some sort of fire safe council or fire mitigation group. This effort is imperative to ensure that the CWPP is continuously revisited, modified as necessary, updated and utilized to its fullest capacity. Following the adoption of the CWPP, the stakeholder group identified in the CWPP development should reconvene with the purpose of assembling a group of involved community members to be responsible for implementing the projects in the document. Ideally, a representative for every community/planning area should be on the council, in addition to members from local agencies, the fire protection district, local utility companies, area ranches, and any other interested parties.

Once the council has been formed, they should focus on one goal in the first year. This may include creating and distributing a newsletter, setting-up an additional public meeting(s) to gain community support, picking a single fuel mitigation project to complete as an example or producing an annual work plan. The initial, first year goal set by the council must be achievable to generate momentum. Successfully completing this initial task will serve to motivate the fire safe council and residents alike.

PROJECTS TO IMPLEMENT

The table below is a list of the projects identified by Anchor Point Group. This summary table does not include individual defensible space recommendations, though it should be reiterated that defensible space is the most important action an individual homeowner and community can take. Further details for each of the projects can be found within the community/planning areas of the main report. A map of each of the projects is included. The recommendations are not a prescription for the area, and any project to be undertaken should be done in conjunction with a trained forester. The projects detailed in the CWPP are not the only projects that are viable within the planning areas. Landscape scale projects are excellent options as well, but often require multiple communities working with federal and state agencies, county governments, utility companies, and other adjacent private landowerns. As support and community involvement grows through these smaller projects, the larger treatments become more viable. Additional projects at all scales should be considered by a Fire Safe Council, especially as KFPD and communities begin to complete the initial projects identified.

Table 26. Fuels Treatment Recommendations Summary Table

Community	Community Hazard Rating	Fuels Treatment Name
Big Horn Park	Very High	County Road 2415 Fuelbreak
		Big Horn Park Drainage Fuelbreak
Grand River Ranch / Gorewood	Very High	Golden Eagle Drive Evacuation Route Thinning
		Community Secondary Development / Thinning
Lake Agnes	Very High	Lake Agnes North Fuelbreak
		Lake Agnes South Fuelbreak
Old Park / Gore Lakes	Very High	Connect Current and Reenter FS Treatments
Rabbit Ears Village	Very High	Roadway Fuelbreak
Spring Creek / Shadow Creek	Very High	Spring Creek Road Evacuation Route Thinning

Action Item Worksheet

Proposed Action Item Identification:
(Each action item includes a list of the key issues that the activity will address. Action items should be fact based and tied directly to issues or needs identified through the planning process.)
Proposed Action Title:
(*Utilize the appropriate recommendation name or title in the CWPP.*)
Rationale for Proposed Action Item:
(*Utilize any justification or report language in the CWPP.*)
Ideas for Implementation (Optional):
(Each action item includes ideas for implementation and potential resources. This information enables a transition from theory to practice. The ideas for implementation serve as a starting point for this plan. This component is dynamic in nature, as some ideas may be not feasible and new ideas may be added during the plan maintenance process. Report graphics can add value to this section.)

Coordinating Organization:	
Internal Partners:	**External Partners:**
(*Internal partners are members of the CWPP advisory committee and may be able to assist in the implementation of action items by providing relevant resources to the coordinating organization.)*	(*External partner organizations can assist the coordinating organization in implementing the action items in various ways. Partners may include local, regional, state, or federal agencies, as well as local and regional public and private sector entities.)*
Timeline:	**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)
(Action items or activities that may be implemented with existing resources and authorities within one to two years.)	(*Action items or activities that may require new or additional resources and/or authorities, and may take from one to five* years to implement.)

To facilitate implementation, each action item, such as fuel modification, public education etc. can be populated into the provided worksheet on the next page, to organize information on key issues, develop ideas for implementation, coordinate with partner organizations, generate a timeline, and plan goals addressed.

GLOSSARY

The following definitions apply to terms used in the Kremmling Community Wildfire Protection Plan and/or are widely used wildland firefighting terms.

1-hour time lag fuels: Grasses, litter and duff; <1/4 inch in diameter

10-hour time lag fuels: Twigs and small stems; 1/4 inch to 1 inch in diameter

100-hour time lag fuels: Branches; 1 to 3 inches in diameter

1000-hour time lag fuels: Large stems and branches; >3 inches in diameter

Active Crown Fire: This is a crown fire in which the entire fuel complex – all fuel strata – become involved, but the crowning phase remains dependent on heat released from the surface fuel strata for continued spread (also called a Running Crown Fire or Continuous Crown Fire).

Crown Fire (Crowning): The movement of fire through the crowns of trees or shrubs; may or may not be independent of the surface fire.

Defensible Space: An area around a structure where fuels and vegetation are modified cleared or reduced to slow the spread of wildfire toward or from the structure. The design and distance of the defensible space is based on fuels, topography, and the design/materials used in the construction of the structure.

Extended Defensible Space (also known as Zone 3): This is a defensible space area where treatment is continued beyond the minimum boundary. This zone focuses on forest management with fuels reduction being a secondary consideration.

Fine Fuels: Fuels that are less than 1/4-inch in diameter, such as grass, leaves, draped pine needles, fern, tree moss, and some kinds of slash which, when dry, ignite readily and are consumed rapidly.

Fire Behavior Potential: The expected severity of a wildland fire expressed as the rate of spread, the level of crown fire activity, and flame length. This is derived from fire behavior modeling programs using the following inputs: fuels, canopy cover, historical weather averages, elevation, slope, and aspect.

Fire Danger: In this document we do not use this as a technical term, due to various and nebulous meanings that have been historically applied.

Fire Hazard: Given an ignition, the likelihood and severity of Fire Outcomes (Fire Effects) that result in damage to people, property, and/or the environment. The hazard rating is derived from the Community Assessment and the Fire Behavior Potential.

Fire Mitigation: Any action designed to decrease the likelihood of an ignition, reduce Fire Behavior Potential, or to protect property from the impact of undesirable Fire Outcomes.

Fire Risk: The probability that an ignition will occur in an area with potential for damaging effects to people, property, and/or the environment. Risk is based primarily on historical ignitions data.

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.

Fuelbreak: A natural or constructed discontinuity in a fuel profile that is used to isolate, stop, or reduce the spread of fire. Fuelbreaks may also make retardant lines more effective and serve as control lines for fire suppression actions. Fuelbreaks in the WUI are designed to limit the spread and intensity of crown fire activity.

ISO (Insurance Standards Office): A leading source of risk (as defined by the insurance industry) information to insurance companies. ISO provides fire risk information in the form of ratings used by insurance companies to price fire insurance products to property owners.

Passive Crown Fire: A crown fire in which individual or small groups of trees torch out (candle), but solid flaming in the canopy fuels cannot be maintained except for short periods.

Shaded Fuelbreak: An easily accessible strip of land of varying width (depending on fuel and terrain), in which fuel density is reduced, thus improving fire control opportunities. The stand is thinned, and remaining trees are pruned to remove ladder fuels. Brush, heavy ground fuels, snags, and dead trees are disposed of and an open, park-like appearance is established.

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

Spotting: Refers to the 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.

Structural Triage: The process of identifying, sorting, and committing resources to a specific structure.

Surface Fire: A fire that burns the surface litter, debris, and small vegetation on the ground.

Time lag: Time needed under specified conditions for a fuel particle to lose about 60% of the difference between its initial moisture content and its equilibrium moisture content.

Values at Risk: People, property, ecological elements, and other human and intrinsic values within the project area. Values at Risk are identified by inhabitants as important to the way of life in the study area, and are particularly susceptible to damage from undesirable fire outcomes.

WHR (Community Wildfire Hazard Rating, AKA Community Assessment): A 140-point scale analysis designed to identify factors that increase the potential for and/or severity of undesirable fire outcomes in WUI communities.

WUI (Wildland Urban Interface): The line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels. This is sometimes referred to as Urban Wildland Interface, or UWI.

RECOMMENDED READING

At Home in the Woods – Lessons Learned in the Wildland/Urban Interface, FEMA, 2004.
Bachmann, A., and Allgower, B., *A Consistent Wildland Fire Risk Terminology is Needed!,* Fire Management Today (61, 4), USDA Forest Services, Washington, DC, Fall 2001.

Dennis, F.C., *Fuelbreak Guidelines for Forested Subdivisions,* Colorado State Forest Service, Colorado State University, 1983.

Developing a Cooperative Approach to Wildfire Protection, National Wildland-Urban Interface Fire Protection Program.

Firefighter Safety in the Wildland/Urban Interface – A Video Series (VHS Video - 60 Minutes.), National Wildland/Urban Interface Fire Program, 2003.

Fires that Changed the Fire Service – Wildlands (VHS Video – 84 Minutes.), American Heat, March 2000.

Hirsch, K.G., Pinedo, M.M., and Greelee, J.M., *An International Collection of Wildland-Urban Interface Resource Materials*, Information Report NOR-X-344, Canadian Forest Service – Northwest Region – Northern Forestry Centre, 1996.

Home Improvement: A Firewise Approach (VHS Video – 15 Minutes.), 2003.

Introducing Firewise Communities Workshops (VHS Video– 6 Minutes.), Firewise Communities, Quincy, MA.

Preparing a Community Wildfire Protection Plan – a Handbook for Wildland-Urban Interface Communities, Sponsored by: Communities Committee, National Association of Counties, National Association of State Foresters, Society of American Foresters, Western Governors' Association, March 2004.

Queen, Phillip L., *Fighting Fire in the Wildland/Urban Interface*, Fire Publications, Inc., Bellflower, California, 1993.

Slaughter, R. (ed.), California's I-ZONE – Urban/Wildland Fire Prevention & Mitigation, Sacramento, California, Jan. 1996.
Standard for Protection of Life and Property from Wildfire, NFPA 1144(02) (Formerly *NFPA 299*) National Fire Protection Association, Quincy, MA, 2002.

Urban-Wildland Interface Code™, International Fire Code Institute, Whittier, California, Jan. 2000.

White, C., Dry Hydrant Manual – A Guide for Developing Alternative Water Sources for Rural Fire Protection, Developed for Summit County, Colorado.

Wildland/Urban Interface Fire Hazard Assessment Methodology, Developed by National Wildland/Urban Interface Fire Protection Program. Wildland/Urban Interface Fire Policy Action Report, Western Governors' Association, Feb. 1996.

RESOURCES FOR IMPLEMENTING CWPP RECOMMENDATIONS

Often the biggest hurdle to overcome when trying to implement a CWPP or wildfire mitigation projects is funding. By having an official CWPP a multitude of funding sources become available to complete the work outlined in the plan. Federal, national, state and county funds are available to begin treatments. The list below is not all inclusive, but it provides many of the most commonly available sources. Other important information, including defensible space recommendations and other wildfire related websites are listed below.

Bureau of Land Management

- Purpose: the Community Assistance and Protection Program focuses on mitigation/prevention, education, and outreach. The mitigation/prevention experts addresses reduction of wildland fire threats and losses to communities and natural resources by taking actions before a fire starts. National Fire Prevention and Education teams are sent to areas across the country at-risk for wildland fire. The teams work with local residents to help reduce the number of human-caused fires and implement wildland fire prevention programs. The BLM also facilitates FIREWISE and other workshops to help people live safely in the wildland-urban interface. Other specialists assist communities by completing comprehensive wildland-urban interface community risk assessments and plans.
  http://www.blm.gov/nifc/st/en/prog/fire/community_assistance.html

Colorado State Forest Service

- Purpose: to help homeowners and landowners promote healthy and sustainable forest conditions. CSFS does this is by emphasizing action on state, private, and other non-federal lands, and providing technical and financial assistance to those that have demonstrated a willingness and/or commitment to effectively manage their property.
- Tax exemption for wildfire mitigation work: Colorado landowners with property located in a Wildland Urban Interface area also may qualify to receive a tax exemption for the costs of wildfire mitigation work. As authorized by §39-22-104(4)(n), C.R.S., for income tax years 2009 through 2013, individuals, estates and trusts may subtract from federal taxable income 50 percent of the costs incurred in performing wildfire mitigation measures.
  http://csfs.colostate.edu/pages/programs-home-land-owners.html
  http://csfs.colostate.edu/pages/funding.html
  http://csfs.colostate.edu/pdfs/Landowner-Assistance-Programs-rev112610.pdf

Federal Emergency Management Agency (FEMA)

- **Assistance to Firefighters Grant Program**
  - Purpose: to improve firefighting operations, purchase firefighting vehicles, equipment and personal protective equipment, fund fire prevention programs, and establish wellness and fitness programs.
    http://www.fema.gov/firegrants

- **Hazard Mitigation Assistance Grant Program (HMGP)**
    - Purpose: The Hazard Mitigation Grant Program provides grants to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. http://www.fema.gov/government/grant/hmgp/index.shtm

- **Pre-Disaster Mitigation Grant Program (PDM)**
    - Purpose: The Pre-Disaster Mitigation program provides funds to states, territories, Indian tribal governments, communities, and universities for hazard mitigation planning and the implementation of mitigation projects prior to a disaster event. Funding these plans and projects reduces overall risks to the population and structures. http://www.fema.gov/government/grant/pdm/index.shtm

Firehouse

- Purpose: emergency services grants. www.firehouse.com/funding/grants.html

Firewise Communities

- Firewise is a multi-agency organization designed to increase homeowners', community leaders', developers', and others' education on the Wildland Urban Interface and the actions they can take to reduce fire risk to protect lives, property, and ecosystems. A summary of grant sources can be found on the Firewise website. http://www.firewise.org/usa/grant_funding_sources.htm

Homeland Security, Office for Domestic Preparedness

- Purpose: to assist local, state, regional, or national organizations in addressing fire prevention and safety. The emphasis for these grants is the prevention of fire-related injuries to children. http://www.firegrantsupport.com

National Volunteer Fire Council

- Purpose: to support volunteer Fire Protection Districts. http://www.nvfc.org/federalfunding.html

Natural Resources Conservation Service Emergency Watershed Protection Program

- Purpose: The purpose of the Emergency Watershed Protection program is to undertake emergency measures, including the purchase of flood plain easements, for runoff retardation and soil erosion prevention to safeguard lives and property from floods, drought, and the products of erosion on any watershed whenever fire, flood or any other natural occurrence is causing or has caused a sudden impairment of the watershed. http://www.nrcs.usda.gov/programs/ewp

Rocky Mountain Wildland Fire Info

- Purpose: searchable database of grant opportunities, calendar of upcoming area trainings, public information resources, and links to other important wildfire websites. http://www.rockymountainwildlandfire.info/websites.htm

USDA Community Facilities Grant Program

- Purpose: to help rural communities. Funding is provided for fire stations.
  www.rurdev.usda.gov/rhs

US Forest Service Cooperative Forestry Assistance

- Purpose: to assist in the advancement of forest resources management, the control of insects and diseases affecting trees and forests, the improvement and maintenance of fish and wildlife habitat, and the planning and conduct of urban and community forestry programs.
  http://www.fs.fed.us/spf/coop

OTHER GRANTS AND INFORMATION SOURCES

Environmental Protection Agency.
http://cfpub.epa.gov/fedfund

ESRI Grant Assistance program for GIS users.
http://www.esri.com/grants

The Fire Safe Council.
http://www.FireSafeCouncil.org

FRAMES -- Fire Research and Management Exchange System,
http://www.frames.gov/tools

Grant opportunities search website.
www.grants.gov

National Association of State Foresters Listing of Grant Sources and Appropriations.
http://www.stateforesters.org/S&PF/FY_2002.html

National Database of State and Local Wildfire Hazard Mitigation Programs,
http://www.wildfireprograms.com

Kremmling Fire Protection District.
http://www.kremmlingfire.org

RAMS - (Risk Assessment and Mitigation Strategies), U.S. Department of Interior, Bureau of Land Management, National Interagency Fire Center, Wildland Fire Management Information.
http://www.nifc.blm.gov/nsdu/fire_planning/rams

Standard for Protection of Life and Property from Wildfire, NFPA 1144.
http://www.normas.com/NFPA/PAGES/NFPA-1144(02).html

Standard for Protection of Life and Property from Wildfire, NFPA 299.
http://webstore.ansi.org/ansidocstore/product.asp?sku=29997PDF

Stewardship and Landowner Assistance—Financial Assistance Programs.
http://www.na.fs.fed.us/spfo/stewardship/financial.htm

APPENDIX A: GENERAL RECOMMENDATIONS

The following categories have been identified as areas to focus on within the Kremmling FPD study area to mitigate impacts from wildfire: home construction, landscaping/fuels, preparedness planning, infrastructure, public education and water source supply. Recommendations are provided for each category in the tables that follow. Priorities are based on actions that are most likely to protect life safety, property and other values at risk. **To improve life safety and preserve property, every home in the study area should have compliant, effective defensible space. Defensible space and proper home construction are THE MOST IMPORTANT actions an individual can do to protect their home.**

All of the recommendations found in the plan are summarized in the following tables. Implementation of the actions will be a shared responsibility in many cases and include individual homeowners, county staff, the fire protection district (FPD), federal agencies, the Colorado State Forest Service and other stakeholders. Suggestions for an implementation lead are identified for each action. These suggestions are not all-inclusive, and may require additional support from state and federal agencies. A summary table of all the specific fuels reduction recommendations within the county can be found in the Conclusions and Next Steps section in the main document.

Additional details on recommendations and issues specific to the recommended action items are discussed in text that follows the summary tables.

Table A1. Home Construction Recommendations

HOME CONSTRUCTION	
Action Items	**Implementation Lead**
Post reflective house numbers so that they are clearly visible from the main road. Reflective numbers should also be visible on the structure itself.	Individual homeowners
Discourage the use of combustible materials for decks, siding and roofs, especially where homes are upslope from heavy vegetation.	Individual homeowners, County
Maintain and clean spark arresters on chimneys.	Individual homeowners
Enclose under decks so firebrands do not fly under and collect.	Individual homeowners
Use glass skylights; plastic will melt and allow embers into the home.	Individual homeowners
Enclose eaves and soffits.	Individual homeowners
Cover openings with 1/8” metal screen to block fire brands and embers from collecting under the home or deck.	Individual homeowners
The roof is the most important element of the home. Use rated roofing material. Replace any shake-shingle roofs with non-combustible types.	Individual homeowners, HOAs, County
Use fire-resistant building materials on exterior walls.	Individual homeowners

Table A2. Landscaping/Fuels Recommendations

LANDSCAPING/FUELS	
Action Items	**Implementation Lead**
Maintain your defensible space constantly	Individual homeowners
Clean your roof and gutters at least twice a year especially as vegetation begins to cure in the autumn.	Individual homeowners
Stack firewood uphill or on a side contour, at least 30 feet away from structures, outbuildings, and other infrastructure, such as propane tanks and power poles.	Individual homeowners
Do not store combustibles or firewood under decks or downhill.	Individual homeowners
When possible, maintain an irrigated greenbelt around the home. Be sure to mow grass regularly, especially along roads and fence lines.	Individual homeowners
Trees and vegetation along driveways should be thinned as necessary to maintain a minimum 15' vertical and horizontal clearance for emergency vehicle access along driveways. This includes removing ladder fuels, which are low lying branches that allow a fire to climb from the ground into tree canopies.	Individual homeowners
Focus on removing vegetation in drainages that intersect roads or are under bridges.	Individual homeowners, HOAs, County
Create a cinder block wall around the perimeter of your yard and use grass and slate to break up the landscape.	Individual homeowners
Use pavers, rock or xeriscaping to break up fuel continuity immediately adjacent to the home.	Individual homeowners
Use groupings of potted plants that include succulents and other drought resistant vegetation.	Individual homeowners
Use faux brick and stone finishes and high-moisture content annuals and perennials.	Individual homeowners
Use grass and driveways as fuel breaks from the house.	Individual homeowners

Table A3. Preparedness Planning Recommendations

PREPAREDNESS PLANNING	
Action Items	**Implementation Lead**
Connect, and have available, a minimum of 50 feet of garden hose to extinguish small fires before they spread.	Individual homeowners
Have nearby evacuation centers for citizens and staging areas for fire resources. This is especially important in communities with single access and a high population density.	County, FPD
Where available, large safety zones should be maintained and identified in all evacuation planning. These safety zones will need to be of adequate size and quality in order to be effective.	Communities, HOAs, County, FPD
Identify and pre-plan primary escape routes for all CWPP communities. Emergency management personnel should be included in the development of preplans for citizen evacuation. Reevaluate and update these plans as necessary.	County, FPD
Educate citizens on the proper escape routes and evacuation centers to use in the event of an evacuation. This also applies to animal rescue.	County, FPD
Create an evacuation plan that is presented and distributed to residents.	County, FPD
Ensure the existing reverse 911 system includes wildfire notifications.	County
Perform response drills to determine the timing and effectiveness of escape routes and fire resource staging areas.	County, state, FPD
Conduct a parcel-level wildfire hazard analysis for all the homes in the study area, especially those with an extreme or very high rating.	County, FPD
Identify areas where large animal evacuation is an issue and develop a plan for evacuation.	County, FPD
Maintain or develop pre-attack/operational plans for the study area. The pre-attack plan assists fire agencies in developing strategies and tactics that will mitigate damage when incidents do occur.	County, FPD
Develop fire safety brochures that can be distributed and made available to guests in the summer months.	Communities, HOAs, County, FPD

Table A4. Infrastructure Recommendations

INFRASTRUCTURE	
Action Item	**Implementation Lead**
A program of replacing worn or difficult to read street signs should be developed. Include specifications and input from County officials, developers, HOAs, and the fire protection districts.	County
A “No Outlet” sign should identify all dead end streets and roads.	County, communities, HOAs
Provide adequate turnarounds for emergency equipment throughout all communities.	County, developers
Encourage the placement of all utilities, including propane tanks and power lines, below ground.	County, communities, HOAs
Determine and post load limits for all bridges within the study area.	County, private communities
All utility companies should provide information about the locations of natural gas pipelines to the FPD.	County, FPD, utility companies

Table A5. Public Education Recommendations

PUBLIC EDUCATION	
Action Item	**Implementation Lead**
Remain aware of the current fire danger in your area.	All
Implement fire prevention, fire preparedness, and defensible space and hazard reduction recommendations for each community.	County, state, communities, HOAs
Obtain "Smokey Bear" signs for use along entrances into town and popular recreation areas to inform the public of the current fire danger and to promote fire prevention. Ensure that fire danger messages are kept up to date with Daily Fire Danger broadcast to maintain credibility and effectiveness.	County, state, FPD, communities, HOAs
Hold multiple meetings per year to educate residents on wildfire risk, defensible space, and evacuation.	County, CSFS, FPD
Provide citizens with the findings of this study including: • Levels of risk and hazard • Values of fuels reduction programs • Consequences of inaction for the entire community	County, CSFS, FPD
Create a Firewise Council or similar WUI citizen advisory committee to promote the message of shared responsibility. The Firewise Council should consist of local citizens, and its primary goals should be: • Bringing the concerns of the residents into the prioritization of mitigation actions • Selecting demonstration sites • Assisting with grant applications and awards	Communities, HOAs, FPD
Make use of regional and local media to promote wildfire public education messages in the fire district.	County, state, FPD
Maintain a current wildfire educational presentation explaining the concepts of defensible space and wildfire hazard mitigation. The information in this report should be incorporated into that presentation for the education of homeowners countywide. This could be done through informational gatherings sponsored by the fire department, homeowners associations or neighborhood groups such as local festivals, school events, at times of extreme fire danger, and other times of heightened awareness concerning wildfire. It is far easier to bring the information to citizens than to bring citizens to the information, making this an especially powerful resource.	County, CSFS, FPD

Table A6. Water Supply Recommendations

WATER SUPPLY	
Action Item	**Implementation Lead**
Areas with no water or inadequate water supply should be evaluated to improve existing hydrants, establish a stored water supply, or use firefighting resources.	County, FPD
Install dry hydrants on applicable streams and ponds	Communities, FPD
Continue to map the location of water sources and their volumes. Make this information available for use by emergency personnel in and out of the district.	County, FPD
Make sure cisterns are well marked with their capacity and are kept clear of vegetation.	County, FPD
Conduct annual testing for fire hydrant function and capacity.	County, FPD
FPD trainings should focus on drafting operations frequently throughout the spring and summer to ensure apparatus can fill in the event of a wildfire.	FPD
Work on obtaining contracts with landowners to gain legal permission to use ditches for suppression activities.	FPD

HOME CONSTRUCTION

General Home Construction Considerations:

- Enclose under decks so firebrands do not fly underneath and collect.
- Use glass skylights; plastic will melt and allow embers into the home.
- Enclose eaves, fascias, soffits and vents. 'Box' eaves, fascias, soffits and vents, or enclose them with metal screens.
- Use non-flammable fencing if attached to the house, such as metal.
- Cover openings with 1/8" metal screen to block fire brands and embers from collecting under the home or deck.
- The roof is one of the most important elements of the home. Use rated roofing material.

Building Materials:

Use rated roofing material. Roofing material with a Class A, B or C rating is fire resistant and will help keep the flame from spreading. Examples include:

- Composition shingle
- Metal
- Clay
- Cement tile

Use fire-resistant building materials on exterior walls. Examples include:

- Cement, plaster, stucco or masonry (concrete, stone, brick or block) are all great fire-resistant building materials.
- While vinyl is difficult to ignite, it can fall away or melt when exposed to extreme heat.
- Use double-paned or tempered glass. Double-pane glass can help reduce the risk of fracture or collapse during an extreme wildfire. Tempered glass is the most effective.
- Protect overhangs and other attachments.
- Remove all vegetation and other fuels from around overhangs and other attachments (room additions, bay windows, decks, porches, carports and fences).
- Box in the undersides of overhangs, decks and balconies with noncombustible or fire-resistant materials.
- Fences constructed of flammable materials should not be attached directly to the house.
- Anything attached to the house (decks, porches, fences and outbuildings) should be considered part of the house. These act as fuel bridges, particularly if constructed from flammable materials.
- If a wood fence is attached to the house, separate the fence from the house with a masonry or metal barrier.
- Decks and elevated porches should be kept free of combustible materials and debris.
- Elevated wooden decks should not be located at the top of a hill. Consider a terrace.

ROAD SIGNS AND HOME ADDRESSES

The majority of roads within the study area have adequate signs that are reflective and made from non-combustible materials. However, there are areas where street signs are not currently adequate or present, especially in the Shadow Creek/Spring Creek community. Street signs should be visible along all highways and major roads. Proper reflective signage is a critical operational need. Knowing at a glance the difference between a road and a driveway (and which houses are on the driveway) cuts down on errors and time wasted interpreting maps. This is especially true for out-of-district responders who do not have the opportunity to train on access issues specific to the response area. The value of the time saved, especially at night and in difficult conditions, cannot be overstated: it can make the difference between lives saved and lost.

Addressing is another major issue in the study area. Most homes within communities lack reflective addressing that is easily visible from the road. Further, addressing is often made of combustible materials and is not uniform within the communities, let alone the county. Visible addressing is vital for fire and medical responders when determining the location and number of structures within a community. Often, addressing is not easily visible during the darkness of night or during smoky conditions. A good standard to follow for addressing is to use all metal white markers that are 4" in width on a green background. These should be placed three to five feet above ground. Examples of addressing found in the study area are located below.

LANDSCAPING / FUELS

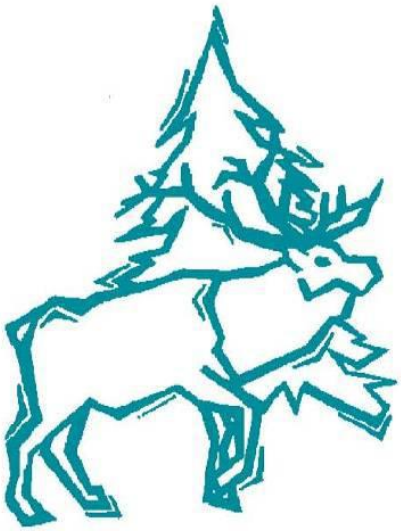
DEFENSIBLE SPACE

Construction type, condition, age, fuel loading of the area, and building position are contributing factors in making homes more susceptible to ignition under even moderate burning conditions. As mentioned previously, creating defensible space is THE MOST IMPORTANT action an individual can do to protect their home. This is especially important for homes with wood roofs and homes located near any other topographic feature that contributes to fire intensity such as chimneys and saddles. These recommendations are intended to give homeowners enough information to immediately begin making their home Firewise or to improve existing home mitigation efforts. Defensible space needs to be maintained throughout the year. Because of differences in vegetation, topography, and construction materials, it is suggested that a trained individual be consulted before embarking on a defensible space project.

Because of the fire ecology of the vegetation and topography, an aggressive program of evaluating and implementing defensible space for all homes combined with adequate home construction, will do more to limit fire-related property damage than any other single recommendation in this report.

Many homes and structures exist outside of the defined CWPP community boundaries in the Kremmling area**. The following defensible space guidelines apply to all structures and infrastructure** that could be threatened by wildfire, whether or not they are part of a defined community. Extended defensible space is recommended for all homes outside of communities located in dangerous topography (above ravines and natural chimneys, mid-slope on steep slopes, on ridge tops or summits) and/or with heavy vegetation loads near or below the home.

The following defensible space guidelines apply to all structures that could be threatened by wildfire, whether or not they are part of a defined community. The guidelines are from Colorado State Forest Service fact sheet 6.302, which can also be referenced online at http://csfs.colostate.edu/pages/defensible-space.html.



NATURAL RESOURCES SERIES

FORESTRY

Creating Wildfire-Defensible Zones no. 6.302

by F.C. Dennis [1]

Quick Facts...

Wildfire will find the weakest links in the defense measures you have taken on your property.

The primary determinants of a home's ability to survive wildfire are its roofing material and the quality of the "defensible space" surrounding it.

Even small steps to protect your home and property will make them more able to withstand fire.

Consider these measures for all areas of your property, not just the immediate vicinity of the house.

Fire is capricious. It can find the weak link in your home's fire protection scheme and gain the upper hand because of a small, overlooked or seemingly inconsequential factor. While you may not be able to accomplish all measures below (and there are no guarantees), each will increase your home's, and possibly your family's, safety and survival during a wildfire.

Start with the easiest and least expensive actions. Begin your work closest to your house and move outward. Keep working on the more difficult items until you have completed your entire project.

Defensible Space

Two factors have emerged as the primary determinants of a home's ability to survive wildfire. These are the home's roofing material and the quality of the "defensible space" surrounding it.

Use fire-resistive materials (Class C or better rating), not wood or shake shingles, to roof homes in or near forests and grasslands. When your roof needs significant repairs or replacement, do so with a fire-resistant roofing material. Check with your county building department. Some counties now restrict wood roofs or require specific classifications of roofing material.

Defensible space is an area around a structure where fuels and vegetation are treated, cleared or reduced to slow the spread of wildfire towards the structure. It also reduces the chance of a structure fire moving from the building to the surrounding forest. Defensible space provides *room for firefighters to do their jobs.* Your house is more likely to withstand a wildfire if grasses, brush, trees and other common forest fuels are managed to reduce a fire's intensity.

The measure of fuel hazard refers to its continuity, both horizontal (across the ground) and vertical (from the ground up into the vegetation crown). Fuels with a high degree of both vertical and horizontal continuity are the most hazardous, particularly when they occur on slopes. Heavier fuels (brush and trees) are more hazardous (i.e. produce a more intense fire) than light fuels such as grass.

Mitigation of wildfire hazards focuses on breaking up the continuity of horizontal and vertical fuels. Additional distance between fuels is required on slopes.

Creating an effective defensible space involves developing a series of management zones in which different treatment techniques are used. See Figure 1 for a general view of the relationships among these management zones. Develop defensible space around each building on your property. Include detached garages, storage buildings, barns and other structures in your plan.

The actual design and development of your defensible space depends on several factors: size and shape of buildings, materials used in their construction, the slope of the ground on which the structures are built, surrounding topography,

Colorado State University Cooperative Extension

Putting Knowledge to Work

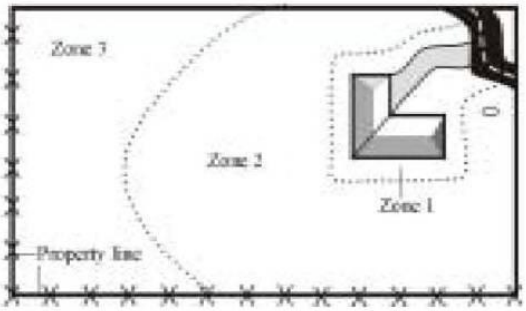


Figure 1: Forested property showing the three fire-defensible zones around a home or other structure.

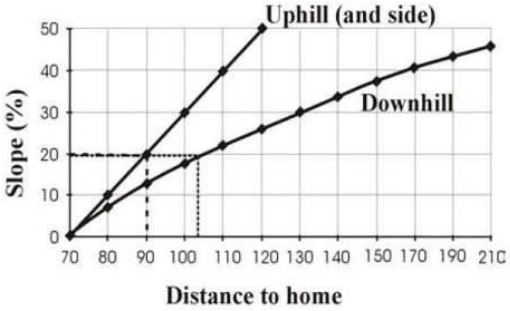


Figure 2: This chart indicates the *minimum recommended* dimensions for defensible space from the home to the outer edge of Zone 2. For example, if your home is situated on a 20 percent slope, the minimum defensible space dimensions would be 90 feet uphill and to the sides of the home and 104 feet downhill from the home.

and sizes and types of vegetation on your property. These factors all affect your design. You may want to request additional guidance from your local Colorado State Forest Service (CSFS) forester or fire department. (See the Special Recommendations section of this fact sheet for shrubs, lodgepole pine, Engelmann spruce, and aspen.)

Defensible Space Management Zones

Zone 1 is the area of maximum modification and treatment. It consists of an area of 15 feet around the structure in which all flammable vegetation is removed. This 15 feet is measured from the outside edge of the home's eaves and any attached structures, such as decks.

Zone 2 is an area of fuel reduction. It is a transitional area between Zones 1 and 3. The size of Zone 2 depends on the slope of the ground where the structure is built. Typically, the defensible space should extend *at least* 75 to 125 feet from the structure. See Figure 2 for the appropriate distance for your home's defensible space. Within this zone, the continuity and arrangement of vegetation is modified. Remove stressed, diseased, dead or dying trees and shrubs. Thin and prune the remaining larger trees and shrubs. Be sure to extend thinning along either side of your driveway all the way to your main access road. These actions help eliminate the continuous fuel surrounding a structure while enhancing homesite safety and the aesthetics of the property.

Zone 3 is an area of traditional forest management and is of no particular size. It extends from the edge of your defensible space to your property boundaries.

Prescriptions

Zone 1

The size of Zone 1 is 15 feet, measured from the edges of the structure. Within this zone, several specific treatments are recommended.

Plant nothing within 3 to 5 feet of the structure, particularly if the building is sided with wood, logs or other flammable materials. Decorative rock, for example, creates an attractive, easily maintained, nonflammable ground cover.

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

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

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

Ideally, remove all trees from Zone 1 to reduce fire hazards. If you do keep a tree, consider it part of the structure and extend the distance of the entire defensible space accordingly. Isolate the tree from any other surrounding trees. Prune it to at least 10 feet above the ground. Remove any branches that interfere with the roof or are within 10 feet of the chimney. Remove all "ladder fuels" from beneath the tree. Ladder fuels are vegetation with vertical continuity that allows fire to burn from ground level up into the branches and crowns of trees. Ladder fuels are potentially very hazardous but are easy to mitigate. No ladder fuels can be allowed under tree canopies. In all other areas, prune all branches of shrubs or trees up to a height of 10 feet above ground (or 1/2 the height, whichever is the least).

Zone 2

Zone 2 is an area of fuel reduction designed to reduce the intensity of any fire approaching your home. Follow these recommended management steps.

Thin trees and large shrubs so there is at least 10 feet between crowns. Crown separation is measured from the furthest branch of one tree to the nearest branch on the next tree (Figure 3). On steep slopes, allow more space between tree crowns. (See Figure 4 for *minimum recommended* spacing for trees on steep slopes.) Remove all ladder fuels from under these remaining trees. Carefully prune trees to a height of at least 10 feet.

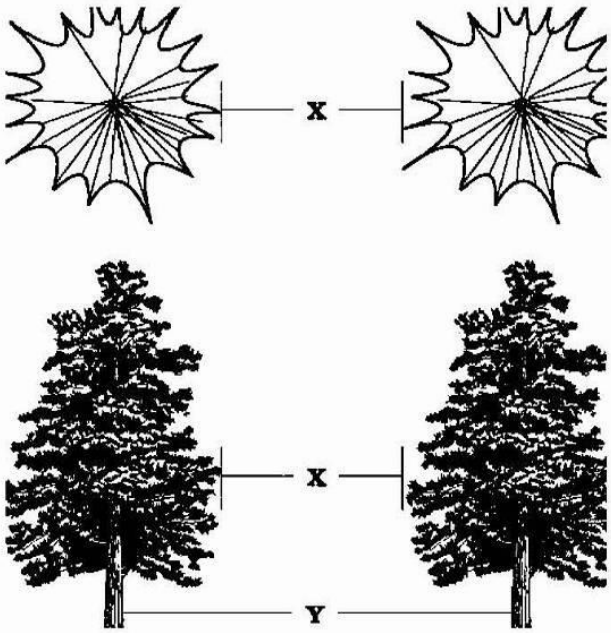


Figure 3: X = crown spacing; Y = stem spacing. Do not measure between stems for crown — measure between the edges of tree crowns.

Small clumps of 2 to 3 trees may be occasionally left in Zone 2. Leave more space between the crowns of these clumps and surrounding trees.

Because Zone 2 forms an aesthetic buffer and provides a transition between zones, it is necessary to blend the requirements for Zones 1 and 3. Thin the portions of Zone 3 adjacent to Zone 2 more heavily than the outer portions.

Isolated shrubs may remain, provided they are not under tree crowns. Prune and maintain these plants periodically to maintain vigorous growth. Remove dead stems from trees and shrubs annually. Where shrubs are the primary fuel in Zone 2, refer to the Special Recommendations section of this fact sheet.

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

Mow grasses (or remove them with a weed trimmer) as needed through the growing season to keep them low, a maximum of 6 to 8 inches. This is extremely critical in the fall when grasses dry out and cure or in the spring after the snow is gone but before the plants green up.

Stack firewood and woodpiles uphill or on the same elevation as the structure but at least 30 feet away. Clear and keep away flammable vegetation within 10 feet of these woodpiles. Do not stack wood against your house or on or under your deck, even in winter. Many homes have burned from a woodpile that ignited as the fire passed. Wildfires can burn at almost any time in Colorado.

Locate propane tanks at least 30 feet from any structures, preferably on the same elevation as the house. You don't want the LP container below your house — if it ignites, the fire would tend to burn uphill. On the other hand, if the tank is above your house and it develops a leak, LP gas will flow downhill into your home. Clear and keep away flammable vegetation within 10 feet of these tanks. Do not screen propane tanks with shrubs or vegetation.

Dispose of slash (limbs, branches and other woody debris) from your trees and shrubs through chipping or by piling and burning. Contact your local CSFS office or county sheriff's office for information about burning slash piles. If neither of these alternatives is possible, lop and scatter slash by cutting it into very small pieces and distributing it over the ground. Avoid heavy accumulations

% slope	Tree Crown Spacing	Brush and Shrub Clump Spacing
0 -10 %	10´	2 1/2 x shrub height
11 - 20%	15´	3 x shrub height
21 - 40%	20´	4 x shrub height
> 40%	30´	6 x shrub height

Figure 4: Minimum tree crown and shrub clump spacing.

Tree Diameter (in inches)	Average Stem Spacing Between Trees (in feet)
3	10
4	11
5	12
6	13
7	14
8	15
9	16
10	17
11	19
12	21
13	23
14	24
15	26
16	28
17	29
18	31
19	33
20	35
21	36
22	38
23	40
24	42

Figure 5: Minimum tree spacing for Zone 3.

of slash. Lay it close to the ground to speed decomposition. If desired, no more than two or three small, widely spaced brush piles may be left for wildlife purposes. Locate these towards the outer portions of your defensible space.

Zone 3

This zone is of no specified size. It extends from the edge of your defensible space to your property lines. A gradual transition into this zone from defensible space standards to other management objectives you may have is suggested. Typical management objectives for areas surrounding homesites or subdivisions are: provide optimum recreational opportunities; enhance aesthetics; maintain tree health and vigor; provide barriers for wind, noise, dust and visual intrusions; support limited production of firewood, fence posts and other forest commodities; or grow Christmas trees or trees for transplanting.

Specific requirements will be dictated by your objectives for your land and the kinds of trees present. See Figure 5 for the *minimum* suggested spacing between "leave" trees. Forest management in Zone 3 is an opportunity for you to increase the health and growth rate of the forest in this zone. Keep in mind that root competition for available moisture limits tree growth and ultimately the health of the forest.

A high canopy forest reduces the chance of a surface fire climbing into the tops of the trees and might be a priority for you if this zone slopes steeply. The healthiest forest is one that has multiple ages, sizes, and species of trees where adequate growing room is maintained over time. Remember to consider the hazards of ladder fuels. Multiple sizes and ages of trees might increase the fire hazard from Zone 3 into Zone 2, particularly on steep slopes.

A greater number of wildlife trees can remain in Zone 3. Make sure that dead trees pose no threat to power lines or fire access roads.

While pruning generally is not necessary in Zone 3, it may be a good idea from the standpoint of personal safety to prune trees along trails and fire access roads. Or, if you prefer the aesthetics of a well-manicured forest, you might prune the entire area. In any case, pruning helps reduce ladder fuels within the tree stand, thus enhancing wildfire safety.

Mowing is not necessary in Zone 3.

Any approved method of slash treatment is acceptable for this zone, including piling and burning, chipping or lop-and-scatter.

Special Recommendations

Tree spacing guidelines do not apply to *mature* stands of aspen trees where the recommendations for ladder fuels have been complied with. In areas of aspen regeneration and young trees, the spacing guidelines should be followed.

Brush and shrubs

Brush and shrubs are woody plants, smaller than trees, often formed by a number of vertical or semi-upright branches arising close to the ground. Brush is smaller than shrubs and can be either woody or herbaceous vegetation.

On nearly level ground, minimum spacing recommendations between clumps of brush and/or shrubs is 2 1/2 times the height of the vegetation. Maximum diameter of clumps should be 2 times the height of the vegetation. As with tree crown spacing, all measurements are made from the edges of vegetation crowns (Figure 3).

For example: For shrubs 6 feet high, spacing between shrub clumps should be 15 feet or more apart (measured from the edges of the crowns of vegetation clumps). The diameter of shrub clumps should not exceed 12 feet (measured from the edges of the crowns). Branches should be pruned to a height of 3 feet.

Grasses

Keep dead, dry or curing grasses mowed to less than 6 inches. Defensible space size where grass is the predominant fuel can be reduced (Figure 5) when applying this practice.

Windthrow

In Colorado, certain locations and tree species, including lodgepole pine and Engelmann spruce, are especially susceptible to damage and uprooting by high winds (windthrow). If you see evidence of this problem in or near your forest, or have these tree species, consider the following adjustments to the defensible space guidelines. It is highly recommended that you contact a professional forester to help design your defensible space.

Adjustments: If your trees or homesite are susceptible to windthrow and the trees have never been thinned, use a stem spacing of diameter plus five instead of the guides listed in the Zone 3 section. Over time (every 3 to 5 years) *gradually* remove additional trees. The time between cutting cycles allows trees to "firm up" by expanding their root systems. Continue this periodic thinning until the desired spacing is reached.

Also consider leaving small clumps of trees and creating small openings on their lee side (opposite of the predominant wind direction). Again, a professional forester can help you design the best situation for your specific homesite and tree species. Remember, with species such as lodgepole pine and Engelmann spruce, the likelihood of a wildfire running through the tree tops or crowns (crowning) is closely related to the overabundance of fuels on the forest floor. Be sure to remove downed logs, branches and *excess* brush and needle buildup.

Maintaining Your Defensible Space

Your home is located in a forest that is dynamic, always changing. Trees and shrubs continue to grow, plants die or are damaged, new plants begin to grow, and plants drop their leaves and needles. Like other parts of your home, defensible space requires maintenance. Use the following checklist each year to determine if additional work or maintenance is necessary.

% slope	D-space size (uphill, downhill, sidehill)
0 - 20 %	30'
21 - 40%	50'
> 40%	70'

Figure 6: Minimum defensible space size for grass fuels.

Defensible Space and FireWise Annual Checklist

- □ Trees and shrubs are properly thinned and pruned within the defensible space. Slash from the thinning is disposed of.
- □ Roof and gutters are clear of debris.
- □ Branches overhanging the roof and chimney are removed.
- □ Chimney screens are in place and in good condition.
- □ Grass and weeds are mowed to a low height.
- □ An outdoor water supply is available, complete with a hose and nozzle that can reach all parts of the house.
- □ Fire extinguishers are checked and in working condition.
- □ The driveway is wide enough. The clearance of trees and branches is adequate for fire and emergency equipment. (Check with your local fire department.)
- □ Road signs and your name and house number are posted and easily visible.
- □ There is an easily accessible tool storage area with rakes, hoes, axes and shovels for use in case of fire.
- □ You have practiced family fire drills and your fire evacuation plan.
- □ Your escape routes, meeting points and other details are known and understood by all family members.
- □ Attic, roof, eaves and foundation vents are screened and in good condition.

FIREWISE is a multi-agency program that encourages the development of defensible space and the prevention of catastrophic wildfire.

Stilt foundations and decks are enclosed, screened or walled up.

- ☐ Trash and debris accumulations are removed from the defensible space.
- ☐ A checklist for fire safety needs inside the home also has been completed. This is available from your local fire department.

References

Colorado State Forest Service, Colorado State University, Fort Collins, CO 80523-5060; (970) 491-6303:

- *FireWise Construction — Design and Materials*
- Home Fire Protection in the Wildland Urban Interface
- Wildfire Protection in the Wildland Urban Interface
- *Landowner Guide to Thinning*

Colorado State University Cooperative Extension, 115 General Services Bldg., Fort Collins, CO 80523-4061; (970) 491-6198; E-mail: resourcecenter@ucm.colostate.edu:

- 6.303, *Fire-Resistant Landscaping*
- 6.304, *Forest Home Fire Safety*
- 6.305, *FireWise Plant Materials*
- 6.306, *Grass Seed Mixes to Reduce Wildfire Hazard*
- 7.205, *Pruning Evergreens*
- 7.206, *Pruning Shrubs*
- 7.207, *Pruning Deciduous Trees*

Colorado State Forest Service

This fact sheet was produced in cooperation with the Colorado State Forest Service.

[1]*Wildfire Hazard Mitigation Coordinator, Colorado State Forest Service.*

Comparison of Sagebrush Management Techniques

I. Prescribed Fire

Advantages

- A "natural" process, therefore, generally fewer environmental side effects
- Can be used in a wide variety of circumstances under the proper environmental conditions
- Returns nutrients to the soil quickly

Disadvantages

- Implementation can be potentially hazardous with associated liability
- Generally, requires fine fuels present (rest) to be effective
- Can potentially negatively affect non-target species
- Short term aesthetic, smoke and erosion concerns

II. Chemical (Herbicides)

Advantages

- Can be quite selective
- Can be relatively inexpensive
- Can be regulated for partial or total treatment
- Can cover large areas quickly

Disadvantages

- Many chemicals are residual, and may inhibit plant regrowth
- Can have environmental / toxic side effects if not used carefully
- Application rates and timing can be limiting
- Leaching and drift into non-target areas
- Can affect non-target species within the treatment area

III. Mechanical (Mowing, Chaining, Plowing/Ripping/Scalping/Pitting, Brushrake, Brush Disc, Choppers, Mulchers, Drills, Pipe Harrows, etc)

Advantages

- Can be quite fast
- Easily controlled
- Can be very effective when used under the right conditions
- Soil disturbance can prepare seed bed

Disadvantages

- Topography (i.e., relief/slope, rocky soils) can be limiting for many techniques
- Costs (equipment and operators) can be expensive in some cases
- Benefits may be short-lived
- Short term aesthetic and erosion concerns
- Cultural concerns
- Litter management may be required

IV. Biological (Insects and Herbivory)

Advantages

- Often target species (host) specific / selective
- Grazing treatments can be relatively inexpensive

Disadvantages

- Limited number of bioagents available
- Can take a long time (several years in some cases) to see wide-spread results
- Grazing methods can be counter-productive / abusive if not carefully monitored and managed

USFS REGION 2 FIRE OPERATIONS GUIDANCE IN BARK BEETLE STANDS[1]

Due to altered fuel conditions, personnel operating within the bark beetle environment should be aware of the imminent danger presented by dead and dying trees, falling at an increasing rate across a broad forested landscape.

Purpose and Intent

Fire Operations Guidance is mindful of Foundational Fire Suppression Doctrine in the Forest Service. The first principle is: No resource or facility is worth the loss of human life, however the wildland fire suppression environment is complex and possesses inherent hazards that can---even with reasonable mitigation---result in harm to fire fighters engaged in fire suppression operations. In recognition of this fact, we are committed to the aggressive management of risk.

This guidance provides a collection of potential hazards unique to bark beetle forests, including appropriate practices that have evolved over time within the wildland fire service. It does not provide absolute solutions to the unlimited number of situations that will occur.
This guidance within bark beetle stands was provided with the intention of being used in conjunction with existing fire risk management documents. No further protocols or rules are necessary to make informed risk management decisions for fire operations in bark beetle stands.

The following hazard guidance is provided:

Tactical Hazards

- Withdrawal and/or reassessment should be considered if any of the following are present:
    - Thunderstorms in the immediate vicinity.
    - Wind speeds are strong enough that canopy movement is observed (Consider that wind speeds at eye level in sheltered areas may not indicate the much greater winds aloft)
    - Reliable communication cannot be established with the appropriate Dispatch Center and remain in place 24/7 when resources are engaged.
- Due to limited ingress or egress in remote areas or in terrain without vantage points, consider using an aerial platform for risk assessment and size up.

Potential Fire Behavior Hazards

- Due to increased potential of extreme fire behavior, when ERCs approach the 90th percentile, air reconnaissance should be on scene within 1 hour of detection.
- The following situations, though possible on any wildfire, may be accentuated in bark beetle stands:
    - Accelerated transition to crown fire (when needles are present)
    - Increased rate of spread (Surface fire)
    - Resistance to control (Heavy dead and down)
    - Frequent spotting, including long range (>.25 miles)

[1] Available at: http://gacc.nifc.gov/rmcc/dispatch_centers/r2ftc/documents/BB_IA_Guidelines_2010.pdf

PREPAREDNESS PLANNING

In order to reduce potential conflicts between evacuating citizens and incoming responders, it is desirable to have nearby meeting points and evacuation centers for citizens and staging areas for fire resources. This is especially important in communities with a single access and a high population density. Evacuation centers should include heated buildings with facilities large enough to handle the population, where available. A preplanned evacuation center should be identified in Kremmling so that area residents will know where to go, and that so planning can begin ahead of time. Schools and churches are usually ideal for this purpose. Meeting points for individual communities should be located near the community and known to all area residents. They should also be located away from flammable vegetation, and out of the way of incoming resources.

Fire staging areas should contain large safety zones, a good view in the direction of the fire, easy access and turnarounds for large apparatus, a significant fuel break between the fire and the escape route, topography conducive to radio communications, and access to water. Large irrigated meadows may make good safety zones for firefighting forces. Local responders are encouraged to preplan the use of potential staging areas with property owners.

EVACUATING

Life safety is the number one priority in any wildland fire situation. This being the case, evacuation is often one of the most difficult, but important, areas to address. Many roads leading into and throughout communities in the study area are one way in and out, narrow, poorly maintained, and/or blocked by low hanging archways or gates. Panicked residents and chaotic conditions will further hinder evacuation effectiveness and timeliness. Widening roadways, improving road maintenance and reducing impediments to travel such as gates and archways will speed the overall evacuation process and aid in the ingress of firefighters. Escape routes should be properly signed so that they are visible in smoky conditions. Evacuation centers should be predetermined so that residents know where they are going and how they will get there. Communities should stage mock evacuation scenarios annually or bi-annually so that residents know what to do in the event of an approaching wildfire. Communities should also work to develop a way to contact all of community residents, in case many residents chose not to go to the evacuation center. This list could be a phone and/or email list, which will allow community members to find out information about one another and on the status of their evacuation.

For more information on evacuation planning, please visit:

http://www.ready.gov/america/beinformed/wildfires.html

PERSONAL PREPAREDNESS

The one thing you cannot plan for is *where you will be* when a disaster hits –

Evacuation Plan - **HOME, VEHICLE and WORK**
Where to meet
Gas, water, electrical shut offs
List of items to take - supplies
Computers - backups (off-site)
Documents, records, computer files
Plastic to cover areas to protect from fire sprinkler damage
How/where to transport hospitalized (patients), boarders, etc.

Communication plan

Who to call
Family phone tree, including contact in distant location

Emergency Supply Examples:

Water (recommended 3 days @ 1 gal/person/day)
Shoes
Rx meds
Rx glasses
Flashlight/batteries
Candles/matches
Blanket
Portable Radio
Mirror
1st aid kit
Fire extinguisher
Food
Camp stove for cooking, fuel
Pots/pans
Can opener (not electric!)
Bleach to disinfect drinking water
Toilet paper
Trash bags
Immunization/Health Records
US Hotel Directory-Pet Friendly

GUIDELINES FOR HORSES AND OTHER LIVESTOCK

- Create neighborhood programs and evacuation plans.
- Keep halters/ropes ready for each horse that includes: the horse's name, your name/phone number and a separate emergency contact number.
- Keep a reserve supply of horse feed and water on hand. Be prepared to be self-sufficient for at least 72 hours.
- Survey your property to find the best location to confine your animals in each type of disaster. Check for alternate water sources in case power is lost and pumps and automatic waterers are not working after the disaster. Do not rely on automatic waterers during a disaster.
- If you have a well, do you have a generator?
- If you think you might need to evacuate your horses from your property, determine several locations (evacuation sites) the animals could be taken, several routes to these locations, and the entry requirements for each. Make arrangements in advance with the owners/operators to accept your horses, and be sure to contact them before taking the horses there. Locations that could be used for evacuation are private stables, racetracks, fair grounds, rodeo grounds, equestrian centers, private farms, and humane societies.
- Permanently identify each horse by tattoo, microchip, brand, tag, photographs (ideally, 4 views—front, rear, left and right side), and/or drawing. Record its age, sex, breed, and color with your record of this identification. Keep this information with your important papers. Also consider visible ID markers during an evacuation, e.g., paint or etch hooves, use neckbands, or paint your telephone number (cell phone?) on side of animal.
- Be sure your horses' vaccination and medical records are written and up-to-date. Check with your veterinarian as to what immunizations are advisable. Have documentation of any medicines with dosing instructions, special feeding instructions, and the name and phone number of the veterinarian who dispensed the drug.
- Place a permanent tag with your name and phone number and the horse's name on each animal's halter.
- Have a First Aid Kit (check with your veterinarian)
    - Leg wraps, track bandage, tape (do NOT use elastic bandages!)
    - Vet wrap
    - Kling or roll gauze, gauze squares
    - Leg quilts or sheet cotton
    - Cotton
    - Soap
    - Antiseptic
    - Bandage scissors
    - Two pieces of garden hose
- Prepare an emergency kit consisting of:
    - First aid kit, water bucket, leg wraps/quilts, fire resistant non-nylon leads and halters, portable radio and extra batteries, flashlight and extra batteries, sharp knife, wire cutters, rake/shovel, emergency phone numbers/contact list. Consider "Special needs" pets.
- Have trailers, vans, towing vehicles maintained (including tires), full of gas, and ready to move at all times. Accustom your horse to loading and traveling.

PUBLIC EDUCATION

There is likely to be a varied understanding among property owners of the hazards associated with the threat of a wildfire. An approach to wildfire education that emphasizes safety and hazard mitigation on an individual property level should be undertaken, in addition to fire department efforts at risk reduction.

Use these web sites for a list of public education materials, and for general homeowner education:

http://csfs.colostate.edu/pages/wf-protection.html

http://www.Safeco.com/Safeco/about/giving/firefree.org

http://www.fs.fed.us/fire/links/links_prevention.html

http://www.or.blm.gov/nwfire/docs/Livingwithfire.pdf

http://www.firewise.org

http://www.blm.gov/nifc/st/en/prog/fire.1.html

READY, SET, GO! PROGRAM

The Ready, Set, Go! Program utilizes firefighters to teach individuals who live in high risk wildfire areas and the wildland-urban-interface (WUI) how to best prepare themselves and their properties against fire threats. Ready, Set, Go! works in complimentary and collaborative fashion with Firewise and other existing wildland fire public education efforts. It amplifies their messages to individuals to better achieve the common goal we all share of fire-adapted communities. The RSG program provides the implementation guidance; background knowledge; and presentation tools to assist fire departments in delivering the program message:

Ready – Preparing for the Fire Threat: Be Ready, Be Firewise. Take personal responsibility and prepare long before the threat of a wildfire so your home is ready in case of a fire. Create defensible space by clearing brush away from your home. Use fire-resistant landscaping and harden your home with fire-safe construction measures. Assemble emergency supplies and belongings in a safe spot. Make sure all residents residing within the home are on the same page, plan escape routes. For more information about how to be ***Ready*** for wildland fires, go to Firewise.org.

Set – Situational Awareness When a Fire Starts: Pack your vehicle with your emergency items. Stay aware of the latest news from local media and your local fire department for updated information on the fire.

Go – Leave early! Following your Action Plan makes you prepared and firefighters are now able to best maneuver the wildfire and ensuring you and your family's safety.

All homeowners and communities should become familiar with the RSG program. For more information and to download the free information guide and checklist, please visit:

http://www.southmetro.org/file/Publiceducation/Ready_Set_Go_SMFRA.pdf

WATER SUPPLY

Water availability is a critical fire suppression issue in all of the communities within the KFPD study area. While the areas immediately around the Town of Kremmling have an adequate hydrant network, all of the communities identified in the WUI do not. In many communities, the only water available comes from small ponds and creeks, many of which are seasonal. Moreover, some of the communities identified do not have any nearby water sources available at all. In all of these areas, water will need to be obtained and delivered via drafting and shuttling, which takes personnel and apparatus away from the firefighting effort. Additional water sources should be developed, to include dry hydrants on existing and developed ponds, water tanks where applicable, and additional pond development. All available water sources should be identified, marked and mapped so that the information is available for local and in-coming resources.

For more information on dry hydrant development, please visit:

http://www.co.larimer.co.us/wildfire/dry_hydrant_concept.htm

WATER SOURCE LOCATIONS

Big Horn Park:

Note: No water sources in the community. The following are down in the valley off of GCR 2.

40* 10' – 01.4"	
106* 17' – 54.0"	Troublesome Ponds North

Blue Valley Subdivision #1 & #2:

39* 55' – 23.1"	
106* 20' – 52.3"	Blue River Bridge
39* 53' – 12.1"	
106* 18' – 38.7"	Green Mountain Reservoir
39* 57' – 46.1"	
106* 24' – 56.7"	Way Reservoir

Blue Valley Ranch (ASI):

40* 00' – 12.8"	
106* 22' – 25.0"	Numerous ponds

Lake Agnes:

40* 21' – 10.1"	
106* 35' – 37.7"	Lake Agnes

Grand River Ranch & Gore Wood Estates:

40* 05' – 51.3"	
106* 28' – 45.5"	Charlie's Pond
40* 02' – 45.7"	
106* 27' – 57.5"	Gore Wood Pond
40* 03' – 41.3"	
106* 27' – 07.7"	Jones Reservoir #1 & #2
40* 04' – 17.4"	
106* 27' – 21.4"	Jones Reservoir #3
40* 04' – 31.2"	
106* 29' – 00.5"	Rose City

Old Park Subdivision & Gore Lakes:

40* 06' – 47.6 106* 30' – 58.0"	GCR 1933 & GCR 1935
40* 06' – 21.8" 106* 30' – 57.5"	Gore Lakes (multiple)
40* 08' – 17.0" 106* 28' – 33.3"	Gore Pass Reservoir
40* 09' – 05.2" 106* 27' – 40.5"	Hinman Reservoir (GCR 17)
40* 09' – 33.7" 106* 32' – 52.0"	Latigo Ranch (GCR 1911)
40* 11' – 2.9" 106* 34' – 25.8"	Red Dirt Reservoir

Rabbit Ears Village:

40* 23' – 33.1" 106* 33' – 8.8"	Small Pond
40* 19' – 49.1" 106* 30' – 53.0"	Whitely Peak Reservoir

Spring Creek / Shadow Creek:

39* 52' – 24.1" 106* 22' – 30.8"	Scattered Small Ponds

Troublesome Valley:

40* 06' – 21.6" 106* 19' – 31.1"	Troublesome Ponds South
40* 01' – 1.1" 106* 12' – 34.4"	Williams Fork Reservoir
40* 08' – 26.9" 106* 24' – 47.4"	Wolford Reservoir

Note: All water sources above are to be considered capable of supporting up to and including Type 1 Rotary Aircraft.

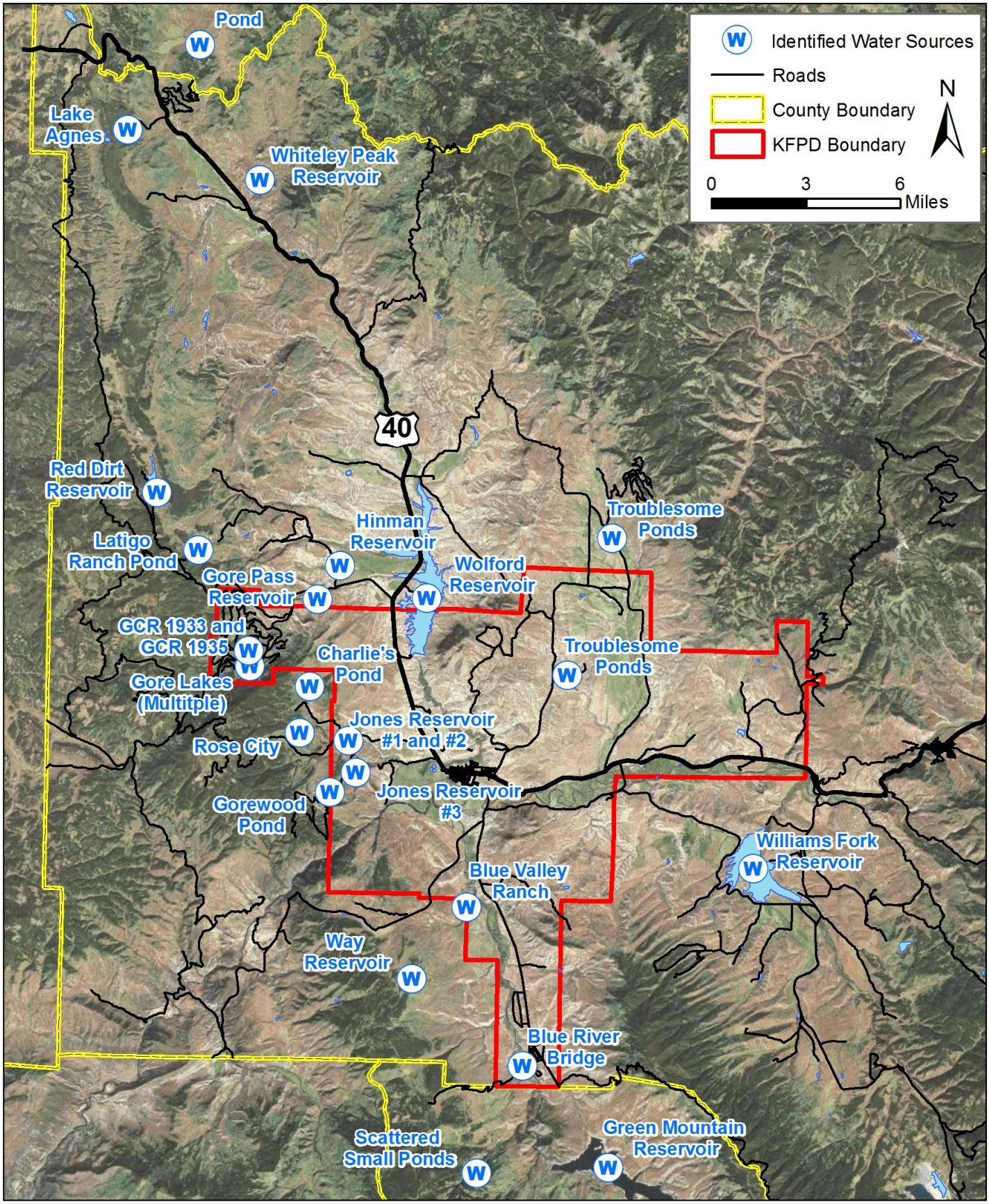


Figure A1. Identified Water Supply Sources within the study area.

APPENDIX B: COLLABORATION-COMMUNITIES/AGENCIES/STAKEHOLDERS

THE NEED FOR A CWPP

In response to the Healthy Forests Restoration Act (HFRA), and in an effort to create incentives, Congress directed interface communities to prepare a Community Wildfire Protection Plan (CWPP). Once completed, a CWPP provides statutory incentives for the federal agencies to consider the priorities of local communities as they develop and implement forest management and hazardous fuel reduction projects. CWPPs can take a variety of forms based on the needs of the people involved in their development. CWPPs may address issues such as wildfire response, hazard mitigation, community preparedness, structure protection, or all of the above. Colorado Senate Bill 09-001 provided revised minimum standards and guidelines for the development of CWPPs in Colorado. The minimum requirements for a CWPP specify that collaboration between local and state government representatives, in consultation with federal agencies and other interested parties. The plan must exhibit diverse collaboration with an emphasis on involvement of community members/representatives. This appendix describes and documents the process used to collaborate between the core planning group, stakeholders, and community representatives during the development of this plan.

PROJECT FUNDING AND COORDINATION

Funding for this project was provided by the Bureau of Land Management Community Assistance Program. Future community education and private landowner assistance will be coordinated through the fire protection district in concert with the Colorado State Forest Service (CSFS), Grand County, Bureau of Land Management (BLM) and United States Forest Service (USFS). These groups will continue to work private landowners and communities to identify funding for the implementation of mitigation projects.

INTER-AGENCY COLLABORATION

Roles and Responsibilities

To be successful, wildfire mitigation in the interface must be a community-based, collaborative effort. Stakeholders and the fire protection district will have the greatest responsibility for implementing the recommended mitigation projects. The CSFS and the USFS/ BLM are valuable participants in addressing cross-boundary projects throughout the area.

Nearly all of the recommendations from this report affect private land or access roads to private land. There are also mitigation recommendations for individual structures, which are the responsibility of the homeowner. Homeowners will, however, need a Wildfire Mitigation Advocate to help them implement these recommendations. The best defensible space will be created with oversight and expert advice from the fire district and/or government forestry personnel. One-on-one dialog will continue to build the relationship with community members. This level of involvement will allow agencies to keep track of the progress and update this plan to reflect the latest modifications at the community level.

THE COLLABORATIVE PROCESS

Strategic Planning

Several meetings and conference calls were held during the development of the CWPP. The initial stakeholder "kickoff" meeting, held May 4, 2011 at the Kremmling Fire Station, brought together CWPP "Core Team" members. This core team included the Kremmling Fire Protection District, CSFS, BLM, USFS, Grand County officials, local utility companies, and other prominent stakeholders. Discussion focused on the scope of the project, desired outcomes, and agency participation. The meeting covered introductions, methodology, stakeholder goals, project management, mapping data, and a regional map review. The group delineated and defined the study area's community boundaries, areas of special interest and critical infrastructure that would be targeted for assessment. The attendees at this meeting and/or those who provided support in the development of the document are listed below.

NAME	ORGANIZATION
Tony Tucker	Kremmling Fire Protection District
Paul Cada Ron Coisineau Ryan McNertney	Colorado State Forest Service
Lynn Barclay Annie Sperandio Dave Stout Bill Wyatt	Bureau of Land Management
Mark Cahur Sam Duerksen Erick Stahlin	US Forest Service
Jennifer Scott Russ Bateman Trevor Denney	Grand County
Rod Johnson	Sheriff's Office
Linwood Blacksmith	Tri-State G&T
Carol Culbreath Stacy Debill	Grand River Ranch
Joe Pandy	Mountain Parks Electric
Ron Smith David Ingle	Xcel Energy

Community Outreach

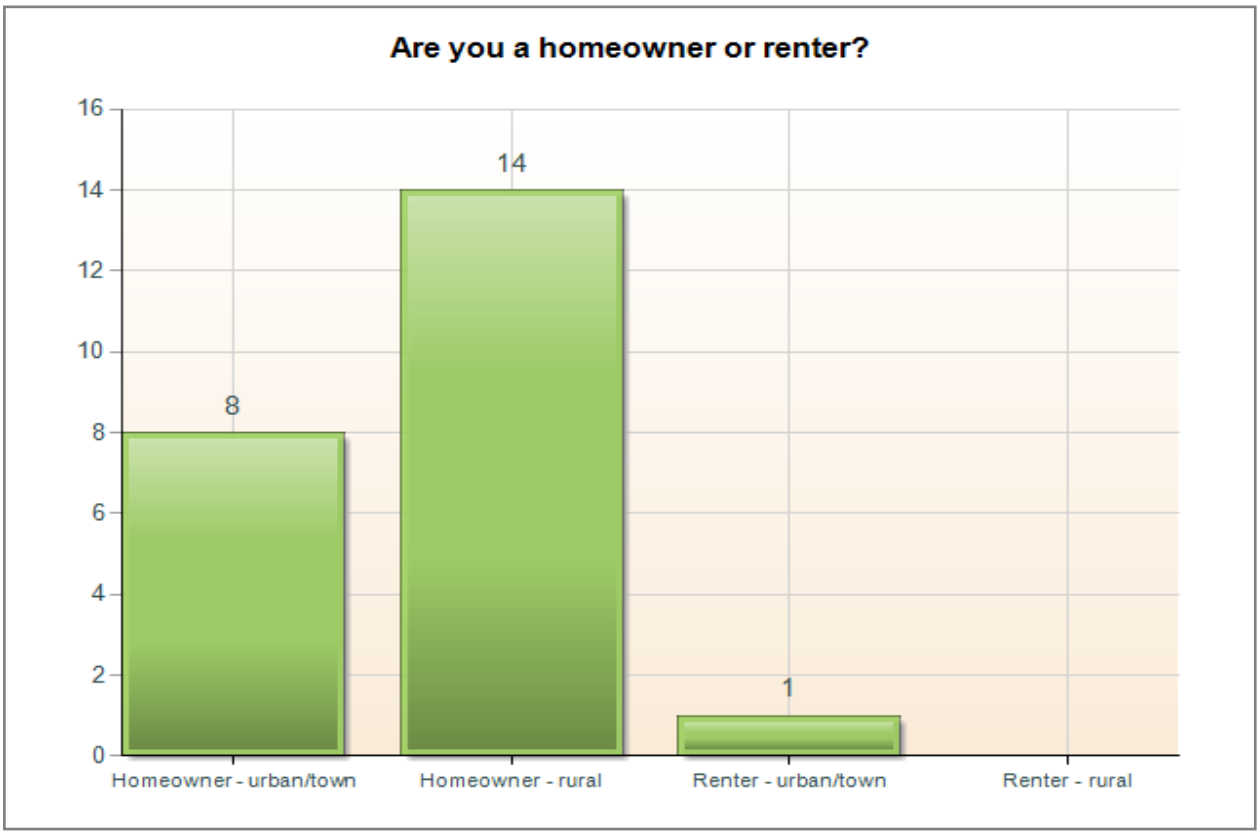
The success of any CWPP is dependent upon community involvement for both strategic input and long-term ownership and implementation. A plan that accurately reflects the community's interests, concerns and priorities will have greater legitimacy and long-term success. The outreach strategy this CWPP employed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

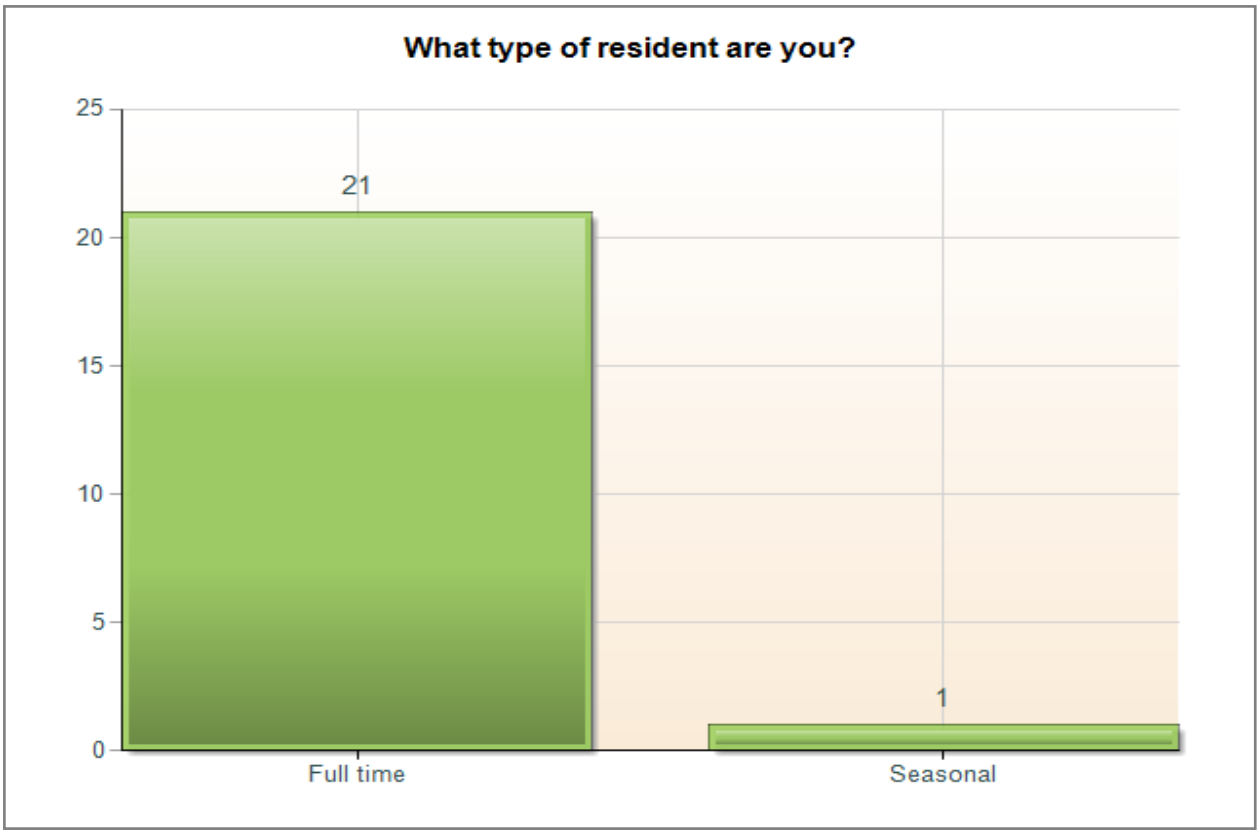
In addition to the stakeholder meeting, a public meeting, advertised through fire department outreach, the Kremmling Chamber of Commerce, the monthly local utility mailing, a radio service announcement, public display highway signs, and in the Sky-Hi Daily newspaper, was held to generate direct feedback from area residents on the CWPP development process, community assessment results and specific community mitigation recommendations. The meeting was held on June 22, 2011, at the Kremmling Fire Station. Approximately 31 people attended. At the meeting, a brief overview of the contents of the report was presented. A number of key stakeholders were present at the meeting to answer questions and solicit feedback, including the fire protection district, BLM, CSFS, Grand County Emergency Services, Grand County Sheriff's Office and Anchor Point.

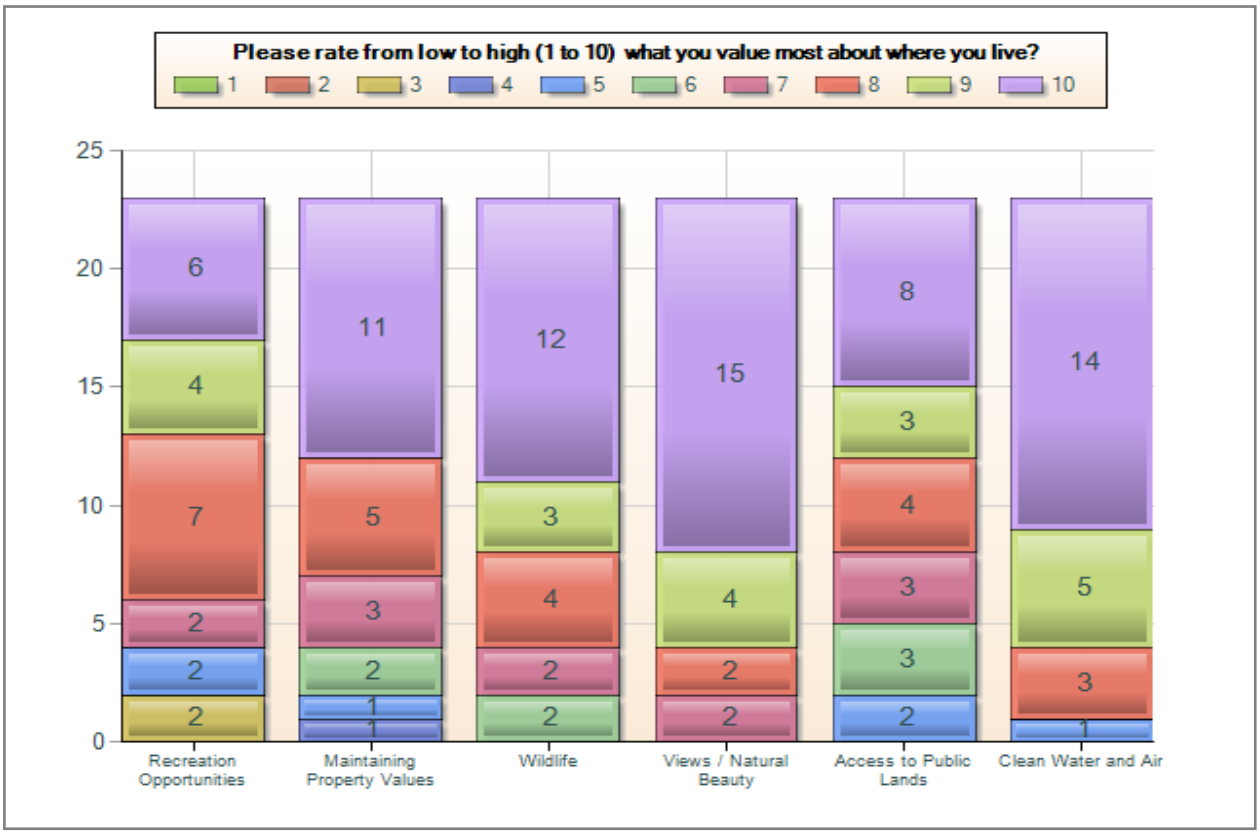
Development of the KFPD CWPP was conducted through an online project collaboration tool known as Basecamp. Basecamp provided a homogeneous means for the sharing of information, data files, mapping, and imagery resources within the core team and provided an open forum for project communications amongst a diverse team of local representatives, fire authorities, forest management, and plan coordinators. Use of the Basecamp tool promoted on-time and on-scale project management and team collaboration in the final development of the CWPP. The first draft of the report was also made available on the fire protection district's website, so the public could review it and submit comments.

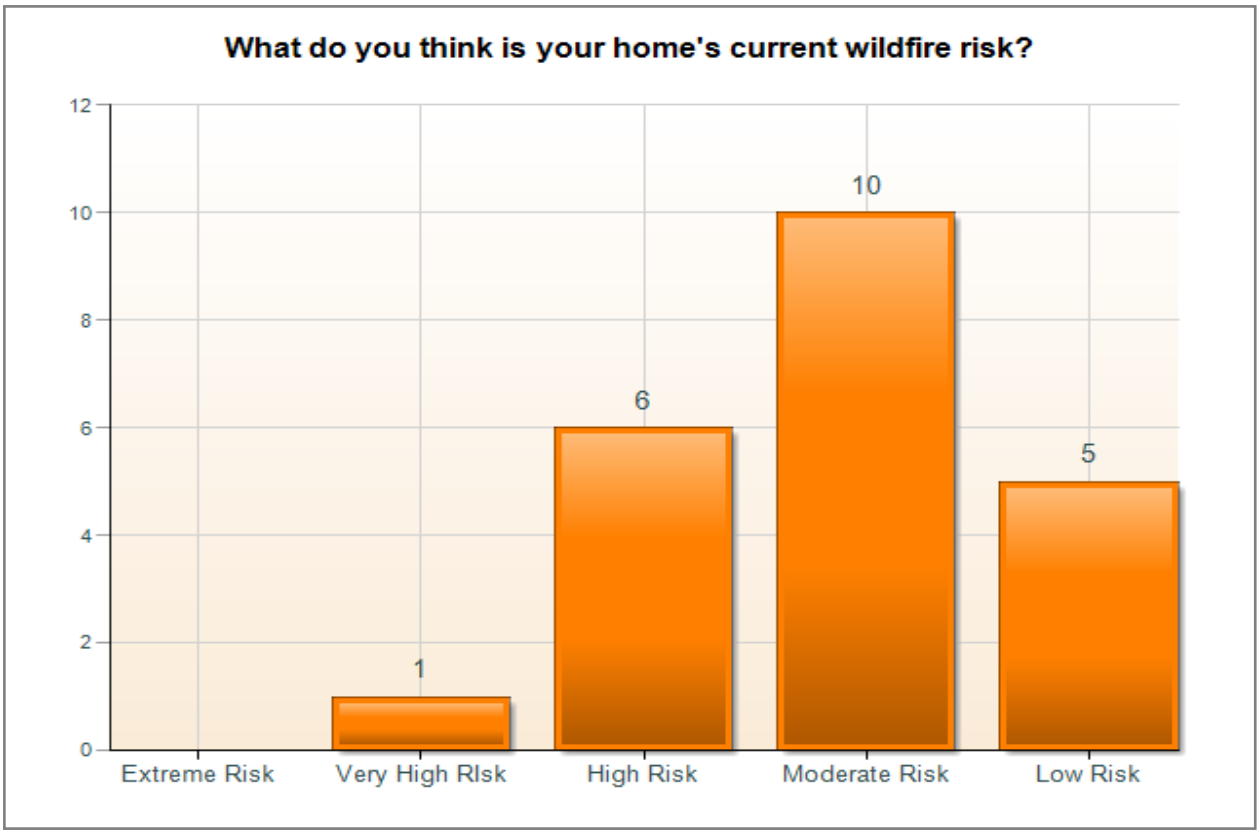
A county-wide resident survey was made available at a number of local businesses and offices, including the fire department and BLM office. A link to the survey was also provided to residents in the monthly local utility mailing and Sky-Hi Daily News public announcement. This survey was made available to the public and was launched on May 15, 2011 and remained available until July 1. The survey consisted of 33 questions inquiring on topics such as, but not limited to; important values for the area, concerns for wildfire risk, concerns on wildfire damage to various resources, overall feeling of safety, evacuation awareness, wildfire awareness, preferences on fuel treatments and defensible space, and overall concerns in addressing a wildfire occurrence. Twenty-five people completed the survey during that time. Results were used in the development of this plan, particularly to inform the values at risk section, and are detailed on the following pages.

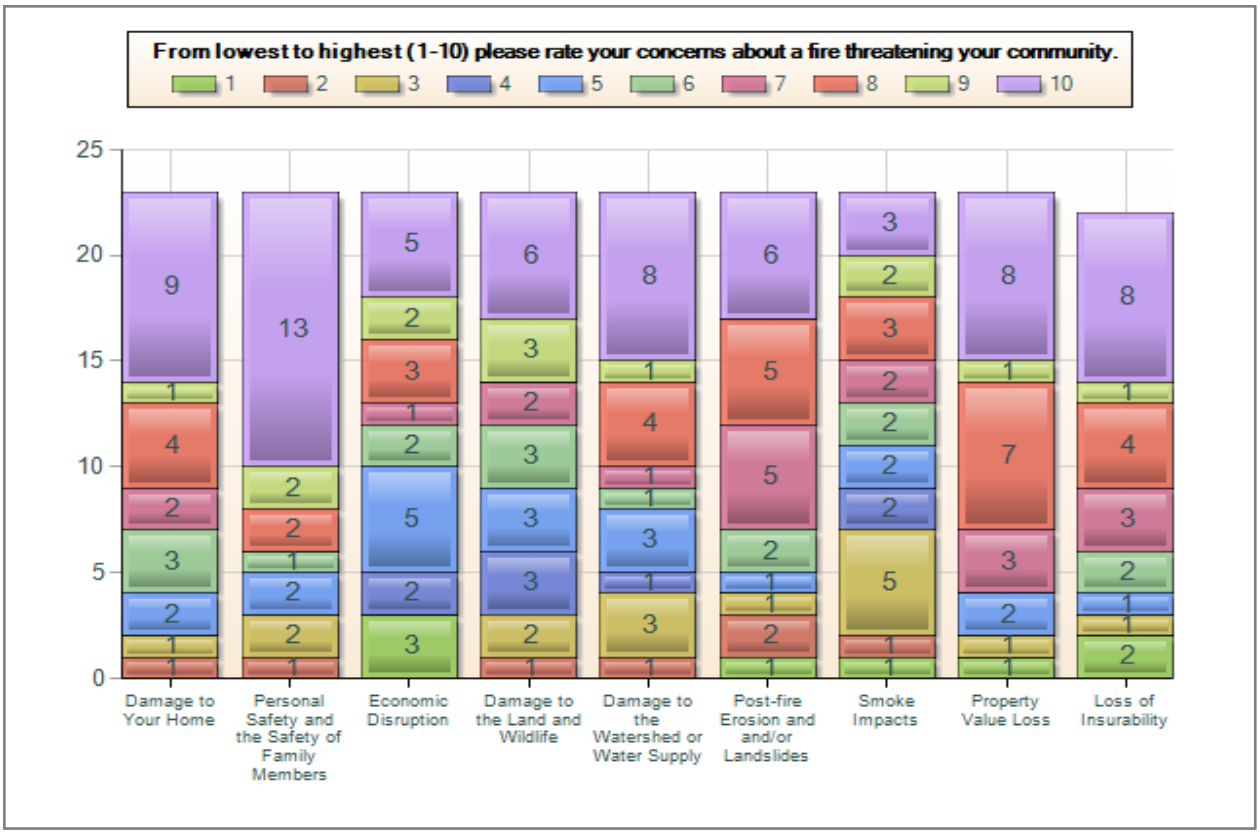
The graphics on the following page provide a visual summary of the respondents' answers to the posted survey. Unfortunately the low number of respondents to the survey did not yield statistically significant results.

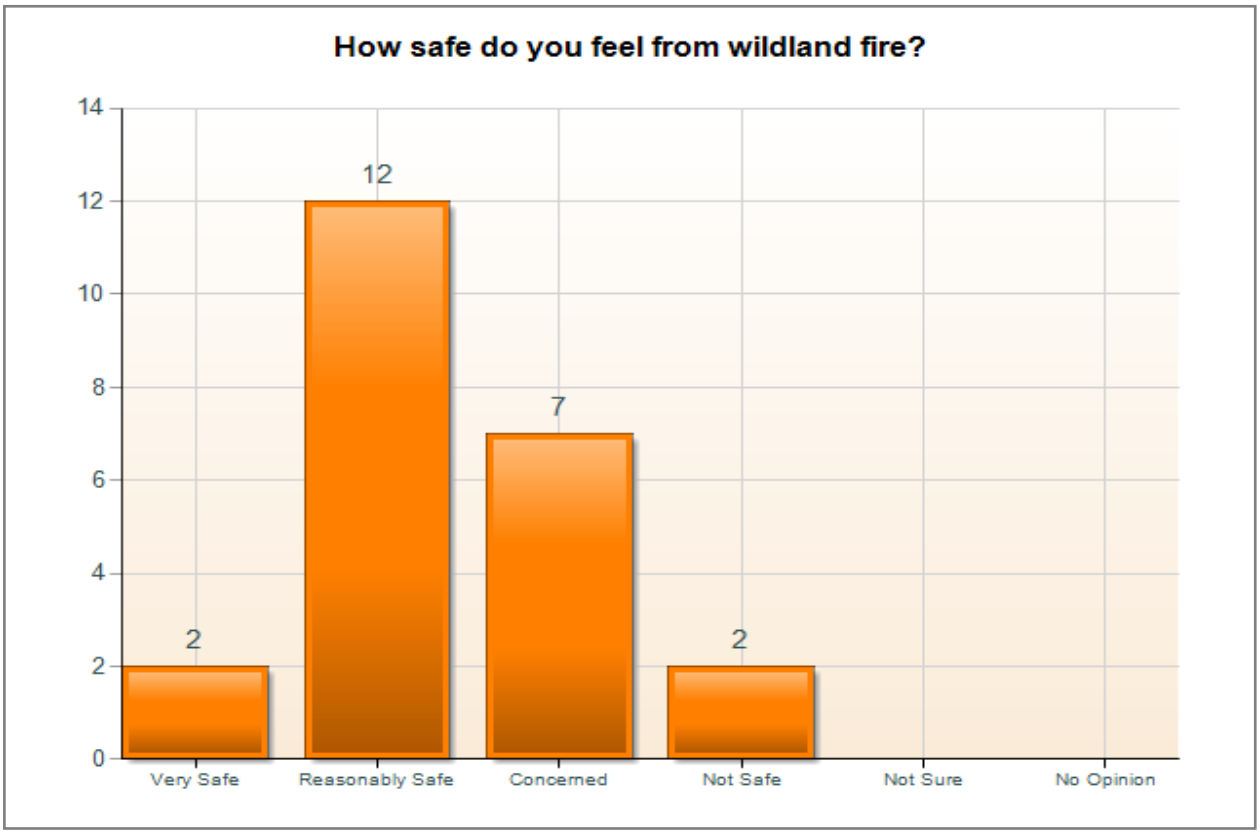

Are you a homeowner or renter?
16
14
12
10
8
6
4
2
0
8
14
1
Homeowner - urban/town
Homeowner - rural
Renter - urban/town
Renter - rural

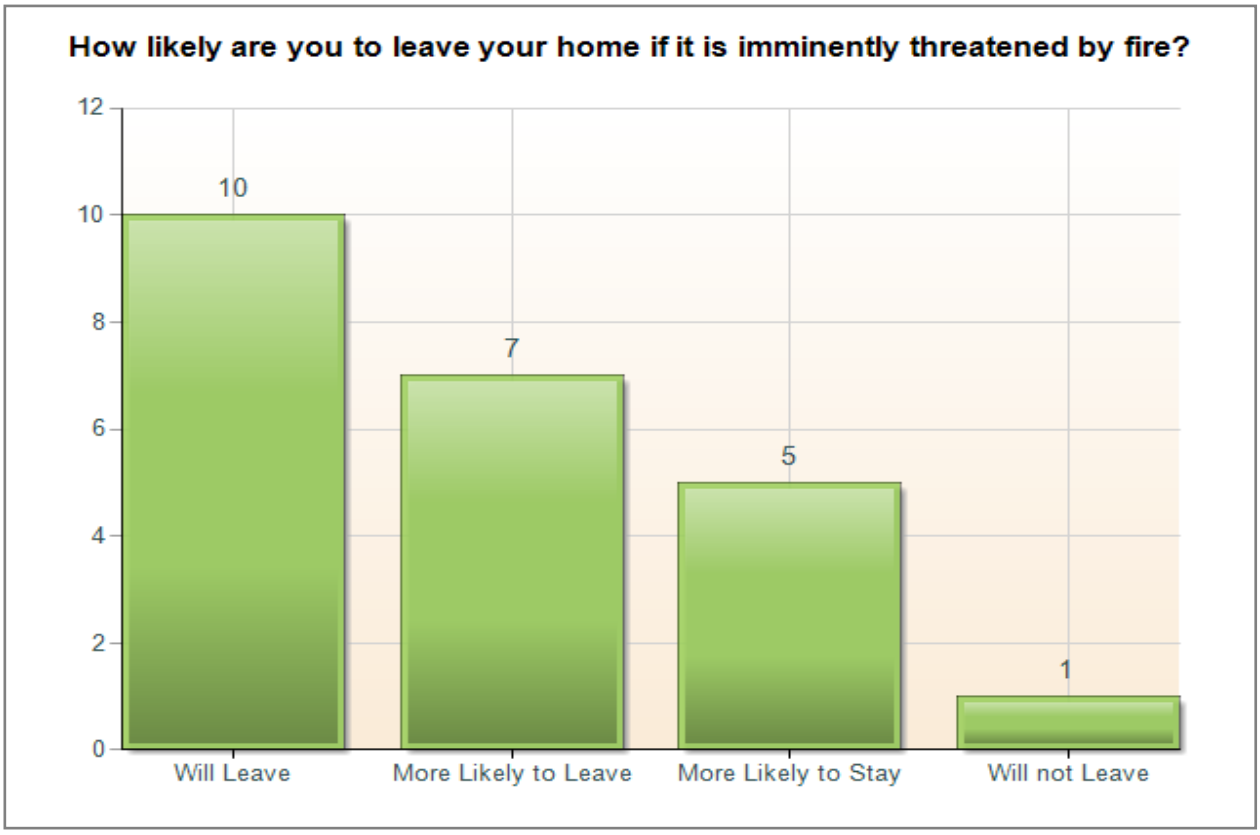

What type of resident are you?
25
20
15
10
5
0
21
1
Full time
Seasonal

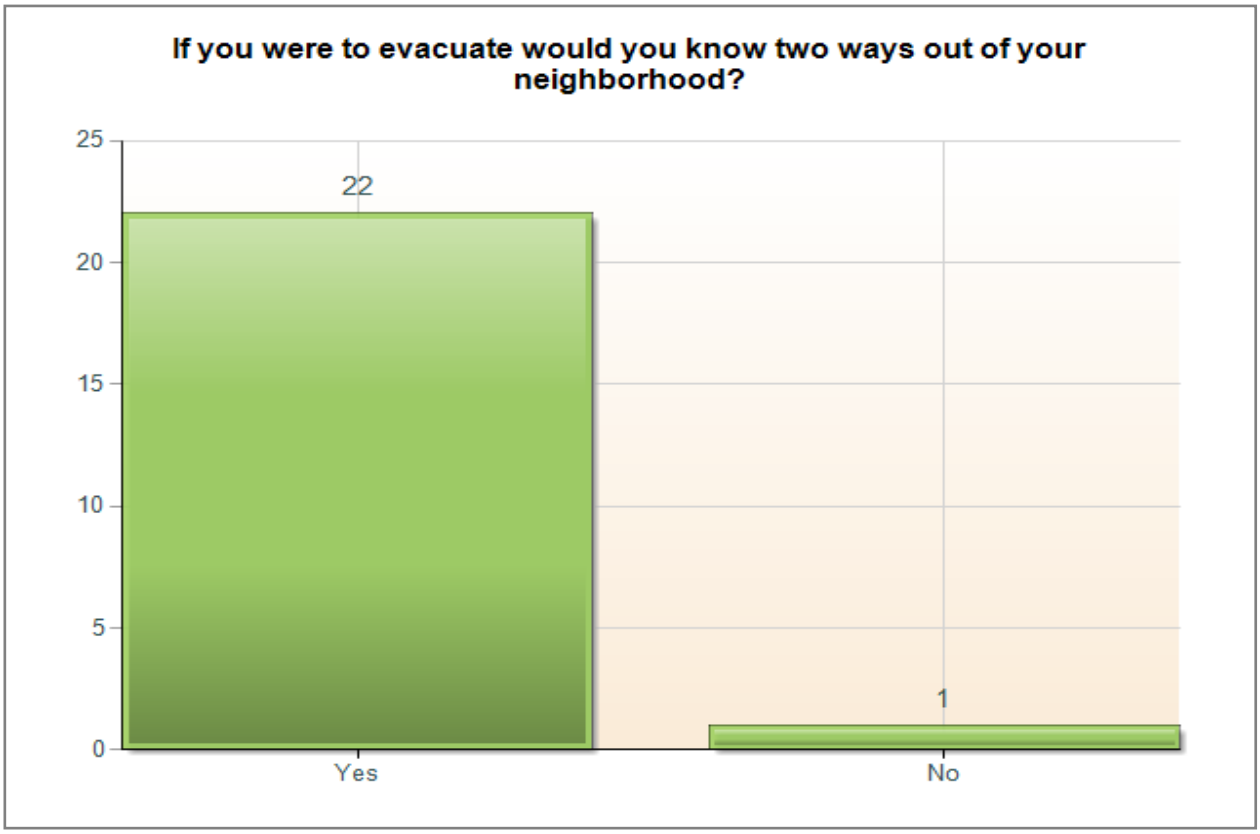

Please rate from low to high (1 to 10) what you value most about where you live?
1
2
3
4
5
6
7
8
9
10
25
20
15
10
5
0
6
4
7
2
2
2
11
5
3
2
1
1
12
3
4
2
2
15
4
2
2
8
3
4
3
3
2
14
5
3
1
Recreation Opportunities
Maintaining Property Values
Wildlife
Views / Natural Beauty
Access to Public Lands
Clean Water and Air

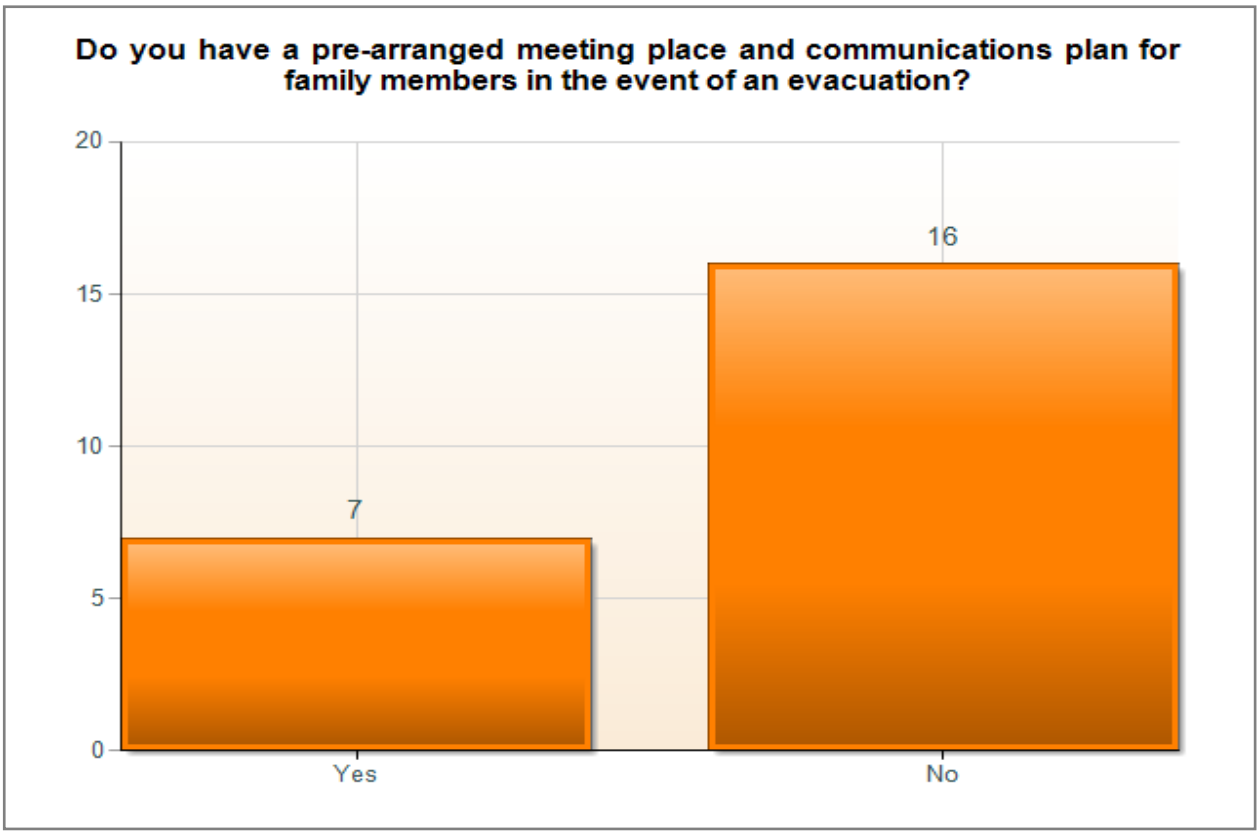

What do you think is your home's current wildfire risk?
12
10
8
6
4
2
0
1
6
10
5
Extreme Risk
Very High RIsk
High Risk
Moderate Risk
Low Risk

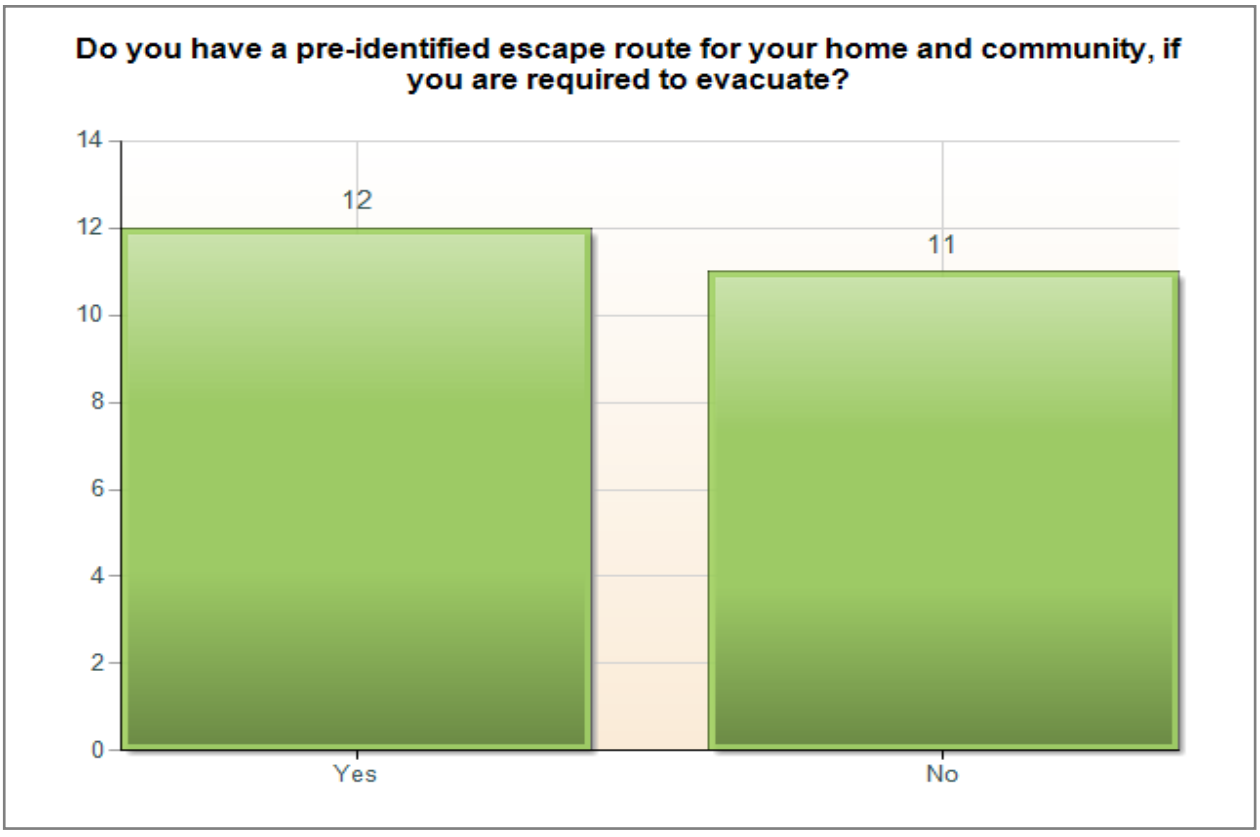

From lowest to highest (1-10) please rate your concerns about a fire threatening your community.
1
2
3
4
5
6
7
8
9
10
25
20
15
10
5
0
Damage to Your Home
Personal Safety and the Safety of Family Members
Economic Disruption
Damage to the Land and Wildlife
Damage to the Watershed or Water Supply
Post-fire Erosion and and/or Landslides
Smoke Impacts
Property Value Loss
Loss of Insurability

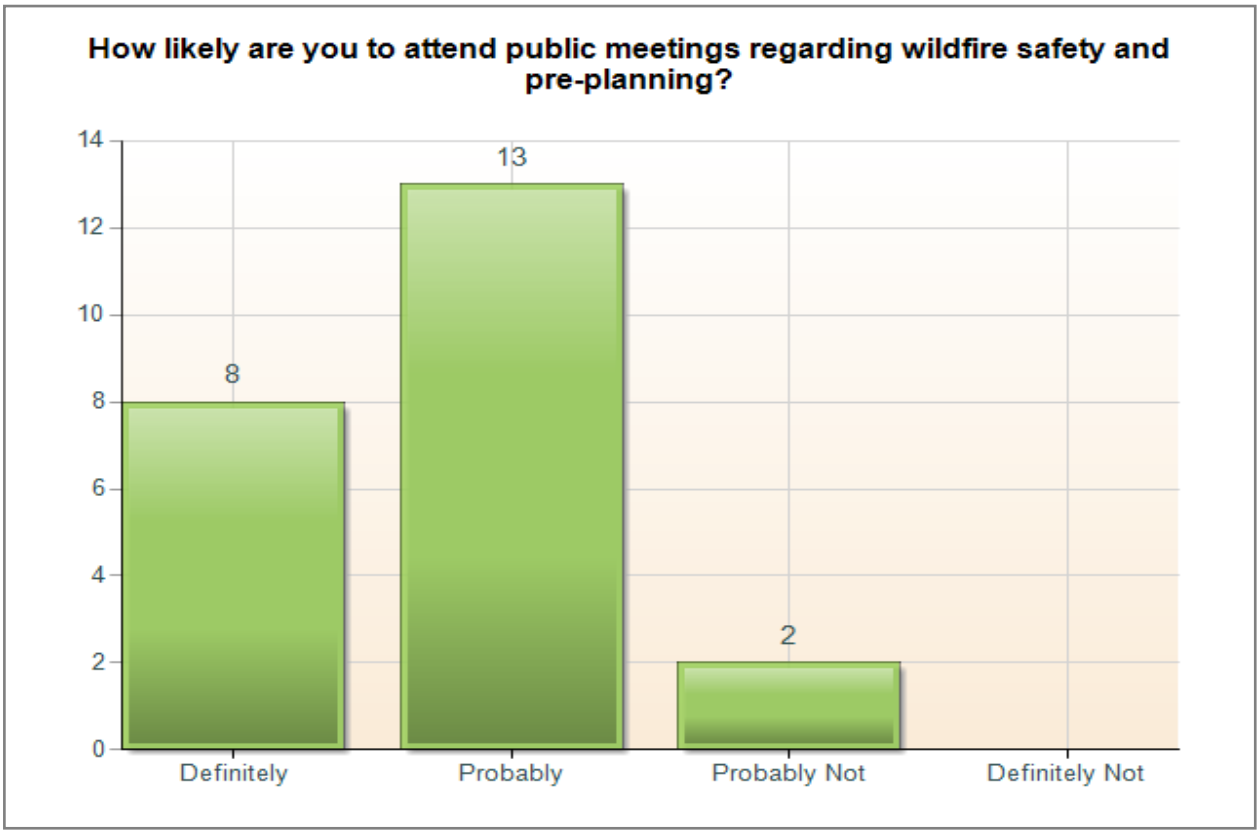

How safe do you feel from wildland fire?
14
12
10
8
6
4
2
0
2
12
7
2
Very Safe
Reasonably Safe
Concerned
Not Safe
Not Sure
No Opinion

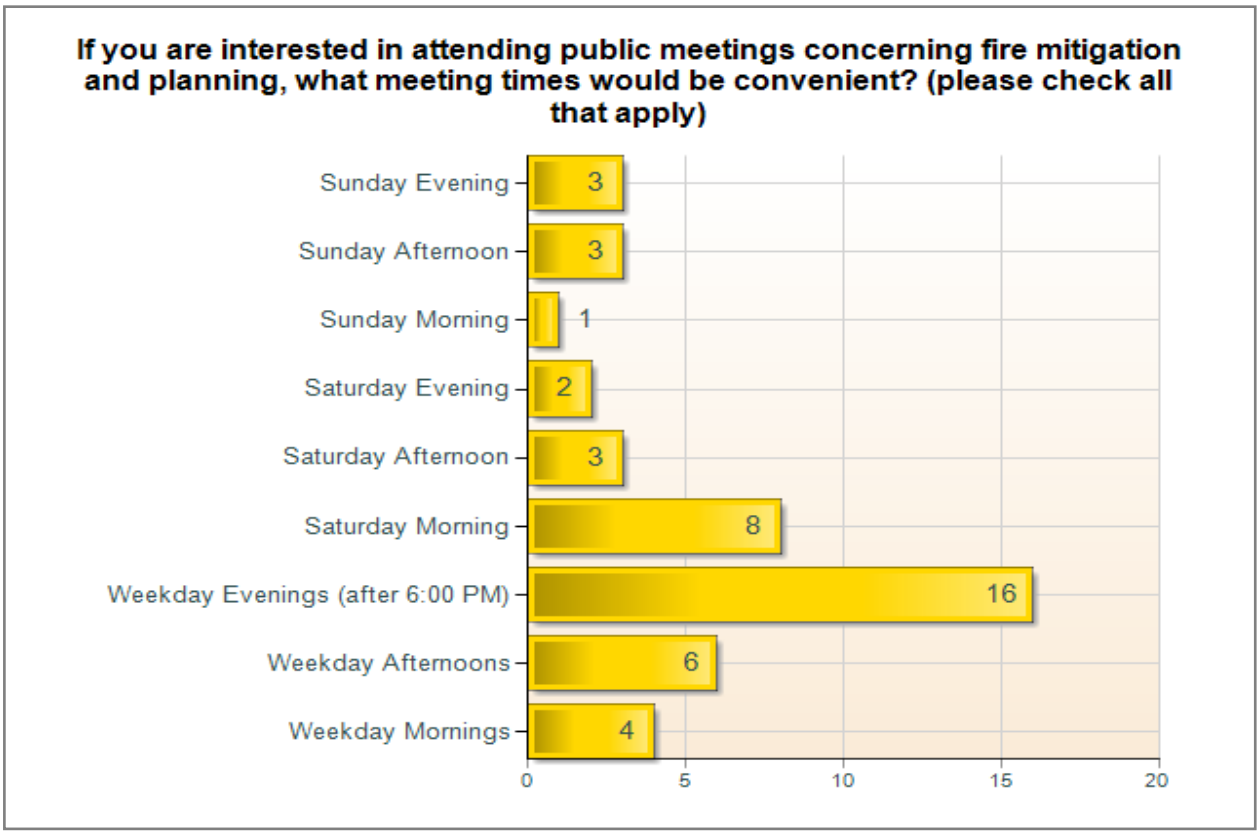

How likely are you to leave your home if it is imminently threatened by fire?
12
10
8
6
4
2
0
10
7
5
1
Will Leave
More Likely to Leave
More Likely to Stay
Will not Leave

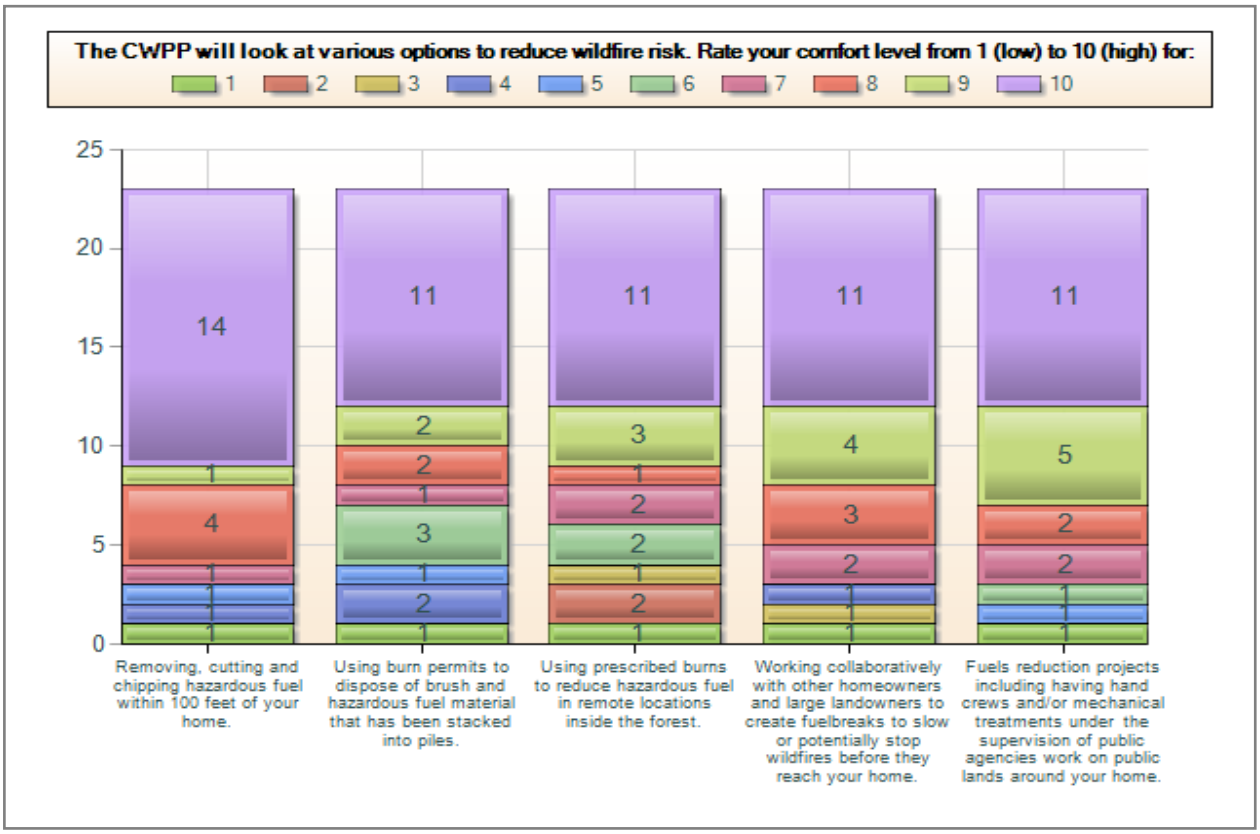

If you were to evacuate would you know two ways out of your neighborhood?
25
20
15
10
5
0
22
1
Yes
No

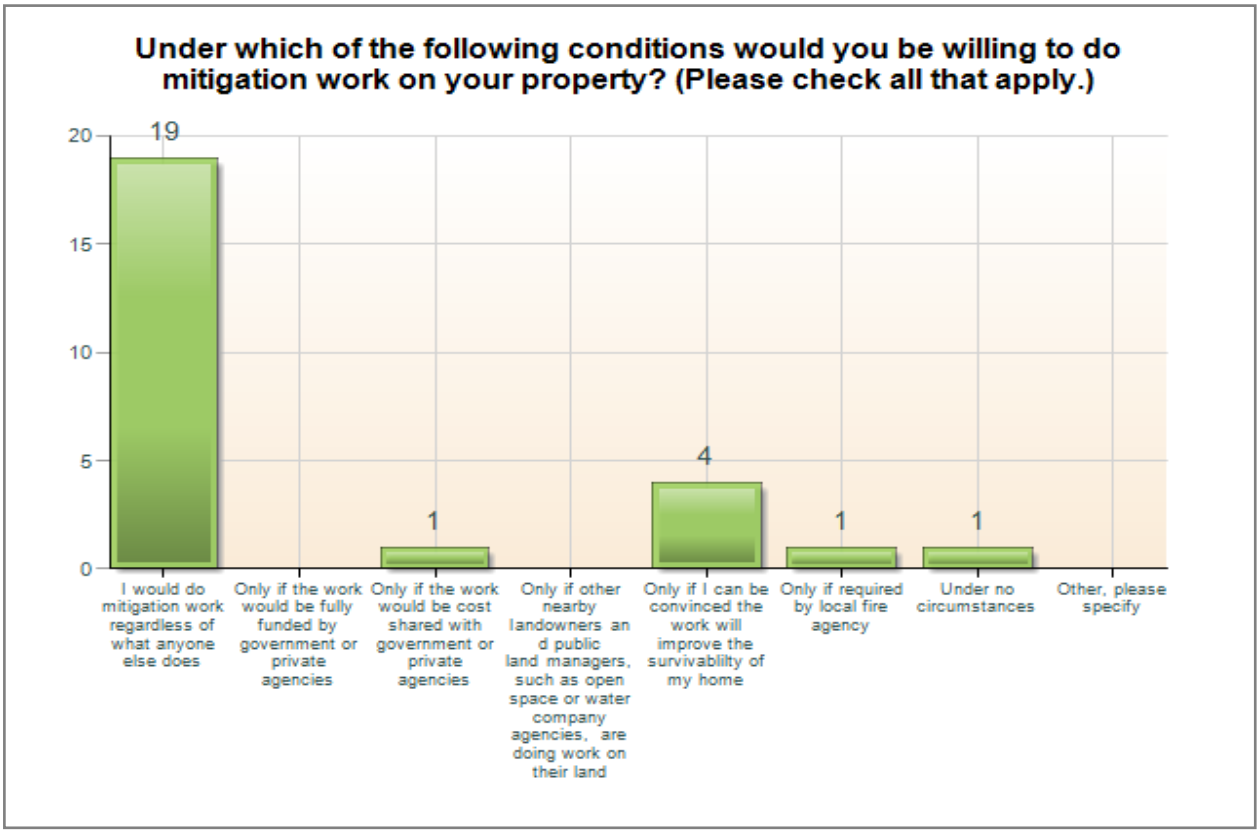

Do you have a pre-arranged meeting place and communications plan for family members in the event of an evacuation?
20
15
10
5
0
7
16
Yes
No

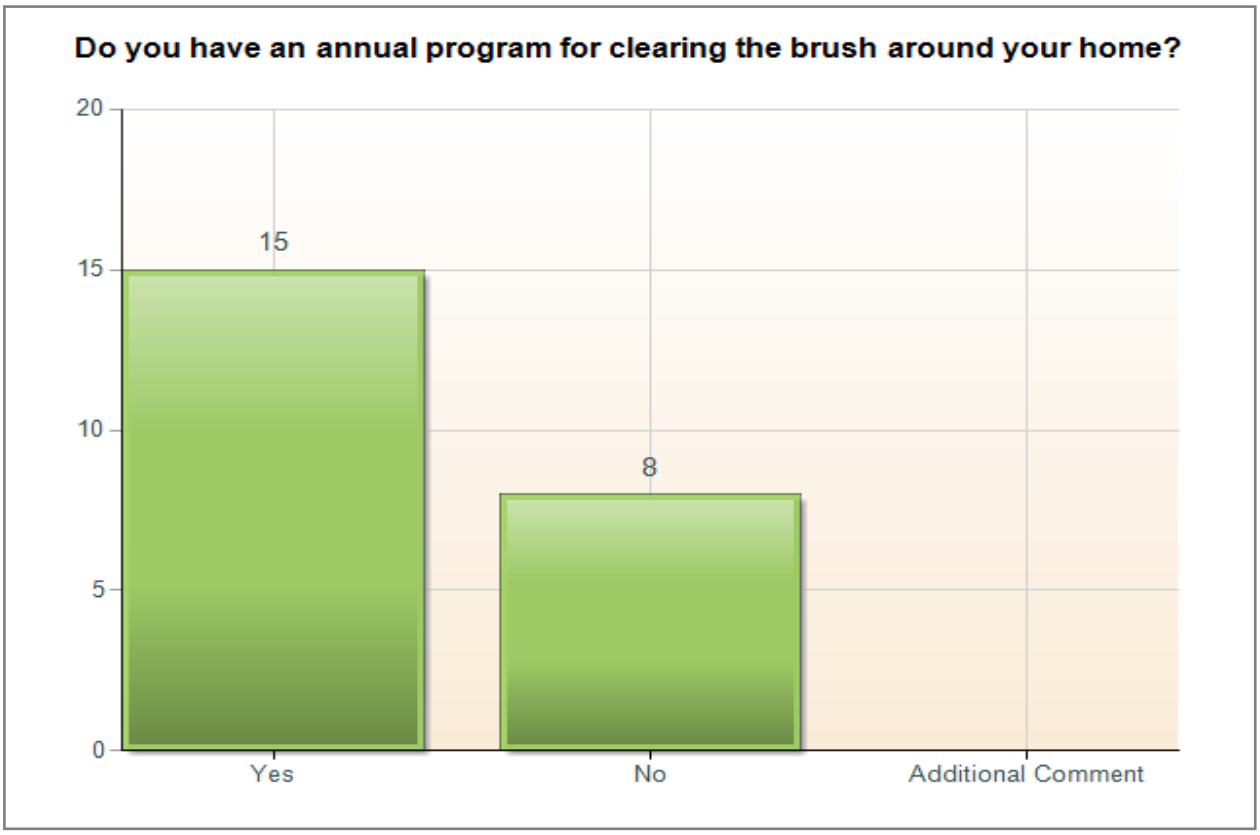

Do you have a pre-identified escape route for your home and community, if you are required to evacuate?
14
12
10
8
6
4
2
0
12
11
Yes
No

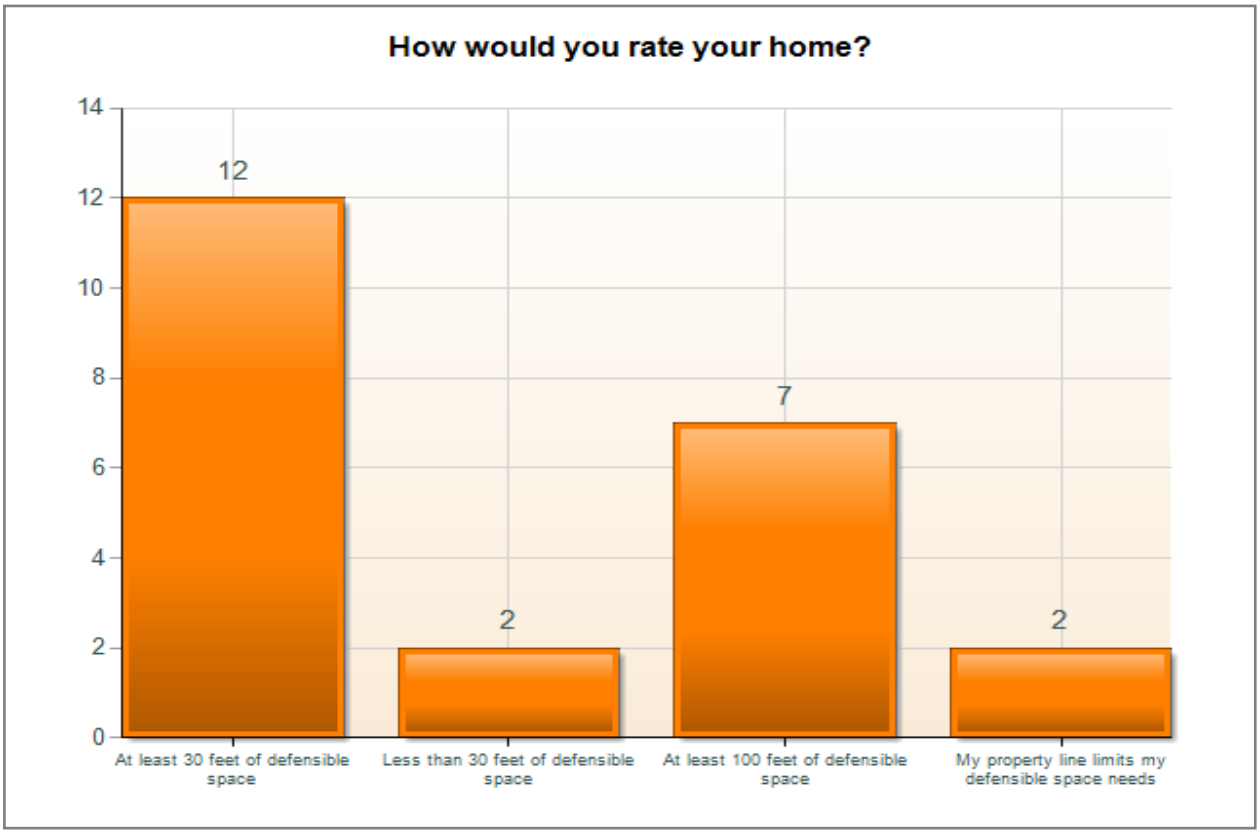

How likely are you to attend public meetings regarding wildfire safety and pre-planning?
14
12
10
8
6
4
2
0
8
13
2
Definitely
Probably
Probably Not
Definitely Not

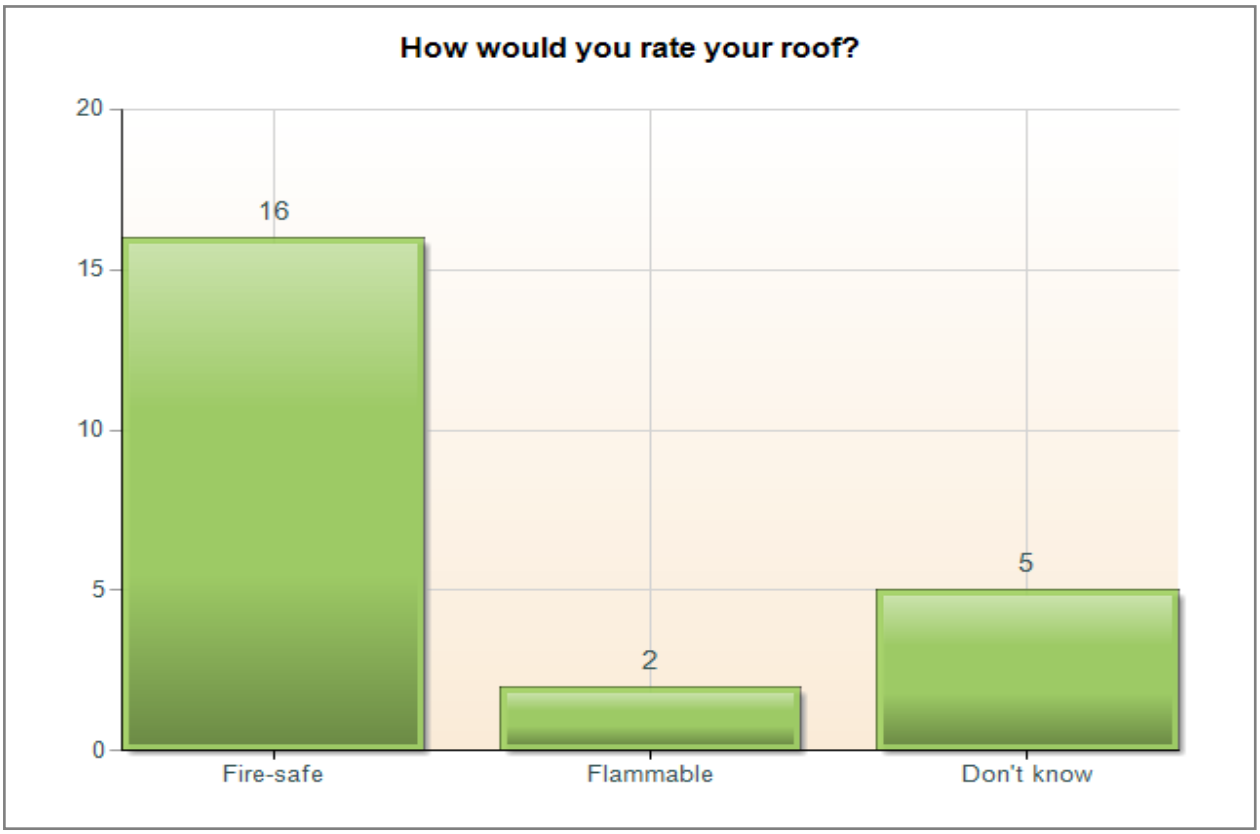

If you are interested in attending public meetings concerning fire mitigation and planning, what meeting times would be convenient? (please check all that apply)
Sunday Evening
3
Sunday Afternoon
3
Sunday Morning
1
Saturday Evening
2
Saturday Afternoon
3
Saturday Morning
8
Weekday Evenings (after 6:00 PM)
16
Weekday Afternoons
6
Weekday Mornings
4
0
5
10
15
20

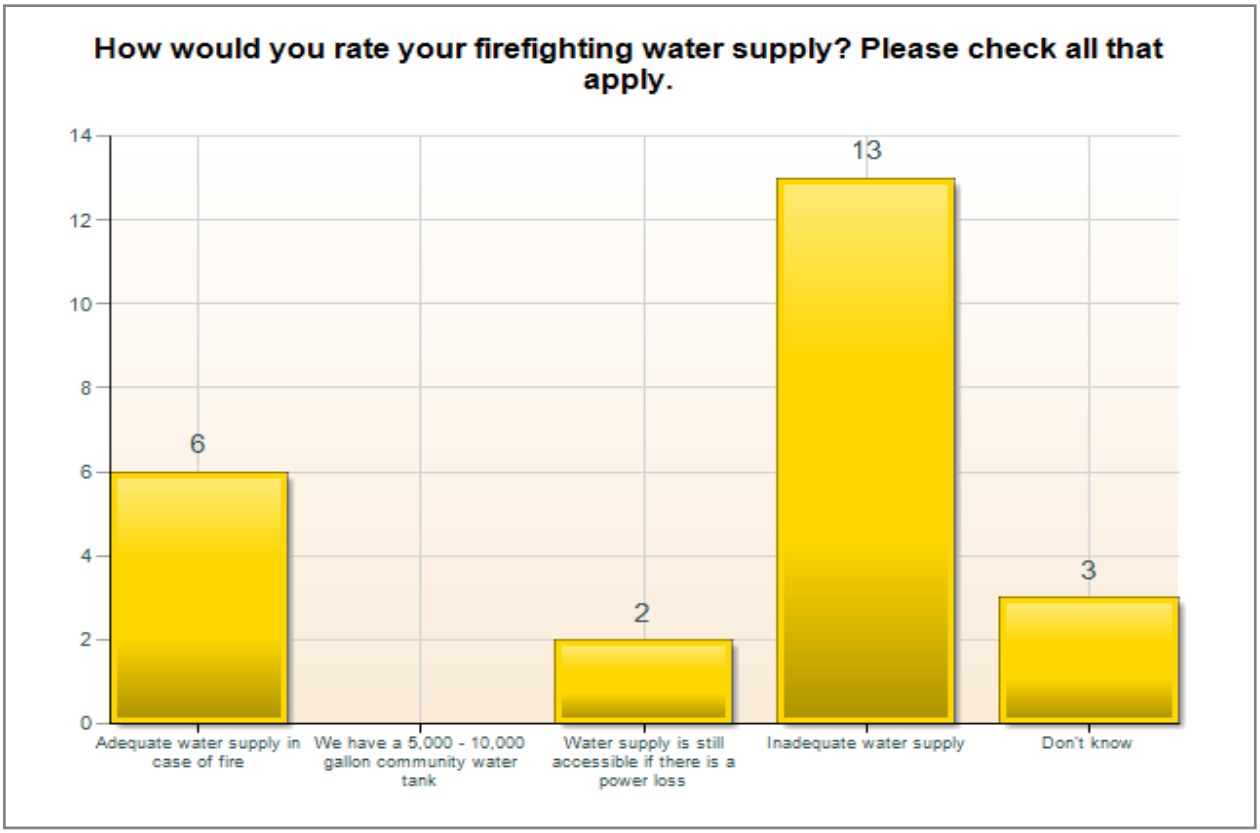

The CWPP will look at various options to reduce wildfire risk. Rate your comfort level from 1 (low) to 10 (high) for:
1
2
3
4
5
6
7
8
9
10
25
20
15
10
5
0
Removing, cutting and chipping hazardous fuel within 100 feet of your home.
Using burn permits to dispose of brush and hazardous fuel material that has been stacked into piles.
Using prescribed burns to reduce hazardous fuel in remote locations inside the forest.
Working collaboratively with other homeowners and large landowners to create fuelbreaks to slow or potentially stop wildfires before they reach your home.
Fuels reduction projects including having hand crews and/or mechanical treatments under the supervision of public agencies work on public lands around your home.

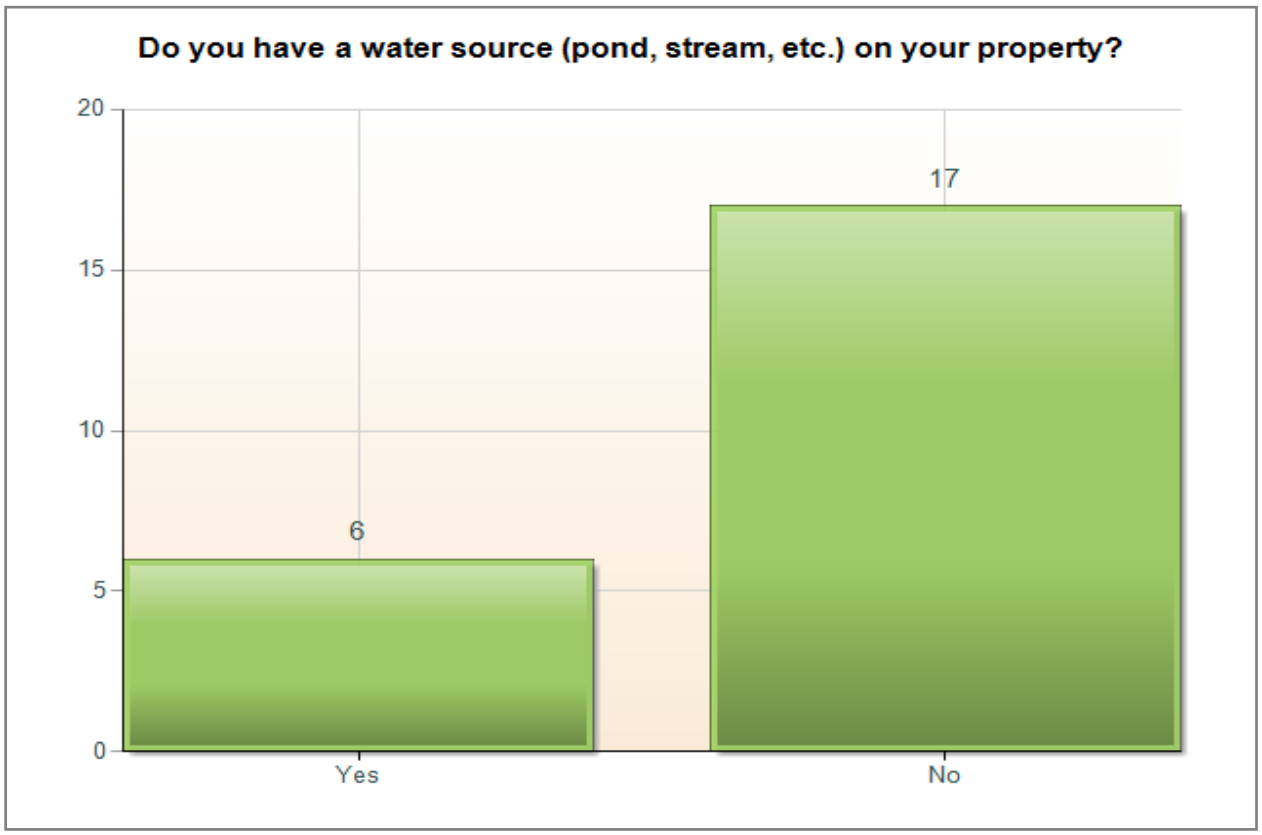

Under which of the following conditions would you be willing to do mitigation work on your property? (Please check all that apply.)
20
15
10
5
0
19
1
4
1
1
I would do mitigation work regardless of what anyone else does
Only if the work would be fully funded by government or private agencies
Only if the work would be cost shared with government or private agencies
Only if other nearby landowners and public land managers, such as open space or water company agencies, are doing work on their land
Only if I can be convinced the work will improve the survivablilty of my home
Only if required by local fire agency
Under no circumstances
Other, please specify

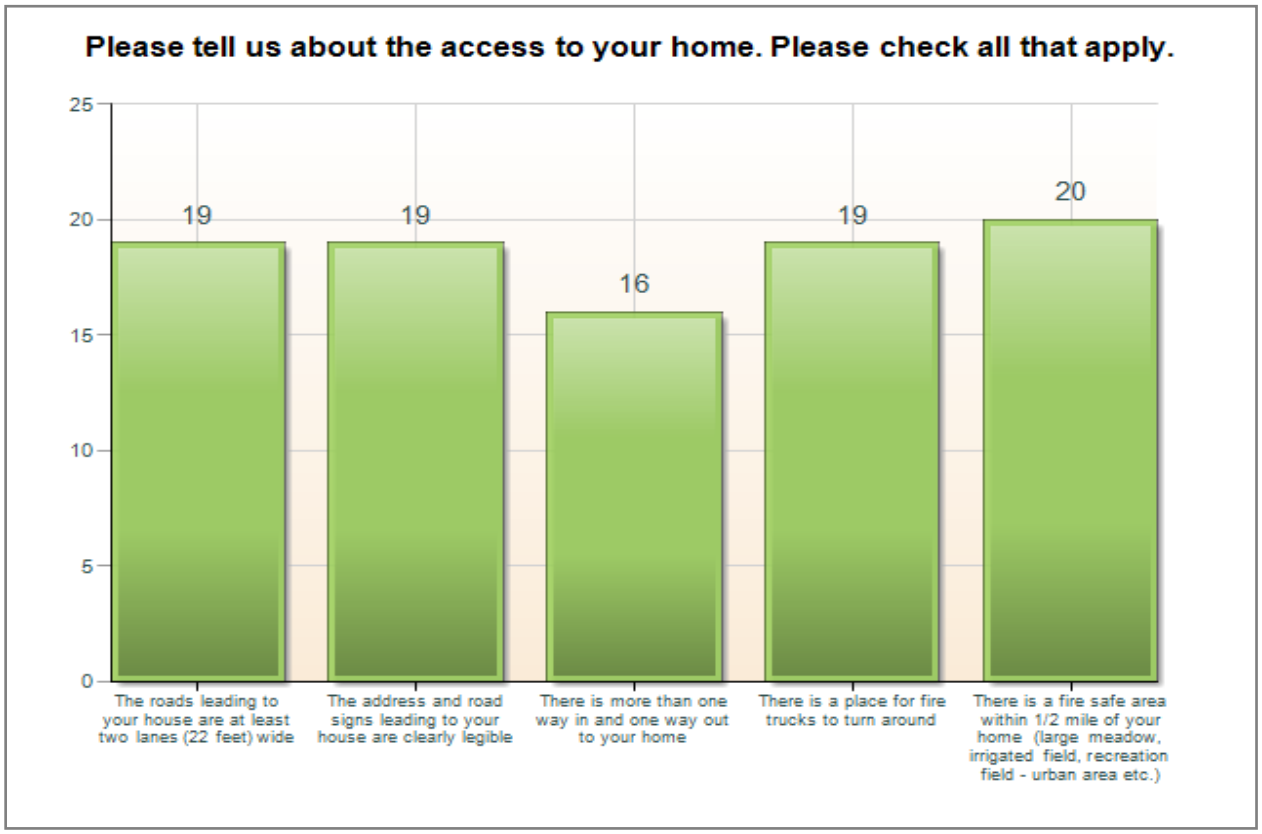

Do you have an annual program for clearing the brush around your home?
20
15
10
5
0
15
8
Yes
No
Additional Comment


How would you rate your home?
14
12
10
8
6
4
2
0
12
2
7
2
At least 30 feet of defensible space
Less than 30 feet of defensible space
At least 100 feet of defensible space
My property line limits my defensible space needs

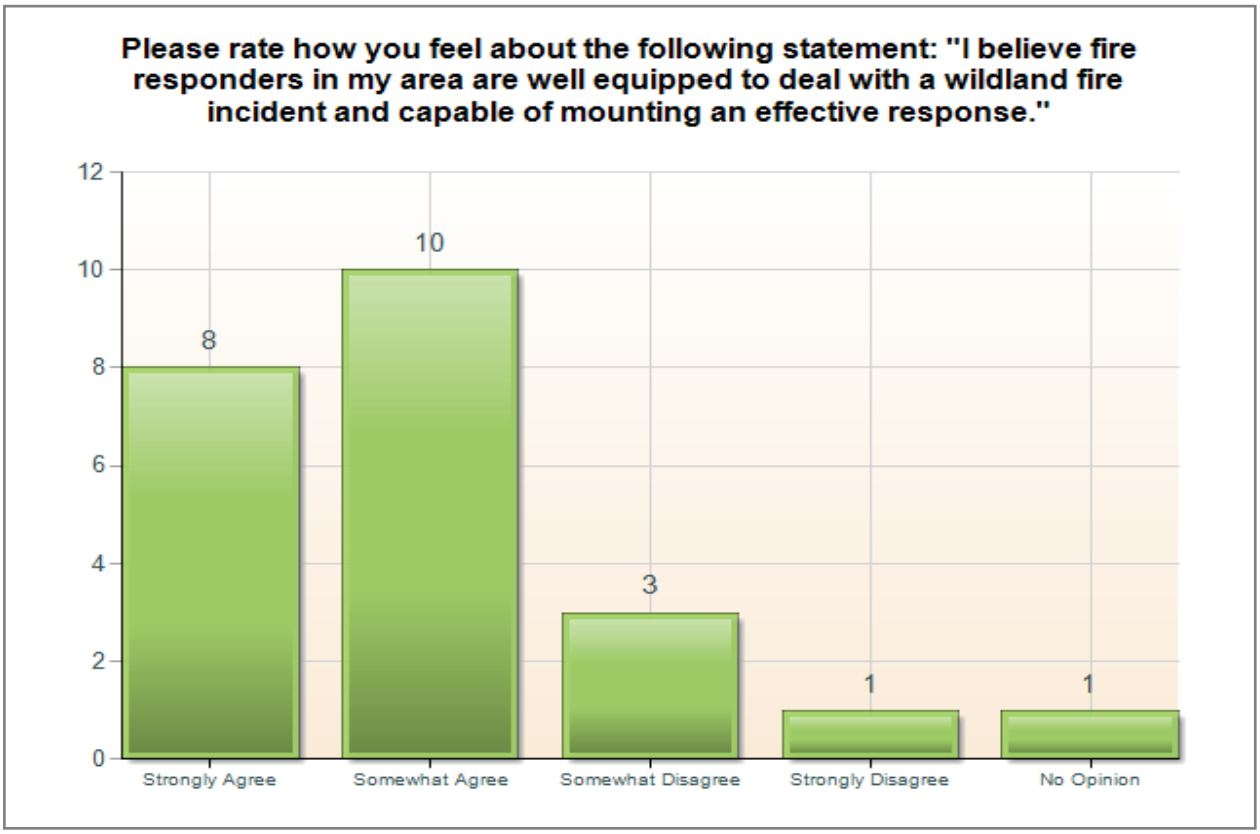

How would you rate your roof?
20
15
10
5
0
16
2
5
Fire-safe
Flammable
Don't know

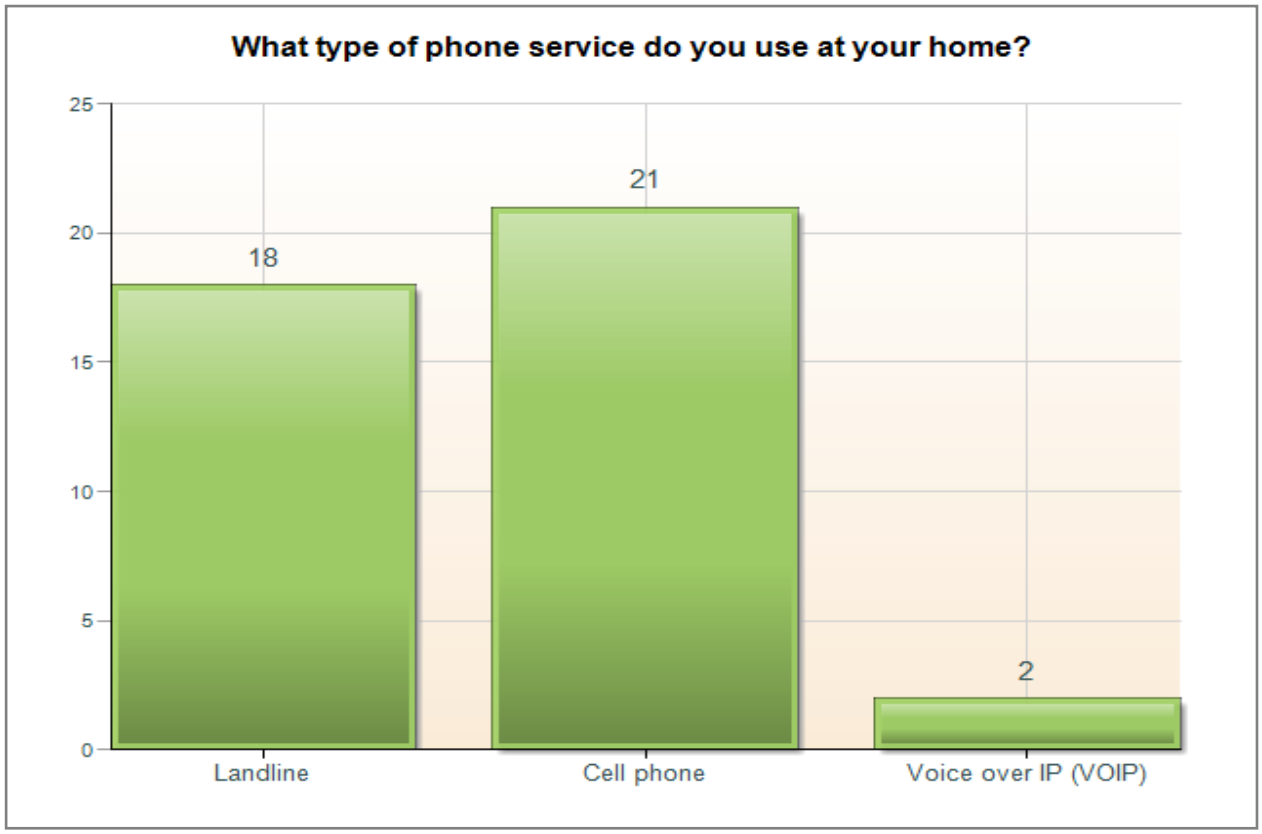

How would you rate your firefighting water supply? Please check all that apply.
14
12
10
8
6
4
2
0
6
2
13
3
Adequate water supply in case of fire
We have a 5,000 - 10,000 gallon community water tank
Water supply is still accessible if there is a power loss
Inadequate water supply
Don't know

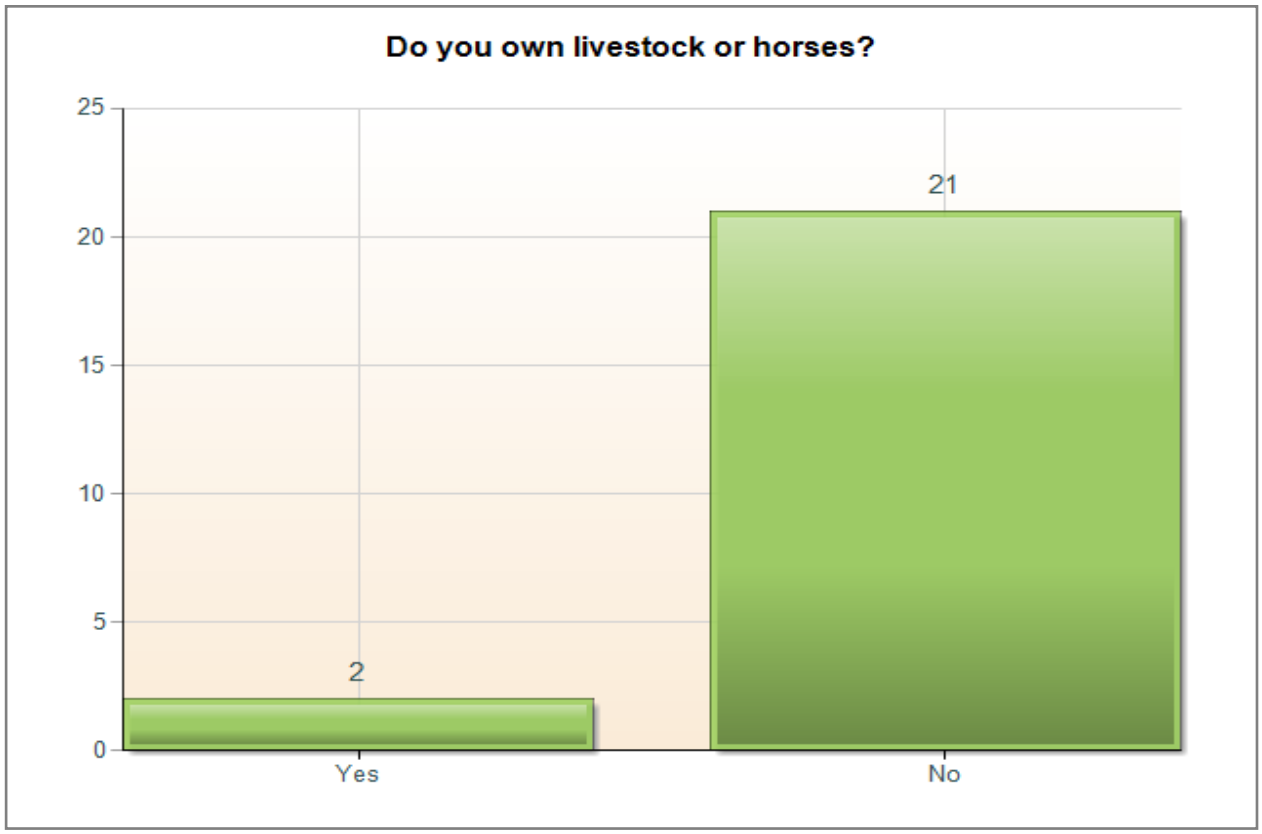

Do you have a water source (pond, stream, etc.) on your property?
20
15
10
5
0
6
17
Yes
No

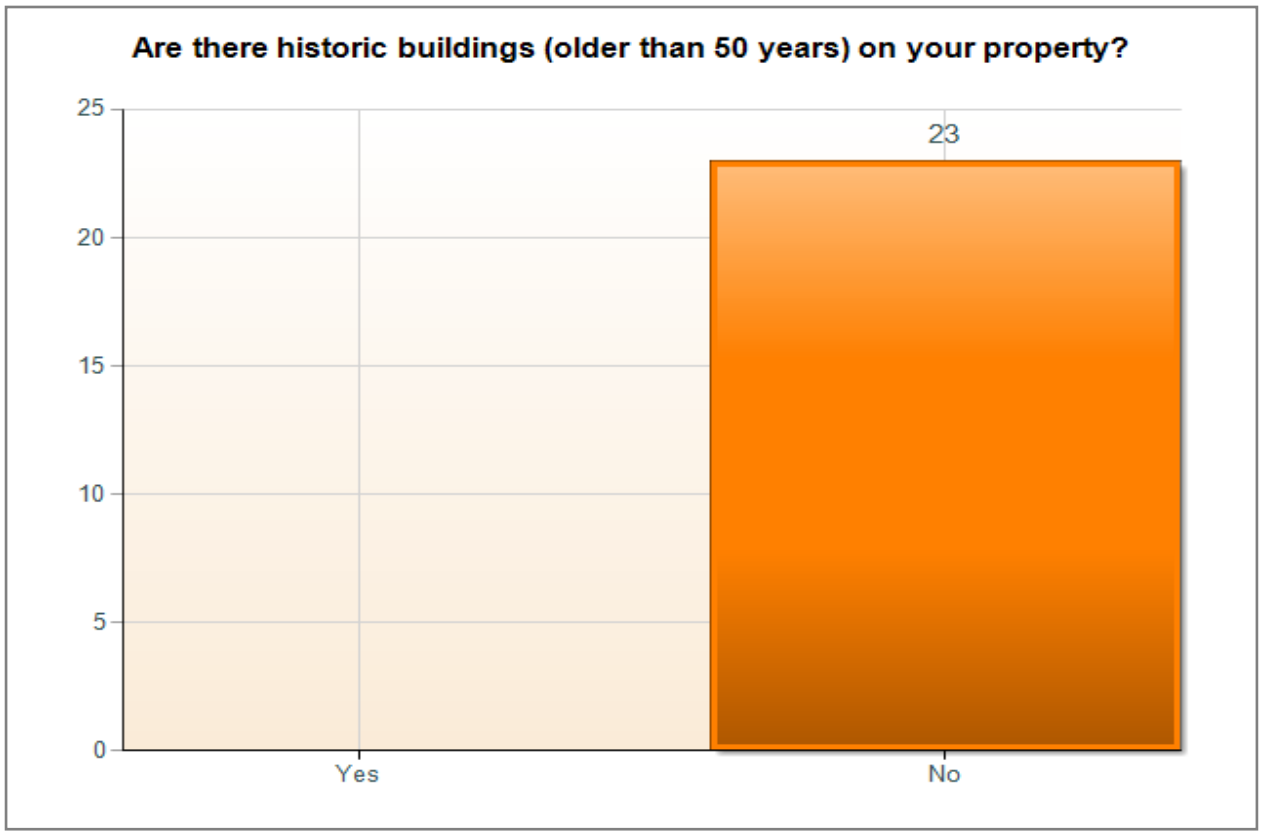

Please tell us about the access to your home. Please check all that apply.
25
20
15
10
5
0
19
19
16
19
20
The roads leading to your house are at least two lanes (22 feet) wide
The address and road signs leading to your house are clearly legible
There is more than one way in and one way out to your home
There is a place for fire trucks to turn around
There is a fire safe area within 1/2 mile of your home (large meadow, irrigated field, recreation field - urban area etc.)

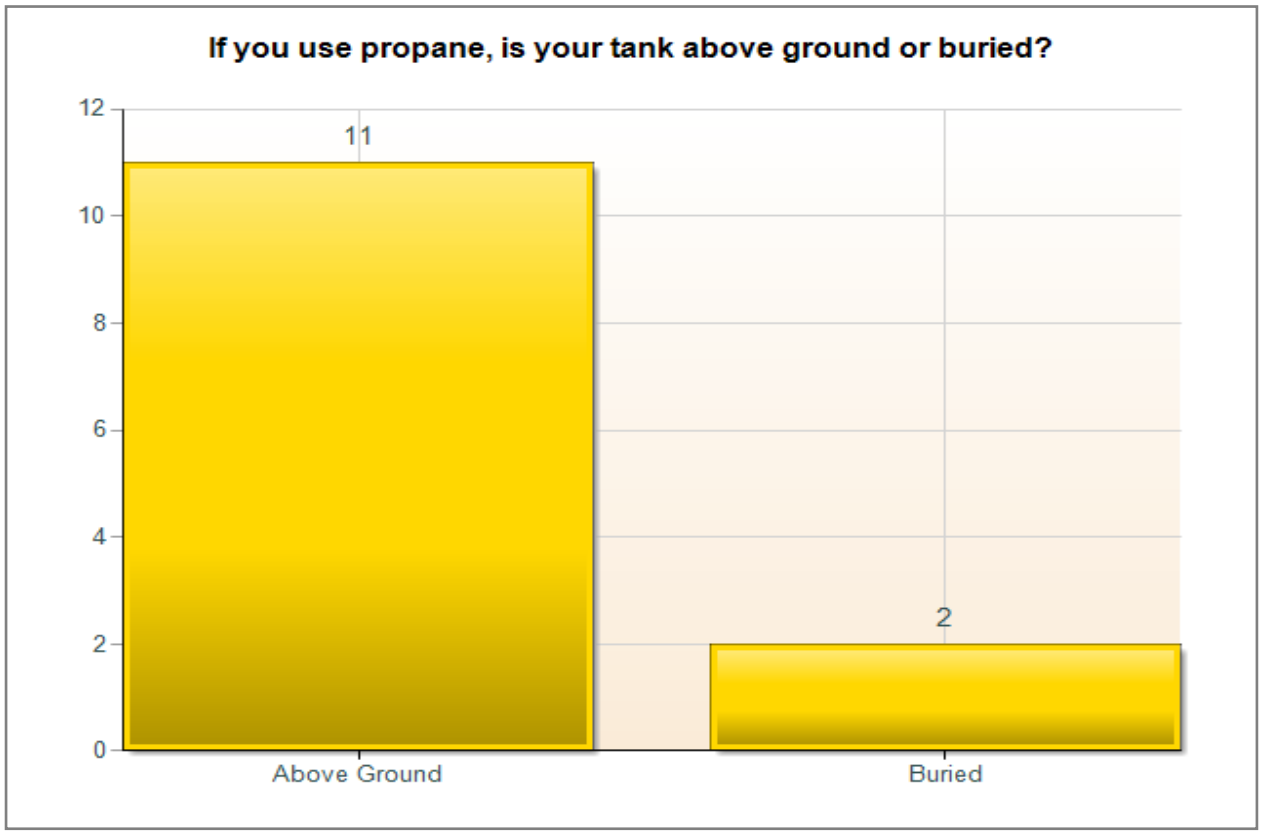

What are your knowledge and experience levels concerning wildfire? (Please check all that apply.)
10
8
6
4
2
0
3
8
9
8
8
6
Current or former professional wildland firefighter
Current or former volunteer firefighter
A wildland fire has threatened my home or community
A wildland fire has never threatened my home or comm...
I am very knowledgeable regarding wildland fire iss...
I have some familiarity with wildland fire issues
I have little or no familiarity with wildland fire issues

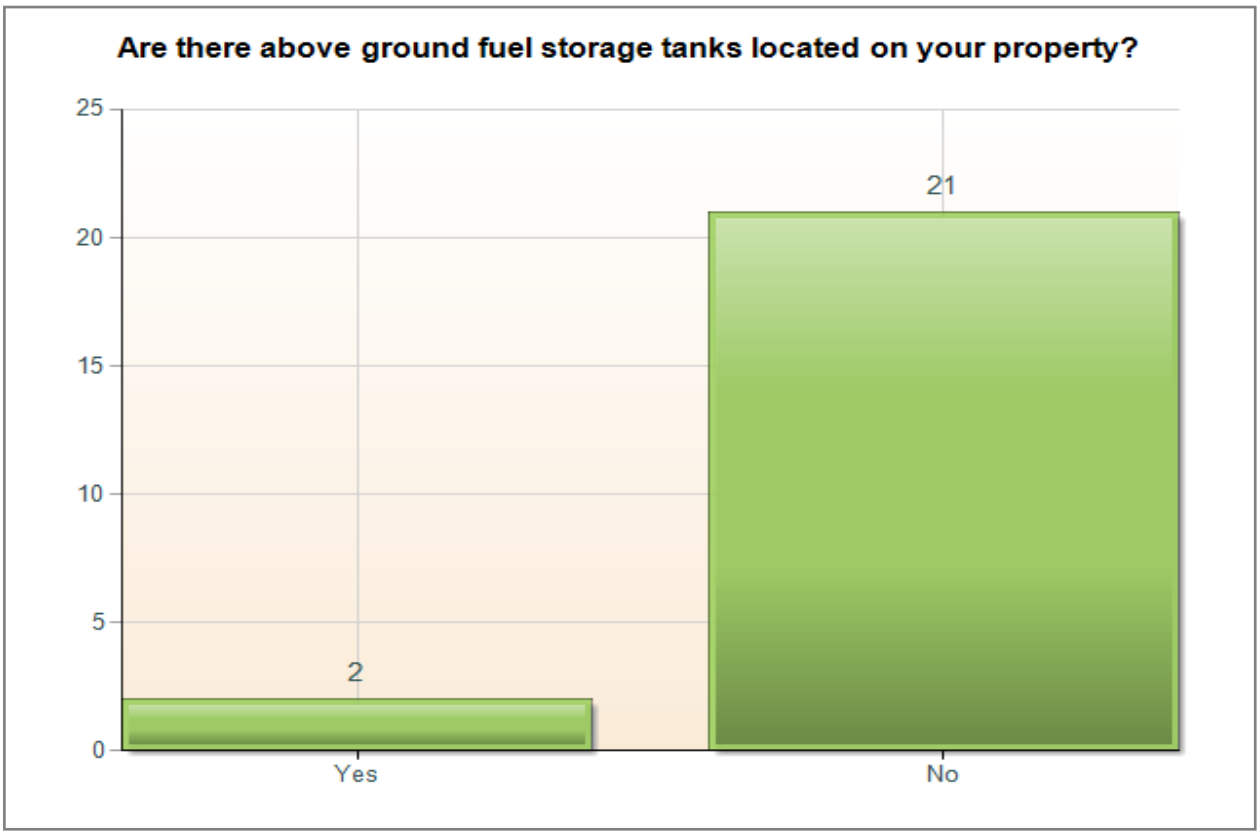

Please rate how you feel about the following statement: "I believe fire responders in my area are well equipped to deal with a wildland fire incident and capable of mounting an effective response."
12
10
8
6
4
2
0
8
10
3
1
1
Strongly Agree
Somewhat Agree
Somewhat Disagree
Strongly Disagree
No Opinion

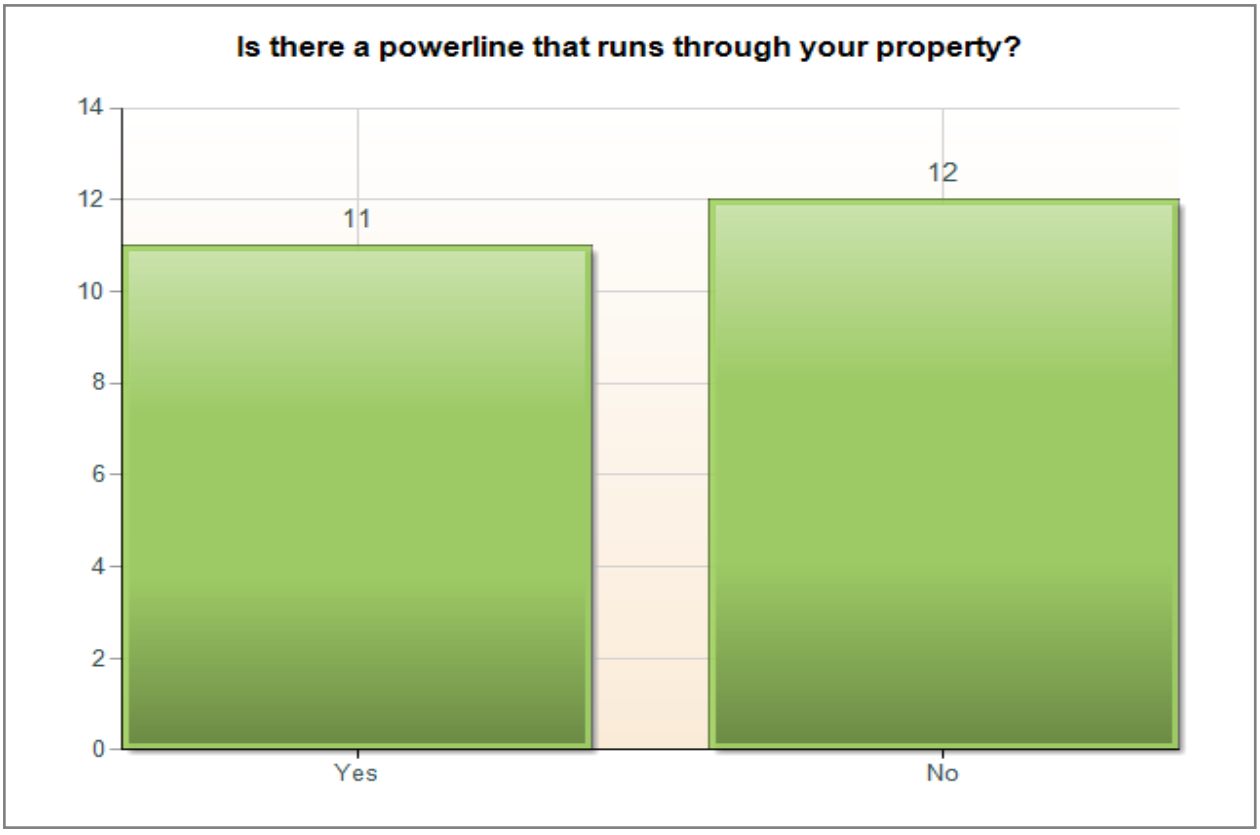

What type of phone service do you use at your home?
25
20
15
10
5
0
18
21
2
Landline
Cell phone
Voice over IP (VOIP)


Do you own livestock or horses?
25
20
15
10
5
0
2
21
Yes
No


Are there historic buildings (older than 50 years) on your property?
25
20
15
10
5
0
23
Yes
No


If you use propane, is your tank above ground or buried?
12
10
8
6
4
2
0
11
2
Above Ground
Buried


Are there above ground fuel storage tanks located on your property?
25
20
15
10
5
0
2
21
Yes
No


Is there a powerline that runs through your property?
14
12
10
8
6
4
2
0
11
12
Yes
No

APPENDIX C: GUIDING DOCUMENTS

THE NATIONAL FIRE PLAN AND THE HEALTHY FORESTS RESTORATION ACT

In 2000, more than eight million acres burned across the United States, marking one of the most devastating wildfire seasons in American history. One high-profile incident, the Cerro Grande fire at Los Alamos, NM, destroyed more than 235 structures and threatened the Department of Energy's nuclear research facility.

Two reports addressing federal wildland fire management were initiated after the 2000 fire season. The first report, prepared by a federal interagency group, was titled "Review and Update of the 1995 Federal Wildland Fire Management Policy" (2001). This report concluded, among other points, that the condition of America's forests had continued to deteriorate.

The second report, titled "Managing the Impacts of Wildfire on Communities and the Environment: A Report to the President in Response to the Wildfires of 2000," was issued by the Bureau of Land Management (BLM) and the United States Department of Agriculture Forest Service (USFS). It became known as the National Fire Plan (NFP). This report, and the ensuing Congressional appropriations, ultimately required actions to:

- Respond to severe fires
- Reduce the impacts of fire on rural communities and the environment
- Ensure sufficient firefighting resources

Congress increased its specific appropriations to accomplish these goals. In 2002 another severe season occurred: more than 1,200 homes were destroyed and over seven million acres burned. In response to public pressure, Congress and the Bush administration continued to designate funds specifically for actionable items such as preparedness and suppression. That same year, the Bush administration announced the Healthy Forests Initiative, which enhanced measures to restore forest and rangeland health and reduce the risk of catastrophic wildfires. In 2003, the Healthy Forests Restoration Act was signed into law.

Through this piece of legislation, Congress continues to appropriate specific funding to address five main sub-categories through the NFP: preparedness, suppression, reduction of hazardous fuels, burned-area rehabilitation, and state and local assistance to firefighters. The general concepts of the NFP blend well with the established need for community wildfire protection in the study area. The spirit of the HFRA and NFP is reflected in the Kremmling CWPP.

This CWPP strives to meet the requirements of HFRA by:

- Identifying and prioritizing fuels reduction opportunities across the landscape
- Addressing structural ignitability
- Assessing community fire suppression capabilities
- Collaborating with stakeholders

CSFS Minimum Standards for Community Wildfire Protection Plans (CWPP)[1]

1. Participants

- Local government, local fire authority, and a representative of the Colorado State Forest Service must agree on the CWPP.
- In addition to the above, the core planning team should include relevant federal land management agency representatives and community members.
- Input from interested non-governmental stakeholders must be sought as community protection priorities are being set and treatment areas and methods are planned.

2. Plan Components

- Community Wildfire Protection Plans must include the following components:
  - A definition of the community's wildland-urban interface (WUI), preferably outlined on a map with an accompanying narrative.
  - A discussion of the community's *preparedness* to respond to wildland fire.
  - A community risk analysis that considers, at a minimum, fuel hazards, risk of wildfire occurrence and community values to be protected – both in the immediate vicinity and the surrounding zone where potential fire spread poses a realistic threat.
  - Identification of fuels treatment priorities, including locations on the grounds and preferred methods of treatment.
  - Recommendations regarding ways to reduce structural ignitability.
  - An implementation plan.

3. Level of Specificity

- A CWPP may be developed for any level of "community," (e.g., homeowner's association, mountain town, county, metropolitan city, or fire protection district).
- Risks must be assessed, and treatment priorities implemented, that will protect the community.
- The plan must be diversely collaborative.
- County level plans can be used as an umbrella for plans in smaller communities, but should not be considered a substitute. A county plan must identify specific projects and implementation methods and must reflect collaborative input from a variety of stakeholders.

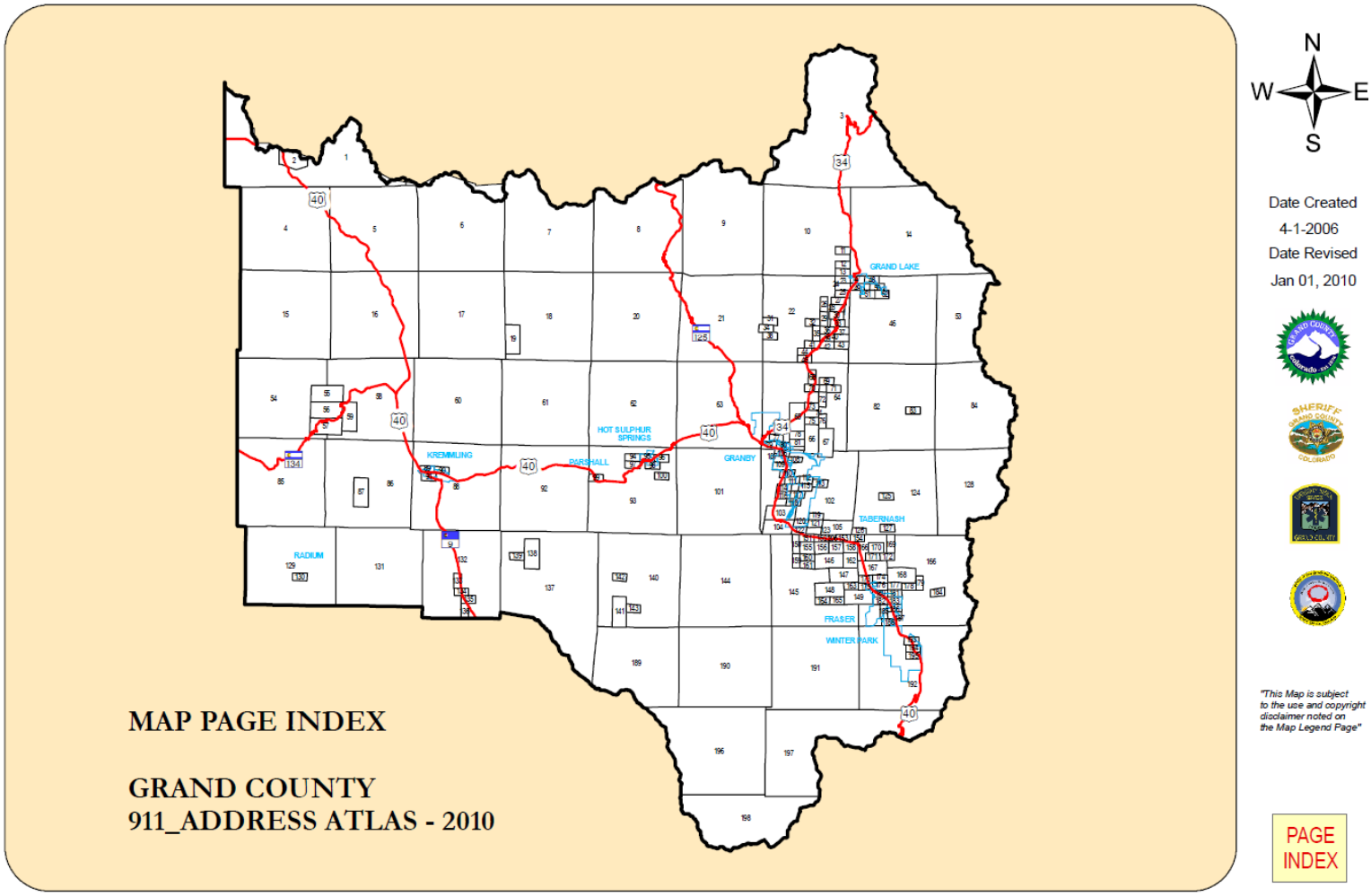
4. Adapting Existing Plans and Combining Related Plans

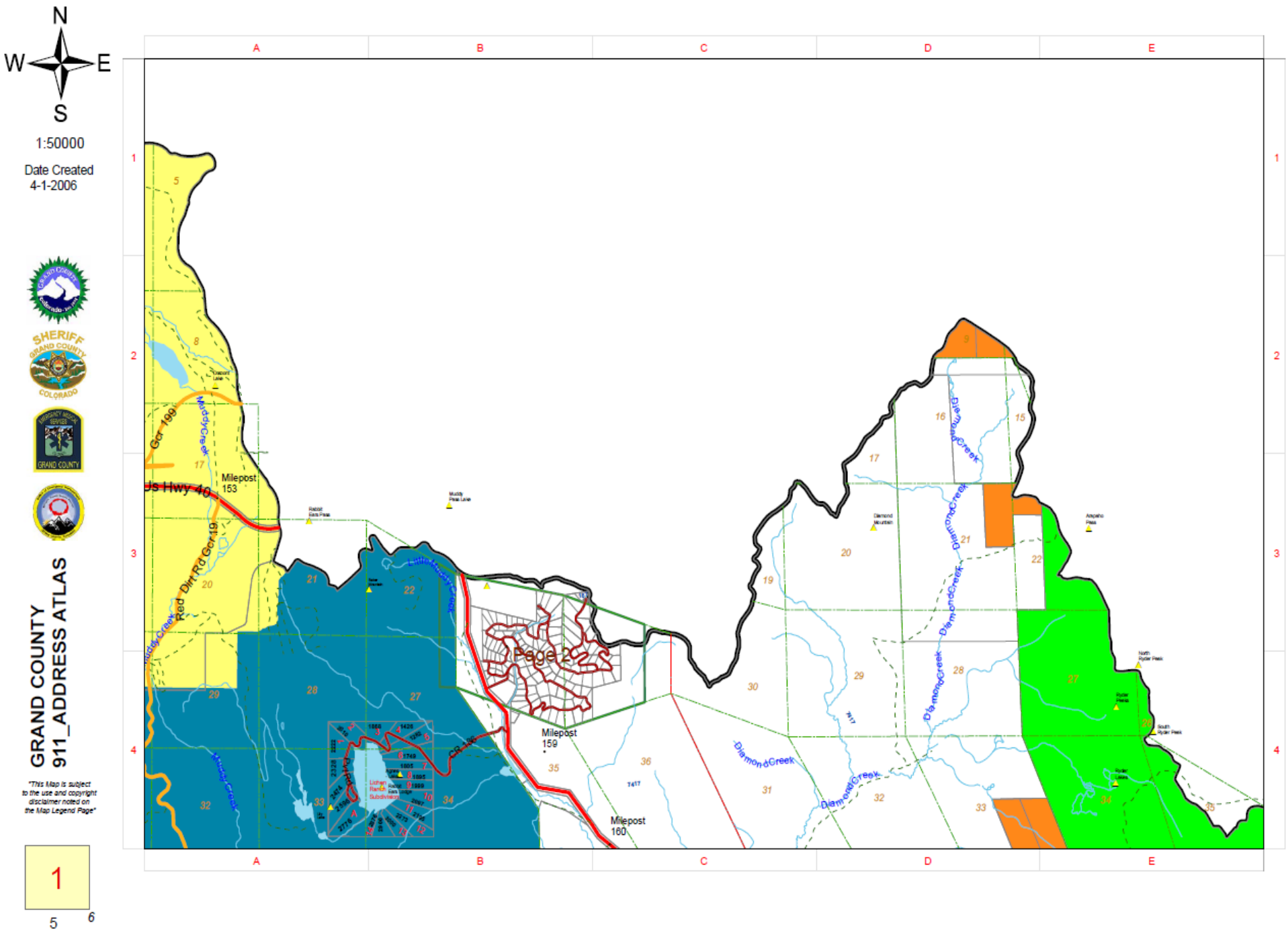
- If a community has an existing plan that already meets the majority of the CWPP
- criteria, it is preferable to work with the community to adapt that plan to meet the
- remainder of the criteria. However, plan adaptations must be collaborative as described
- in (1) above and include stakeholder representation. This is particularly important if the
- adaptation involves establishing fuels treatment priorities.
- Communities are encouraged to combine CWPPs with related documents such as FEMA
- All-Hazard Mitigation Plans where appropriate.

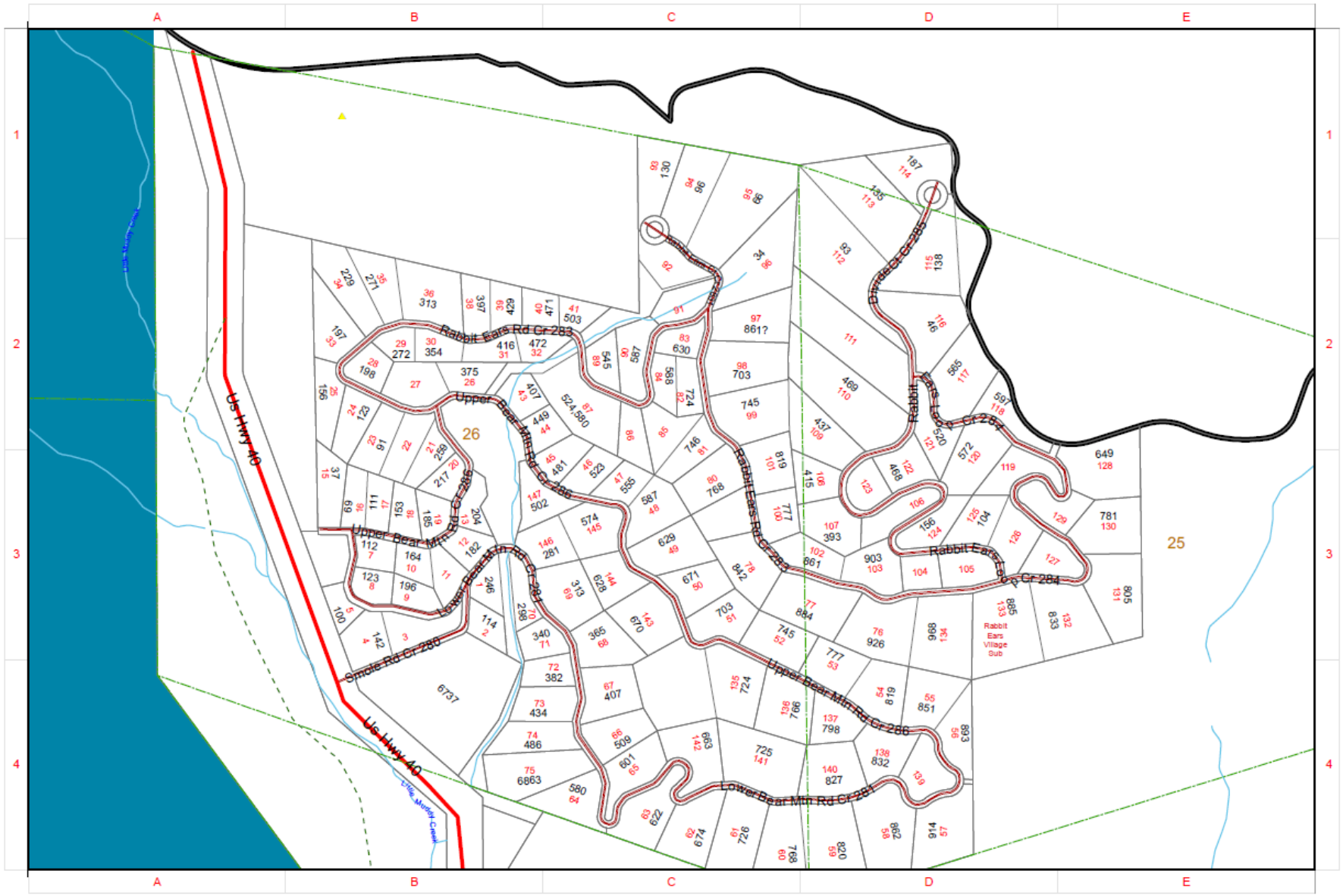
[1] Colorado State Forest Service. "Preparing a Community Wildfire Protection Plan: A Guide for Wildland Urban Interface Communities."

APPENDIX D: GRAND COUNTY 911 ADDRESS ATLAS

The attached graphics were taken directly from the Grand County 911 Address Atlas, which was developed in 2006 and then later revised in 2010. For a more complete list of all maps for the entirety of the county, please refer to the full document.




N
W
E
S
1:50000
Date Created
4-1-2006
GRAND COUNTY
911_ADDRESS ATLAS
"This Map is subject to the use and copyright disclaimer noted on the Map Legend Page"
A
B
C
D
E
1
2
3
4
Milepost 153
Milepost 159
Milepost 160
Red Dirt Rd Gcr 19
Gcr 199
Page 2
Diamond Creek
Muddy Creek
D2
1
5
6



N

W E

S

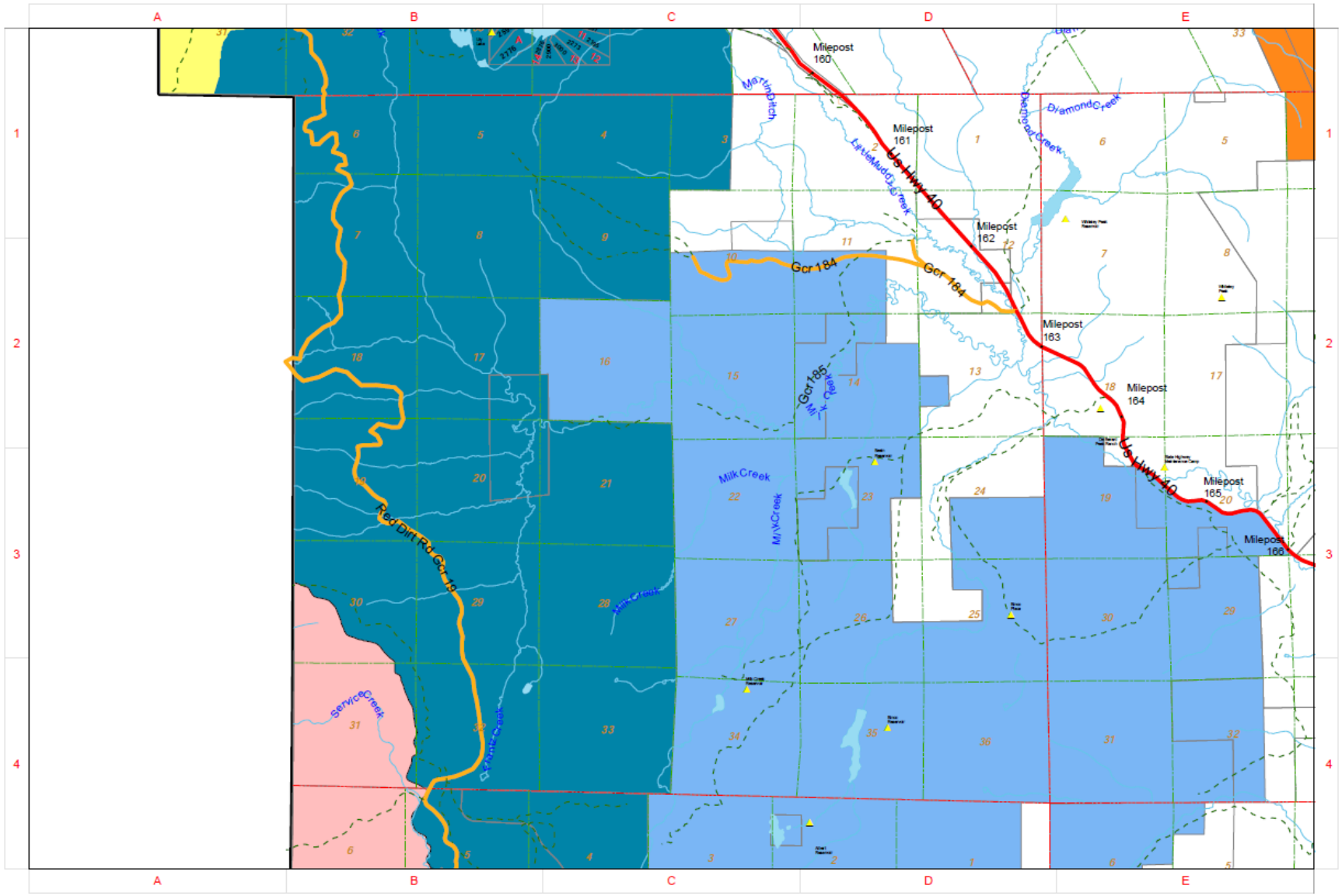
1:9600

Date Created
4-1-2006

GRAND COUNTY
911_ADDRESS ATLAS

2

D3



N
W E
S

1:50000

Date Created
4-1-2006

GRAND COUNTY
911_ADDRESS ATLAS

1
4
5
15
16

D4

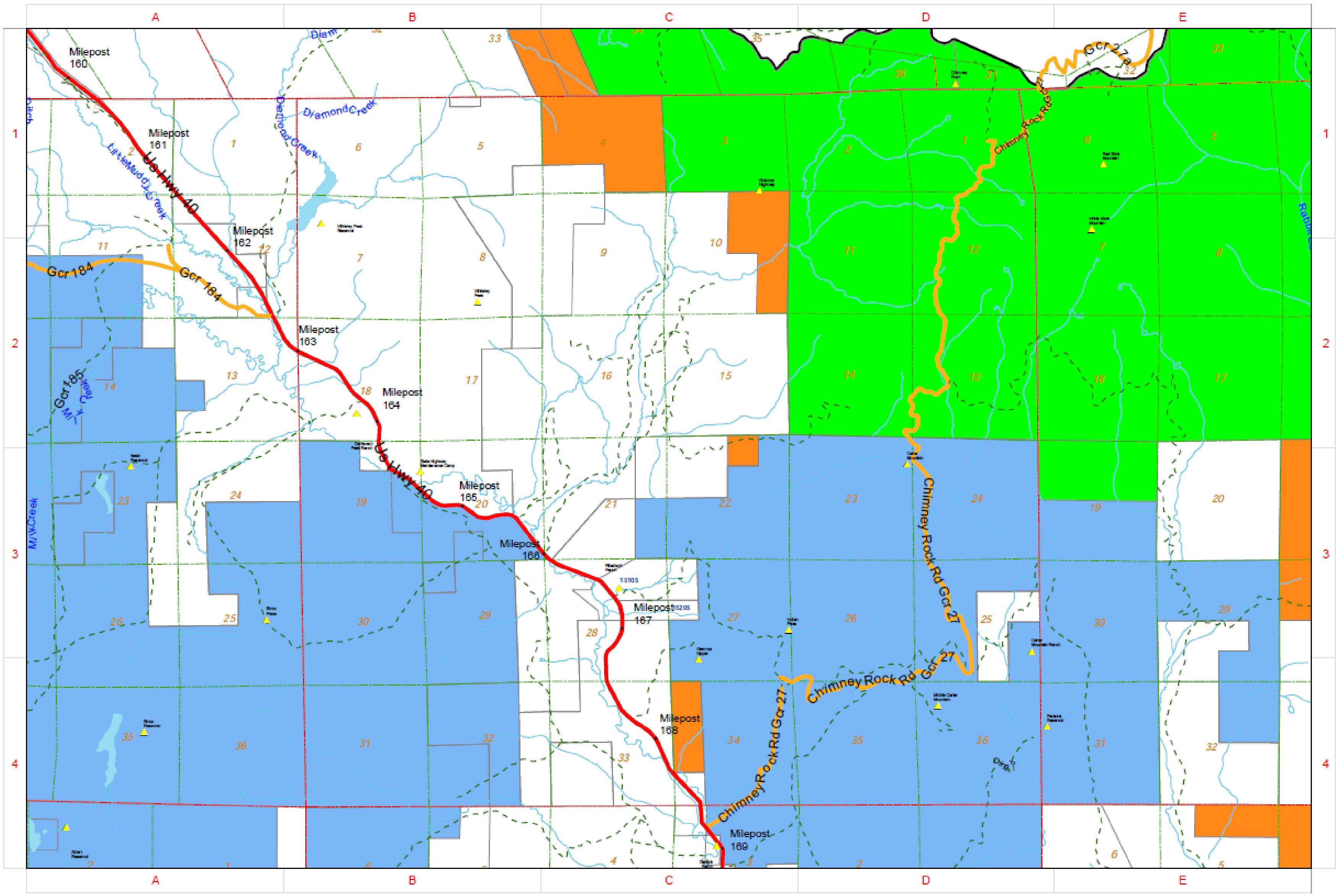
N
W E
S

1:50000

Date Created
4-1-2006

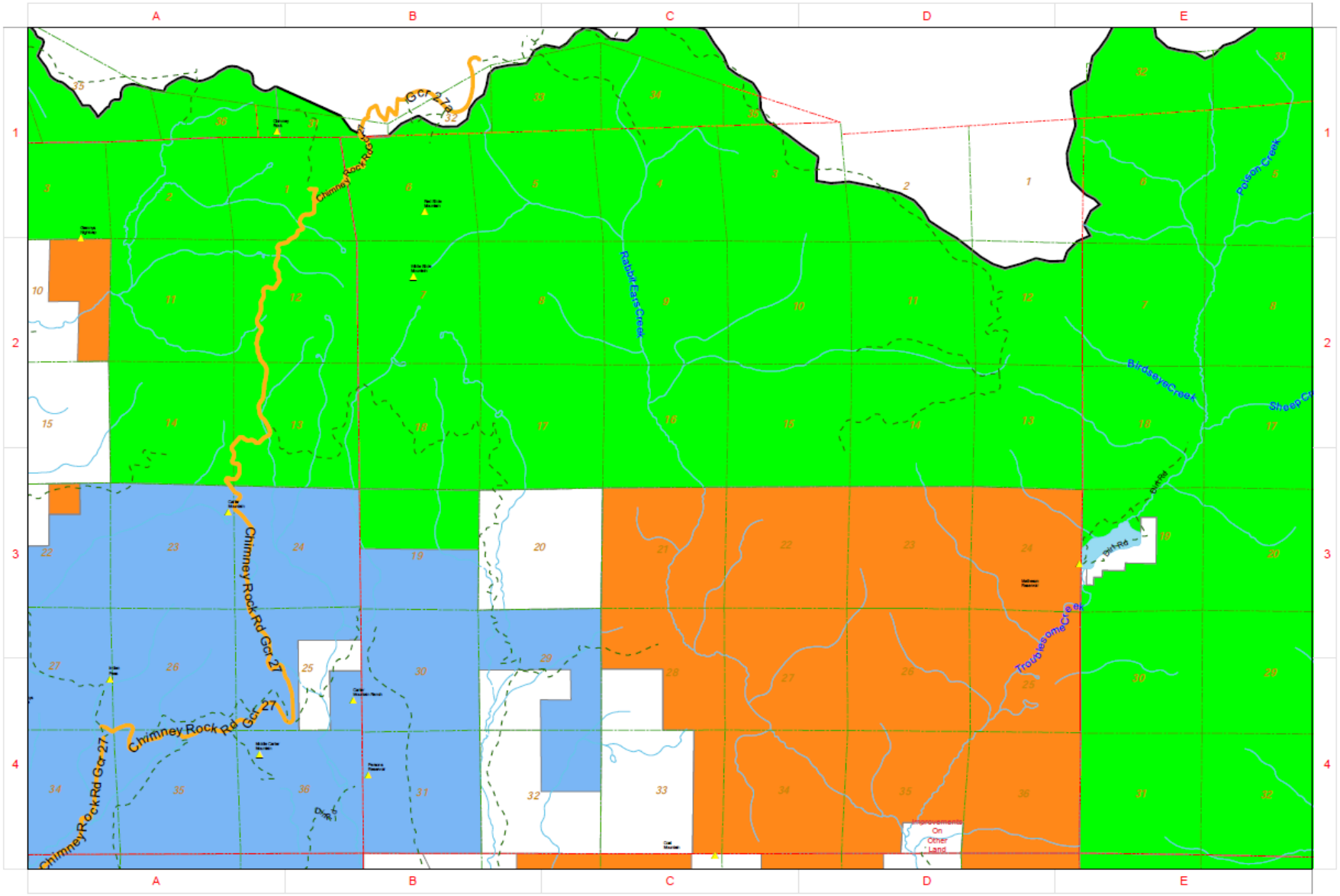
GRAND COUNTY
911_ADDRESS ATLAS

"This Map is subject to the use and copyright disclaimer noted on the Map Legend Page"



1		
4	5	6
15	16	17

D5



N
W E
S

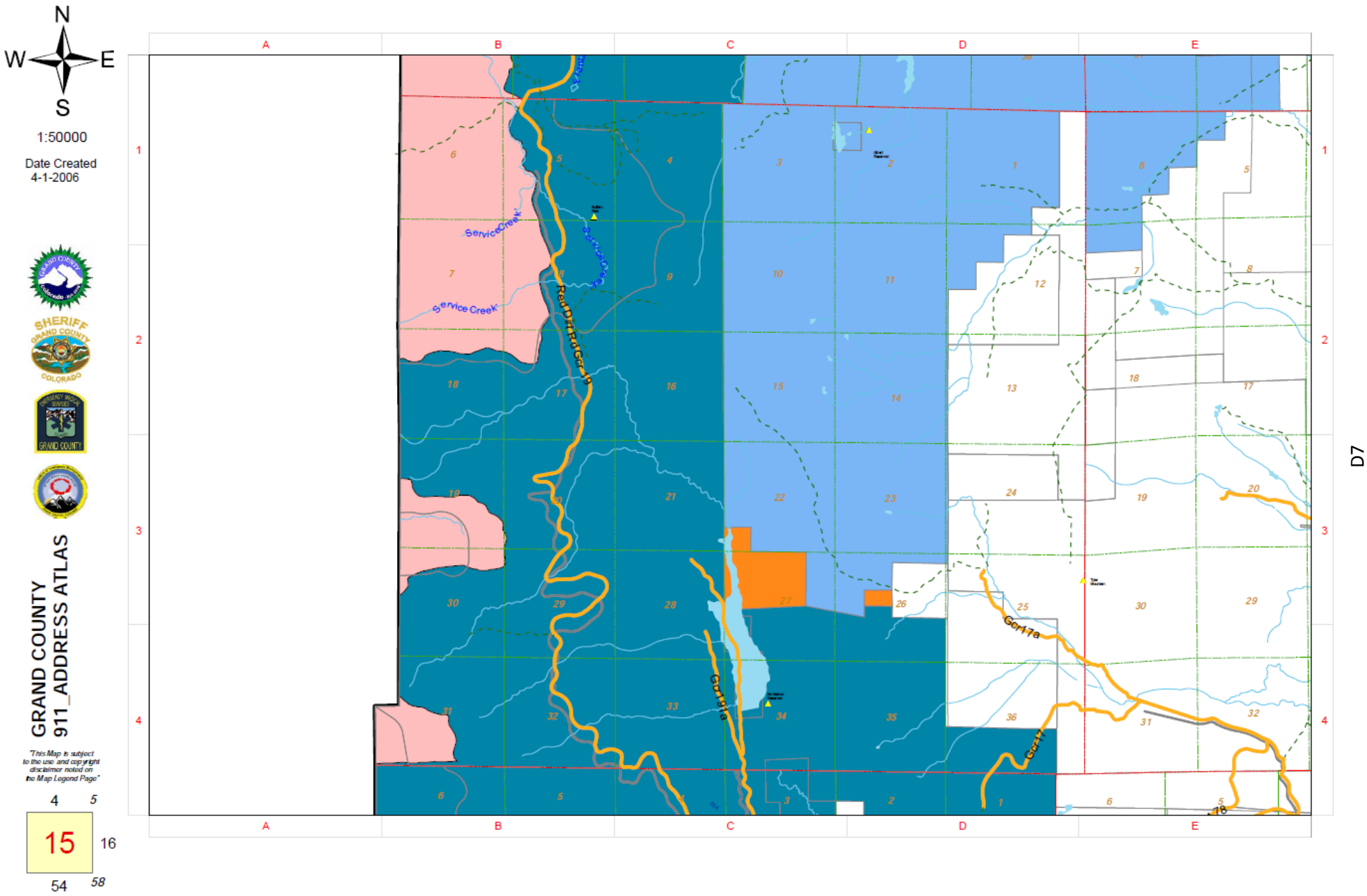
1:50000

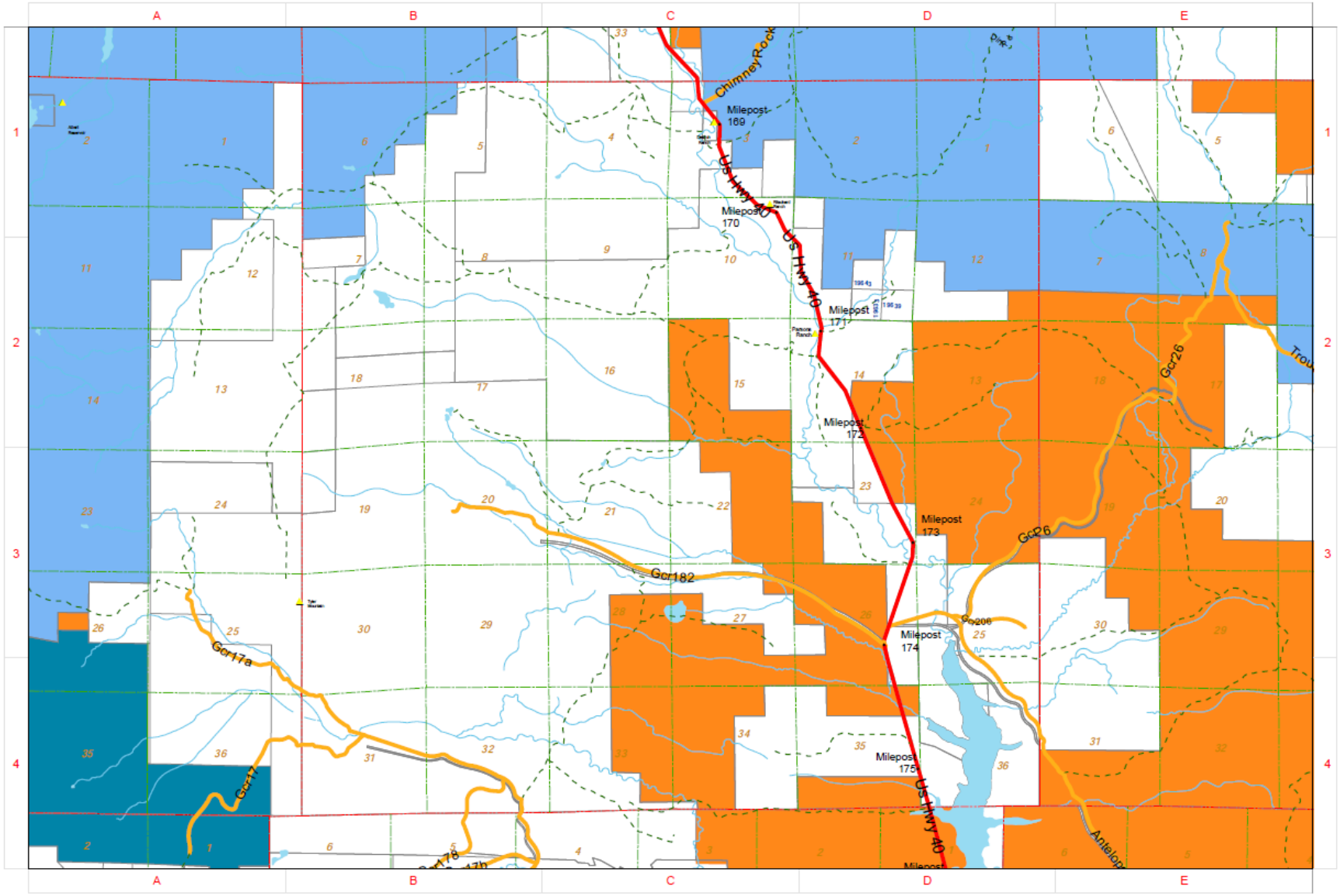
Date Created
4-1-2006

GRAND COUNTY
911_ADDRESS ATLAS

1
5 6 7
16 17 18

D6


N
W
E
S
1:50000
Date Created
4-1-2006
GRAND COUNTY
911_ADDRESS ATLAS
"This Map is subject to the use and copyright disclaimer noted on the Map Legend Page"
4
5
15
16
54
58
A
B
C
D
E
1
2
3
4
D7
ServiceCreek
Service Creek
RedDirtRd(Gcr19)
Gcr191a
Gcr17a
Gcr17



N

W E

S

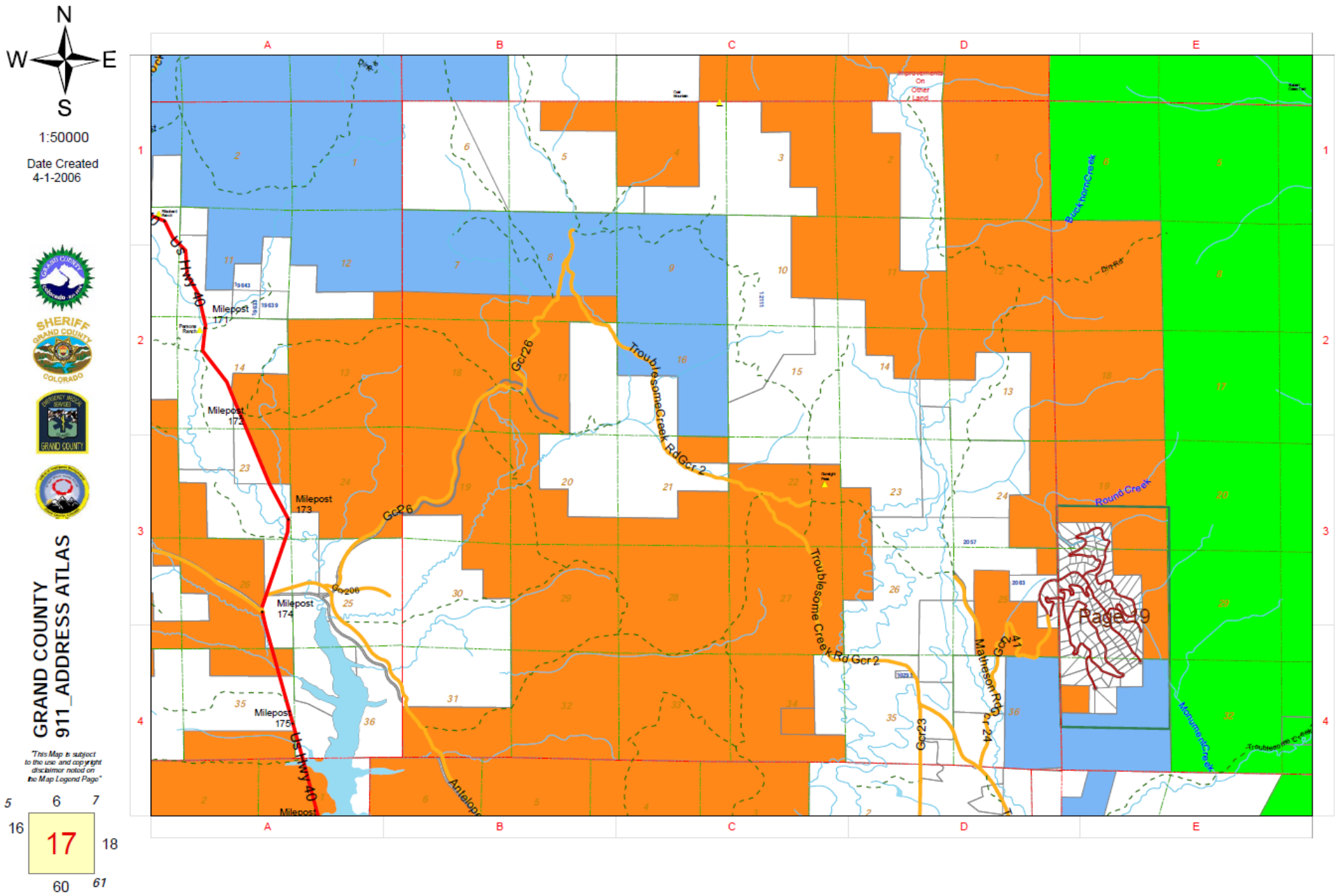
1:50000

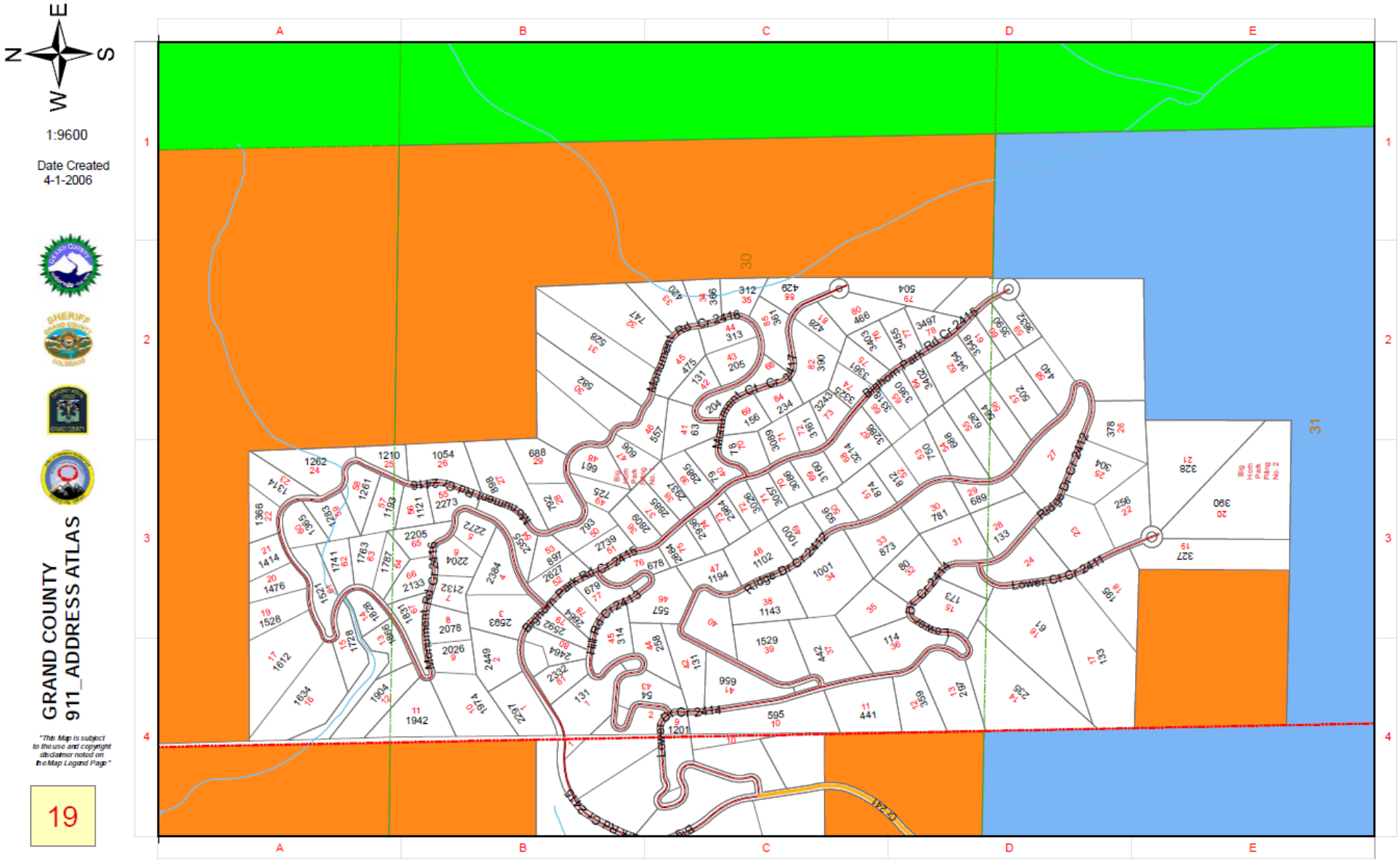
Date Created
4-1-2006

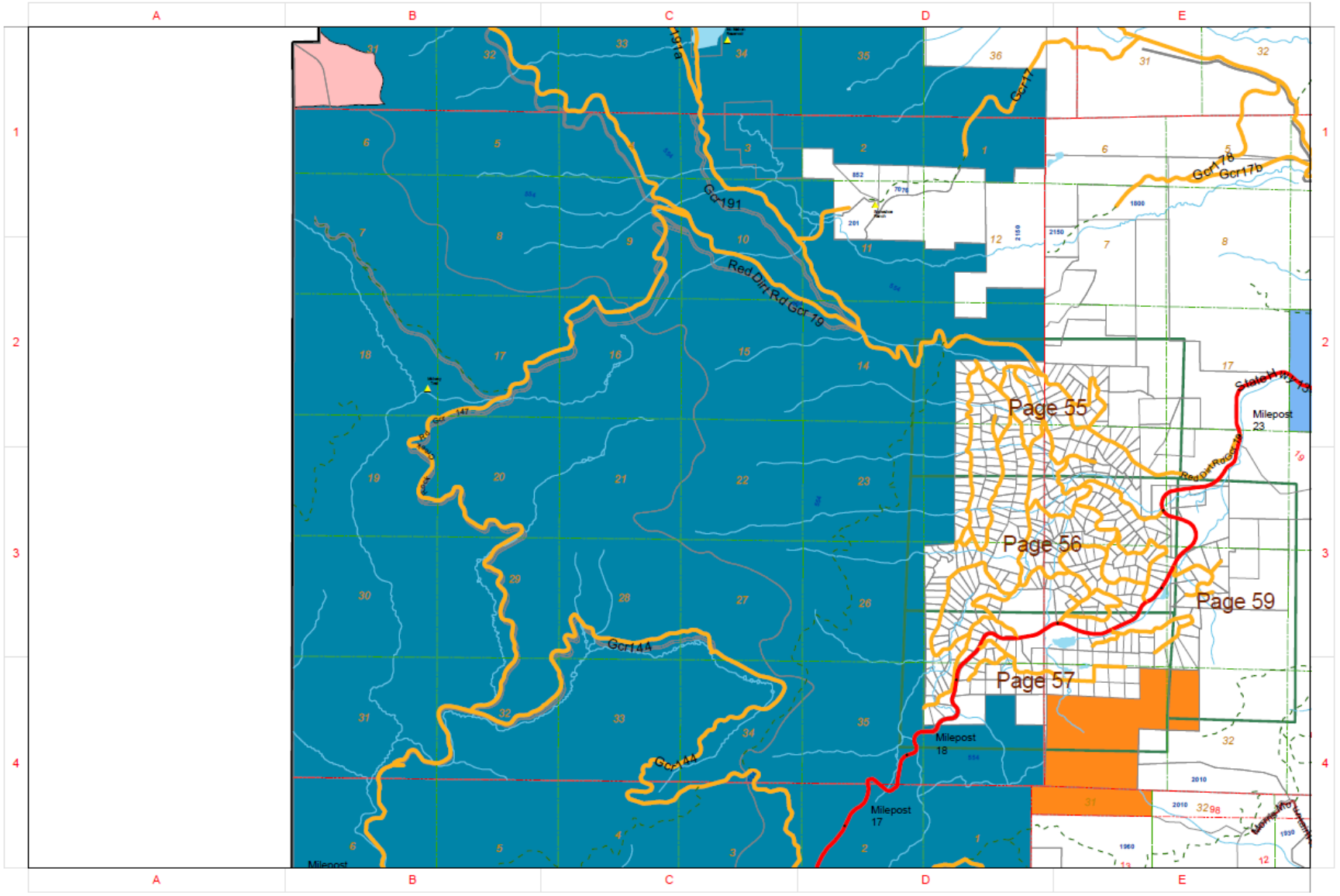
GRAND COUNTY
911_ADDRESS ATLAS

4 5 6
15 16 17
58 60

D8


N
W
E
S
1:50000
Date Created
4-1-2006
GRAND COUNTY
911_ADDRESS ATLAS
"This Map is subject to the use and copyright disclaimer noted on the Map Legend Page"
5
6
7
16
17
18
60
61
A
B
C
D
E
1
2
3
4
US Hwy 40
Milepost 171
Milepost 172
Milepost 173
Milepost 174
Milepost 175
Gcr26
Gcr2
Troublesome Creek Rd
Gcr23
Gcr24
Gcr41
Madison Rd
Buck Horn Creek
Round Creek
Page 19


N
E
S
W
1:9600
Date Created
4-1-2006
GRAND COUNTY
911_ADDRESS ATLAS
"This Map is subject to the use and copyright disclaimer noted on the Map Legend Page"
19
A
B
C
D
E
1
2
3
4
30
31
Monument Rd Cr 2416
Monument Ct Cr 2417
Bighorn Park Rd Cr 2415
Ridge Dr Cr 2412
Lower Ct Cr 2411
Lower Dr Cr 2414
Hill Rd Cr 2413
D10



N
W E
S

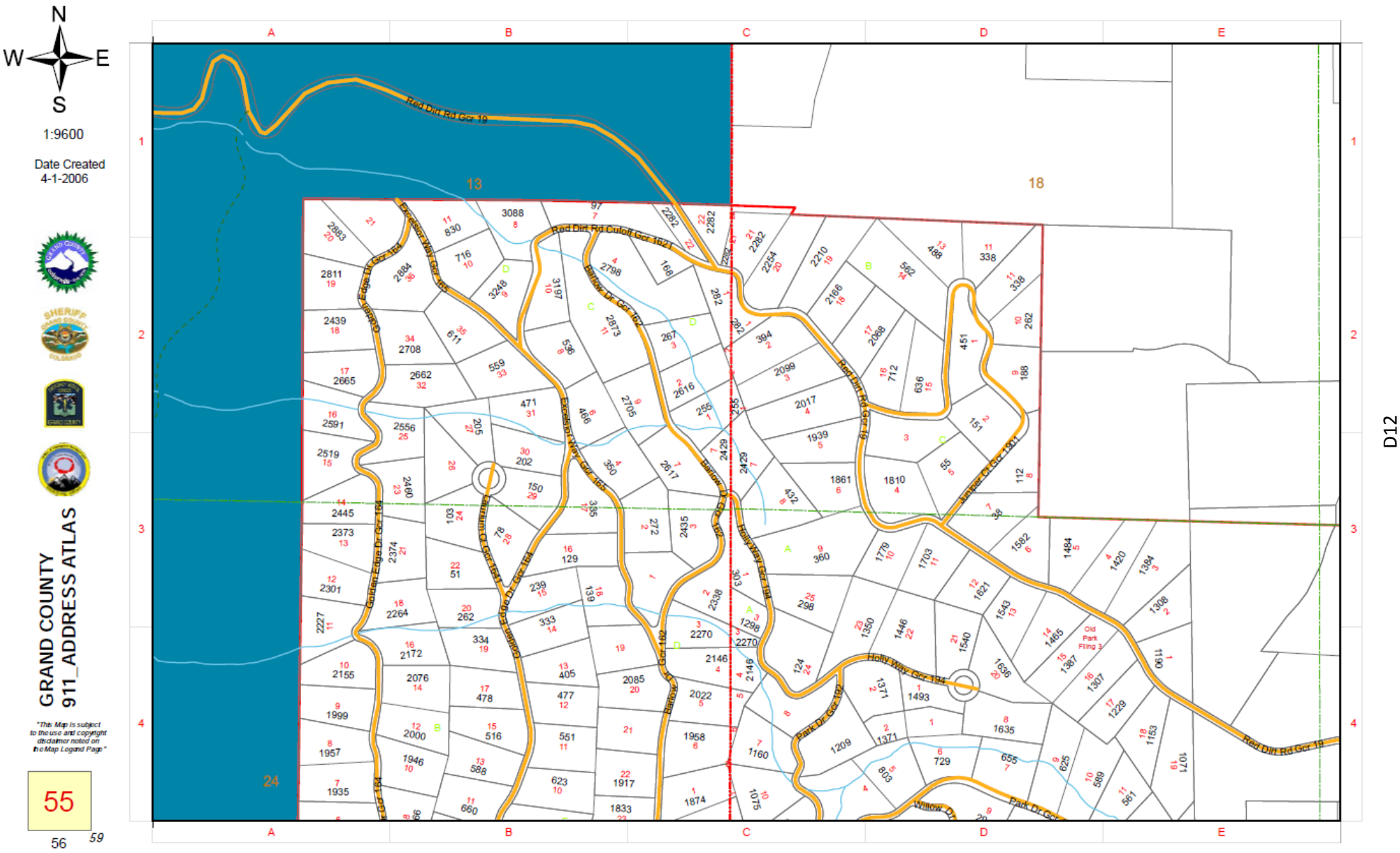
1:50000

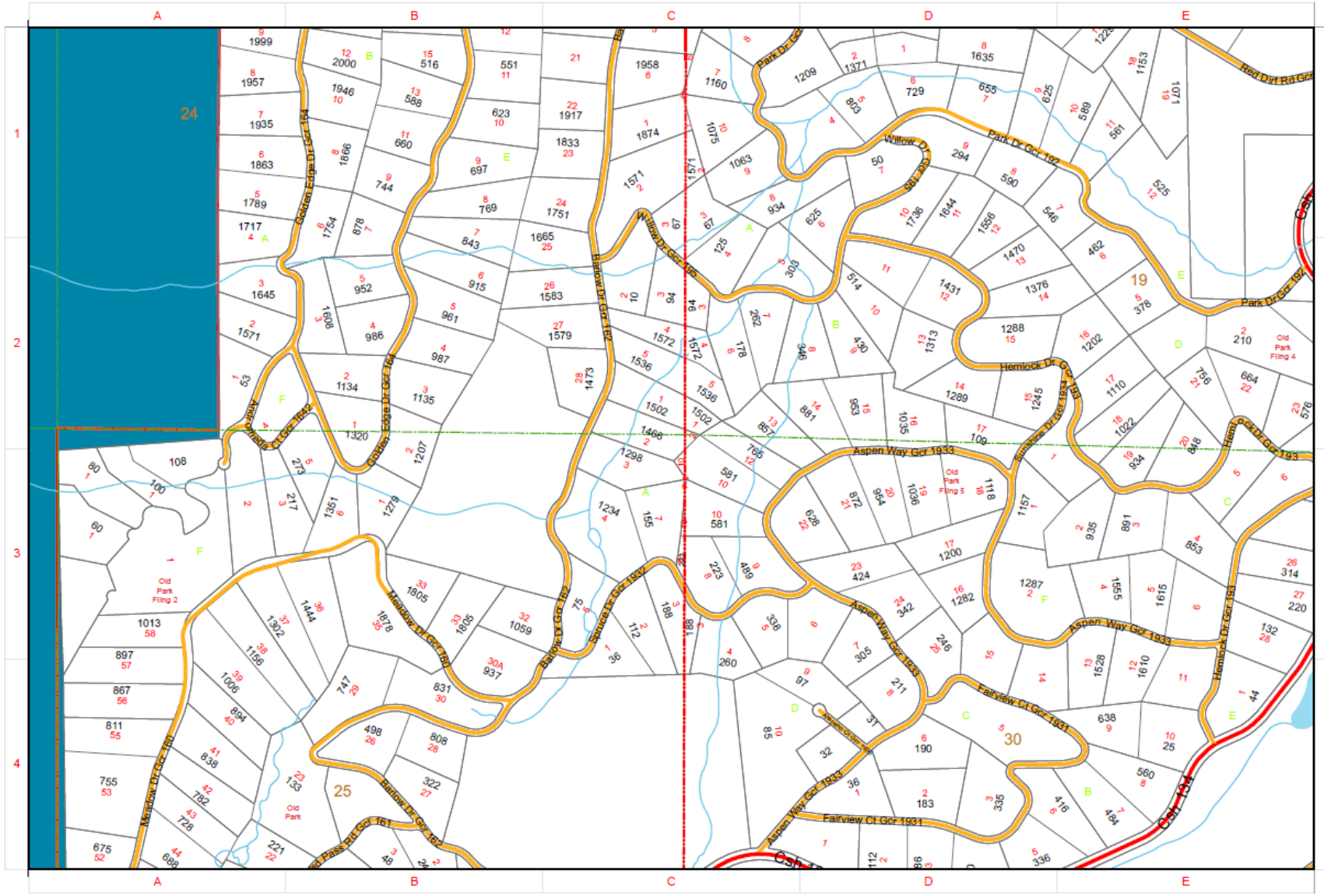
Date Created
4-1-2006

GRAND COUNTY
911_ADDRESS ATLAS

15
54
58
85
86

D11


N
W
E
S
1:9600
Date Created
4-1-2006
GRAND COUNTY
911_ADDRESS ATLAS
"This Map is subject to the use and copyright disclaimer noted on the Map Legend Page"
55
56
59
A
B
C
D
E
1
2
3
4
13
18
24
Red Dirt Rd Gcr 19
Red Dirt Rd Culoff Gcr 162
Excelsior Way Gcr 165
Golden Edge Dr Gcr 164
Barlow Dr Gcr 167
Holly Way Gcr 194
Park Dr Gcr 192
Juniper Ct Gcr 1901
Willow Dr
Park Dr Gcr
Old Park Filing 3
D12



N
W E
S

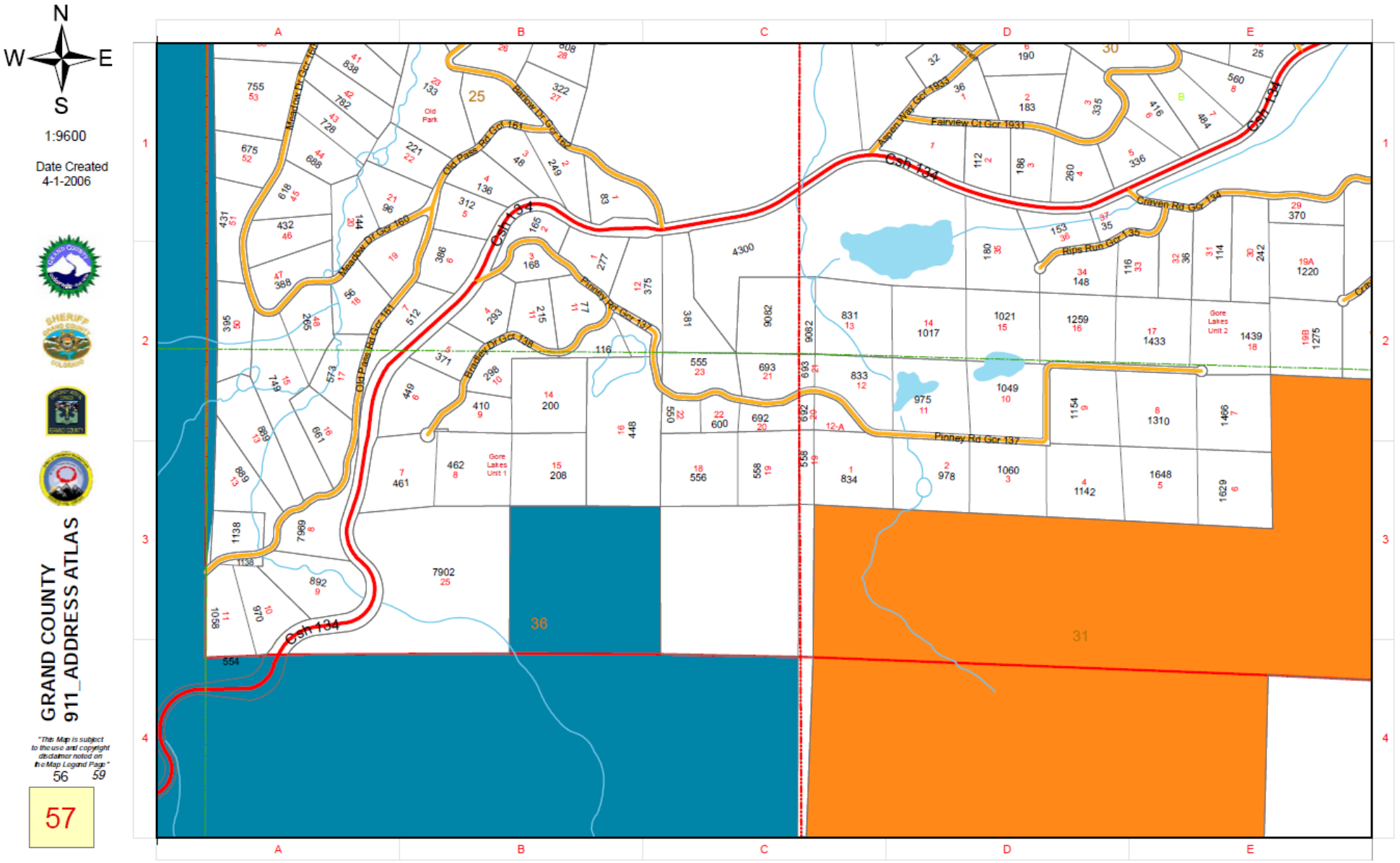
1:9600

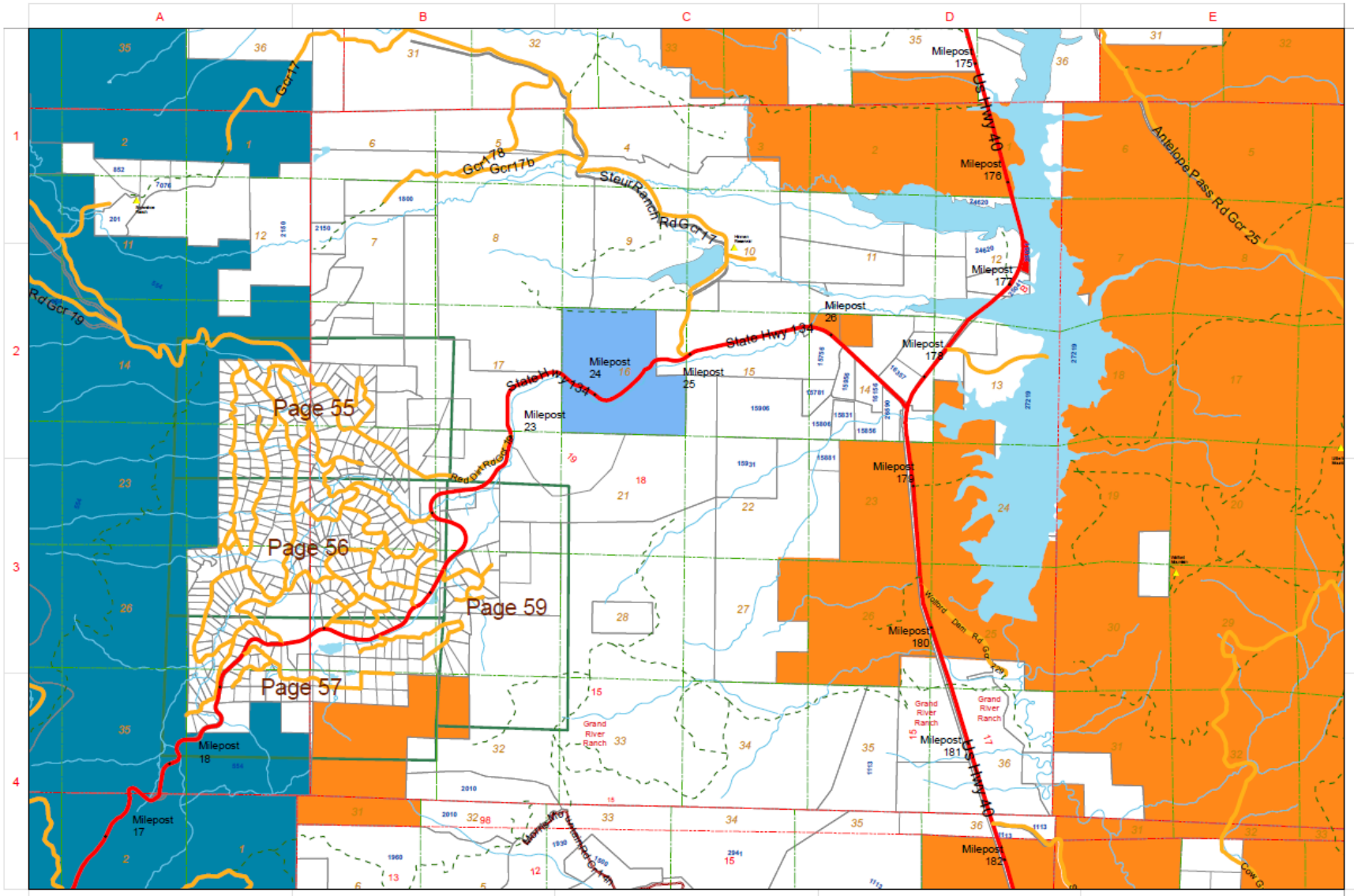
Date Created
4-1-2006

GRAND COUNTY
911_ADDRESS ATLAS

55
56
59
57

D13


N
W
E
S
1:9600
Date Created
4-1-2006
GRAND COUNTY
911_ADDRESS ATLAS
"This Map is subject to the use and copyright disclaimer noted on the Map Legend Page."
56
59
57
A
B
C
D
E
1
2
3
4
D14
Csh 134
Meadow Dr Gcr 160
Old Pass Rd Gcr 151
Pinney Rd Gcr 137
Fairview Ct Gcr 1931
Aspen View Gcr 1933
Craven Rd Gcr 134
Rips Run Gcr 135
Barlow Dr Gcr 181
Braden Dr Gcr 198
Gore Lakes Unit 1
Gore Lakes Unit 2
25
36
31
30
12-A



N
W E
S

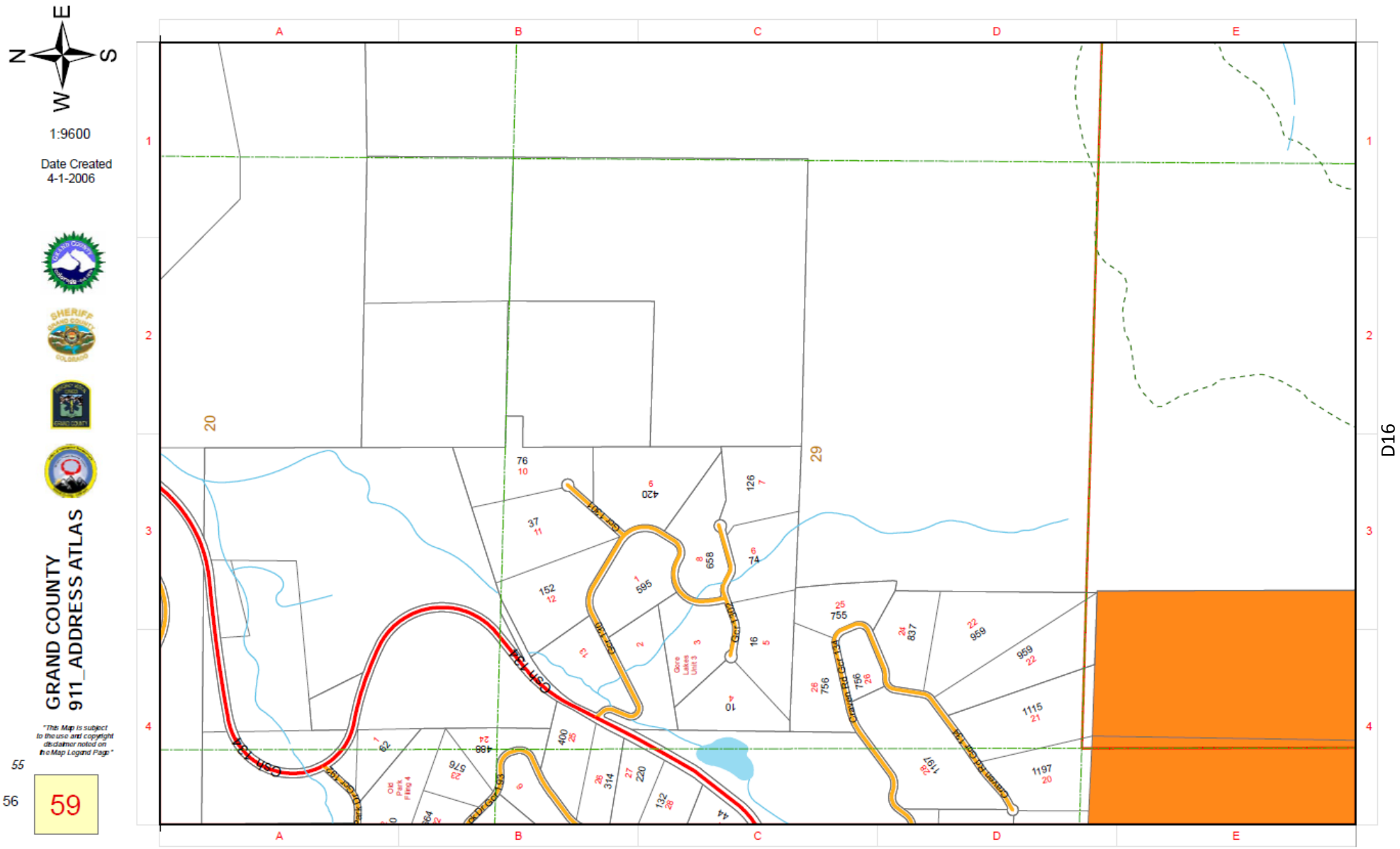
1:50000

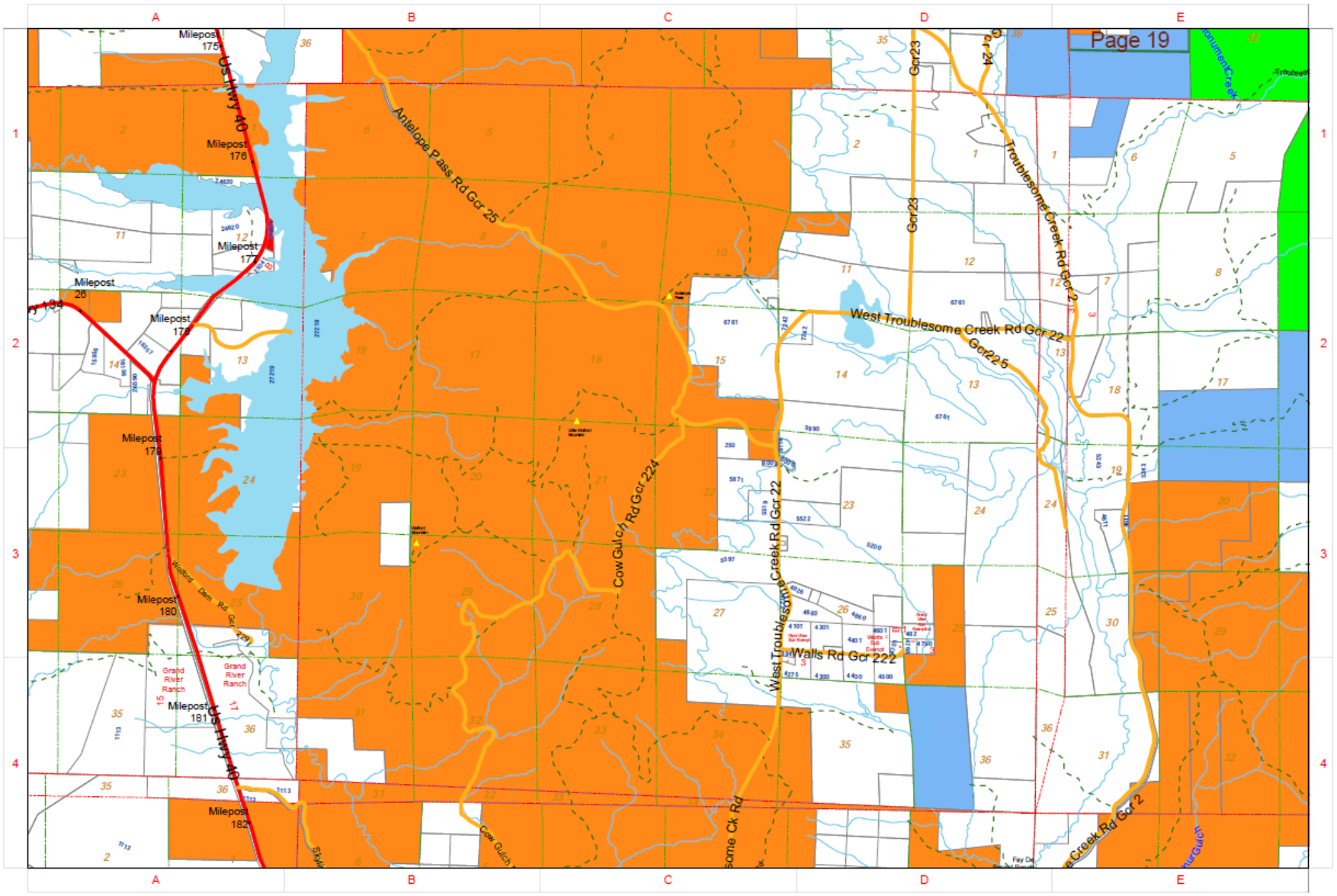
Date Created
4-1-2006

GRAND COUNTY
911_ADDRESS ATLAS

D15

15 16
54 58 60


N
E
S
W
1:9600
Date Created
4-1-2006
GRAND COUNTY
911_ADDRESS ATLAS
"This Map is subject to the use and copyright disclaimer noted on the Map Legend Page"
55
56
59
A
B
C
D
E
1
2
3
4
20
29
D16
CSH 134
County Rd CGC 134
County Rd CGC 134
County Rd CGC 134
County Rd CGC 134
County Rd CGC 134
County Rd CGC 134
County Rd CGC 134
Grove Lakes Unit 3
Old Park Filing 4
76
10
37
11
152
12
420
9
595
1
658
8
74
6
126
7
16
5
10
4
755
25
837
24
959
22
756
26
1115
21
1197
20
1151
19
576
23
488
24
400
25
314
28
220
27
132
28
62
1



N

W E

S

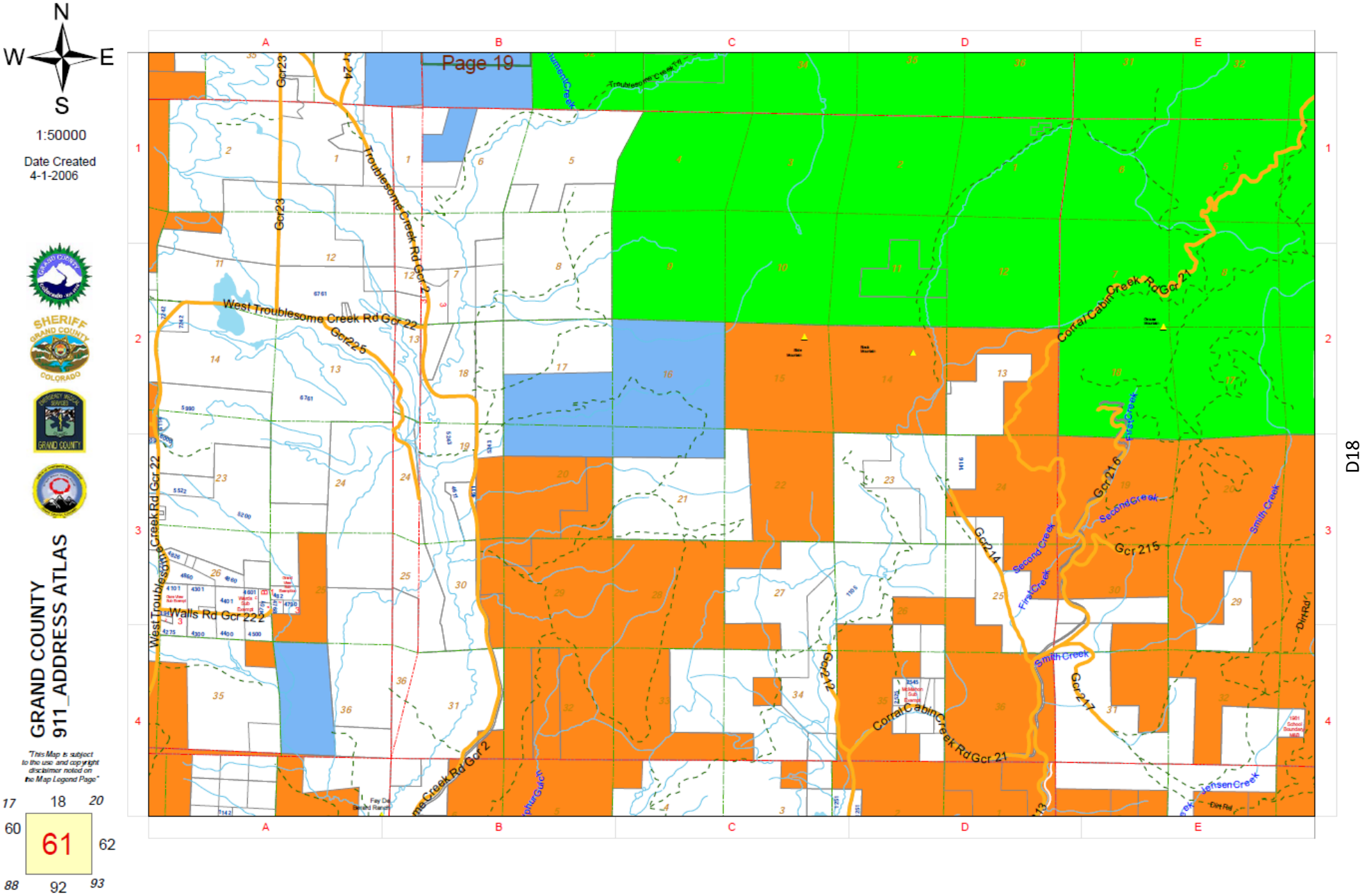
1:50000

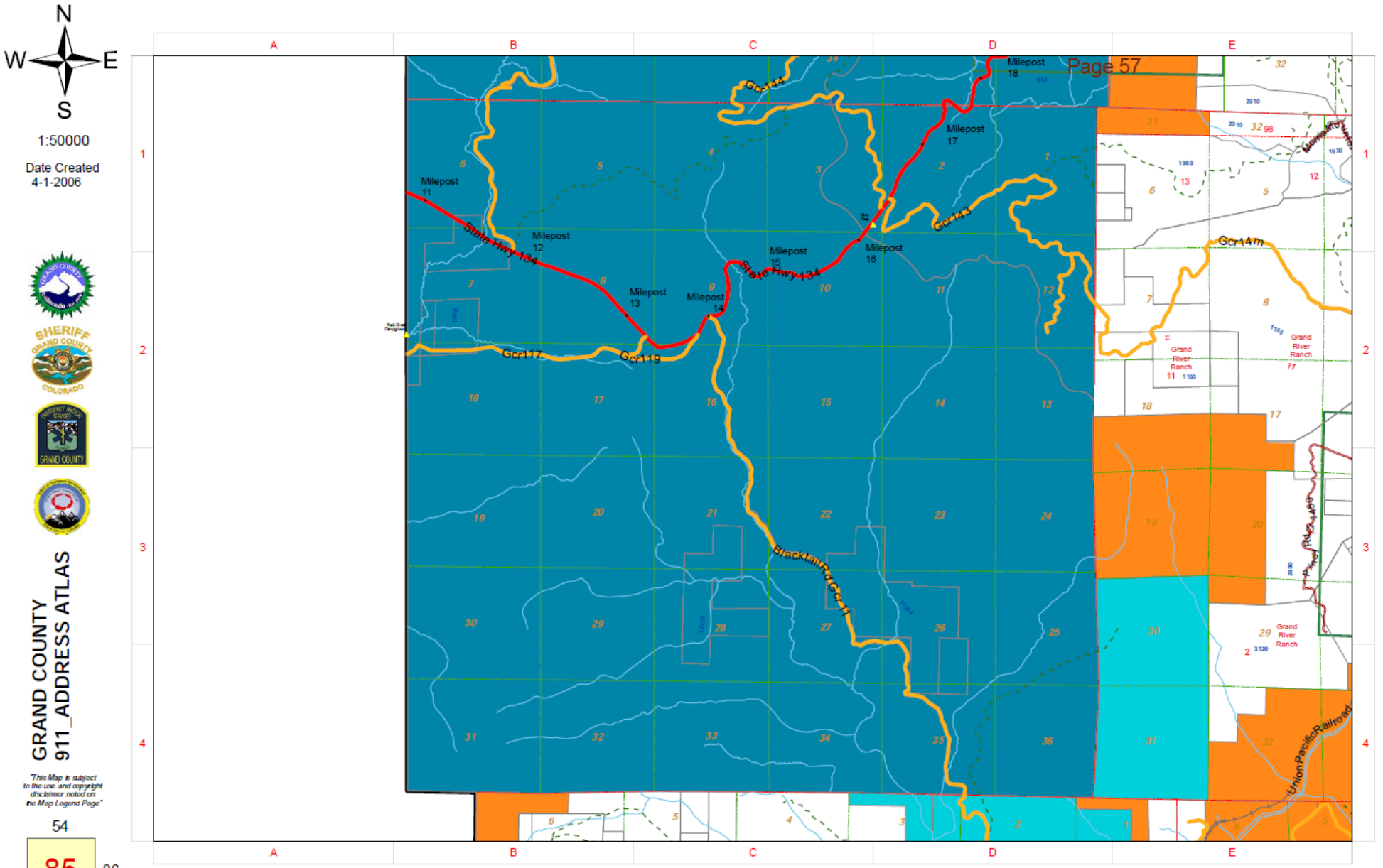
Date Created
4-1-2006

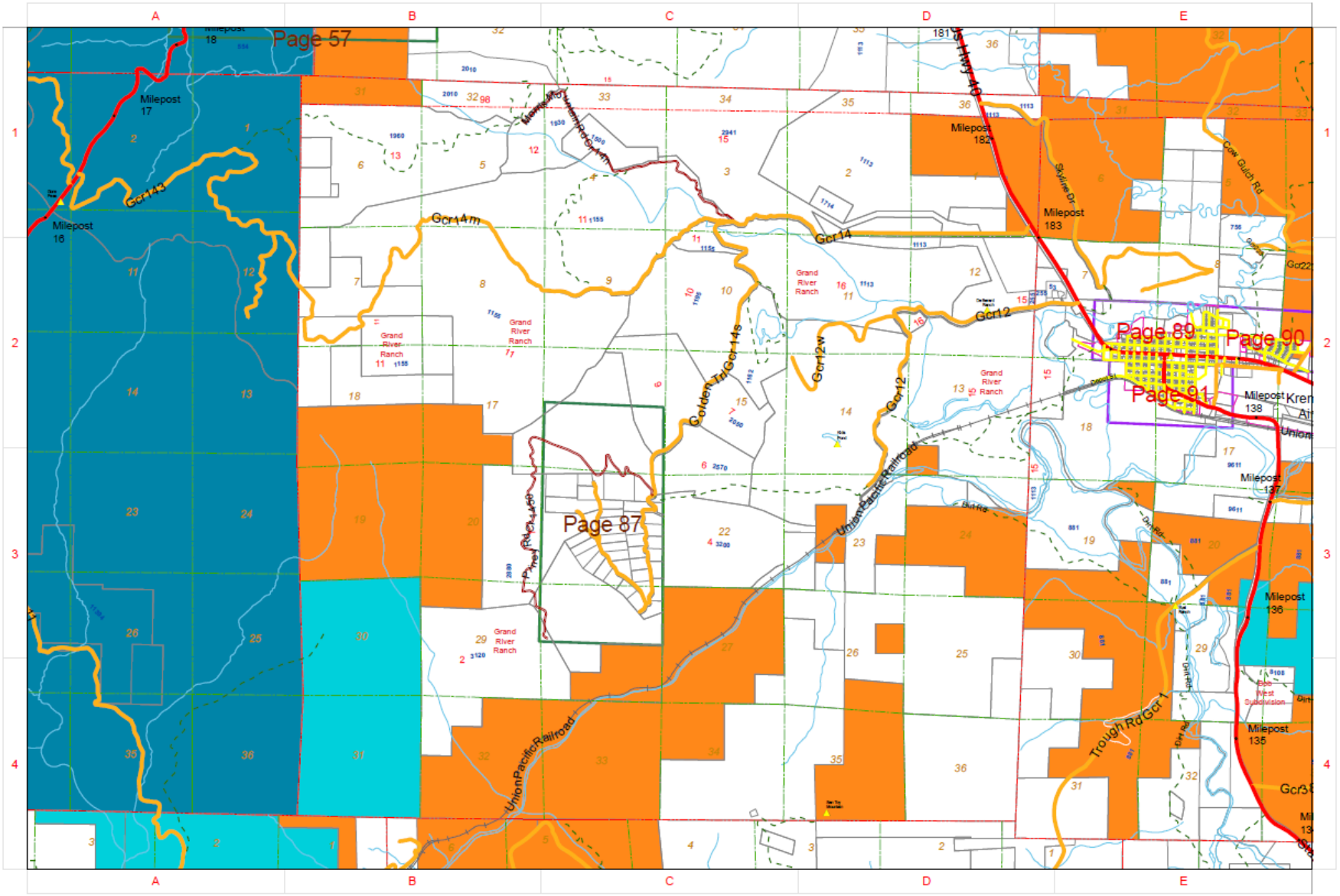
D17

GRAND COUNTY
911_ADDRESS ATLAS

16 17
58 60 61
86 88 92


N
W
E
S
1:50000
Date Created
4-1-2006
GRAND COUNTY
911_ADDRESS ATLAS
"This Map is subject to the use and copyright disclaimer noted on the Map Legend Page"
17
18
20
60
61
62
88
92
93
A
B
C
D
E
1
2
3
4
Page 19
D18
Gcr23
Gcr24
Troublesome Creek Rd Gcr 2
West Troublesome Creek Rd Gcr 22
Gcr225
Walls Rd Gcr 222
Corral Cabin Creek Rd Gcr 21
Gcr216
Second Creek
Gcr 215
Gcr214
First Creek
Smith Creek
Gcr217
Gcr212
Jensen Creek


N
W
E
S
1:50000
Date Created
4-1-2006
GRAND COUNTY
911_ADDRESS ATLAS
"This Map is subject to the use and copyright disclaimer noted on the Map Legend Page"
54
85
86
129
A
B
C
D
E
1
2
3
4
Milepost 11
Milepost 12
Milepost 13
Milepost 14
Milepost 15
Milepost 16
Milepost 17
Milepost 18
State Hwy 134
Gcr144
Gcr143
Gcr14m
Gcr117
Gcr119
Blacktail Rd Gcr11
Grand River Ranch
Union Pacific Railroad
D19



N

W E

S

1:50000

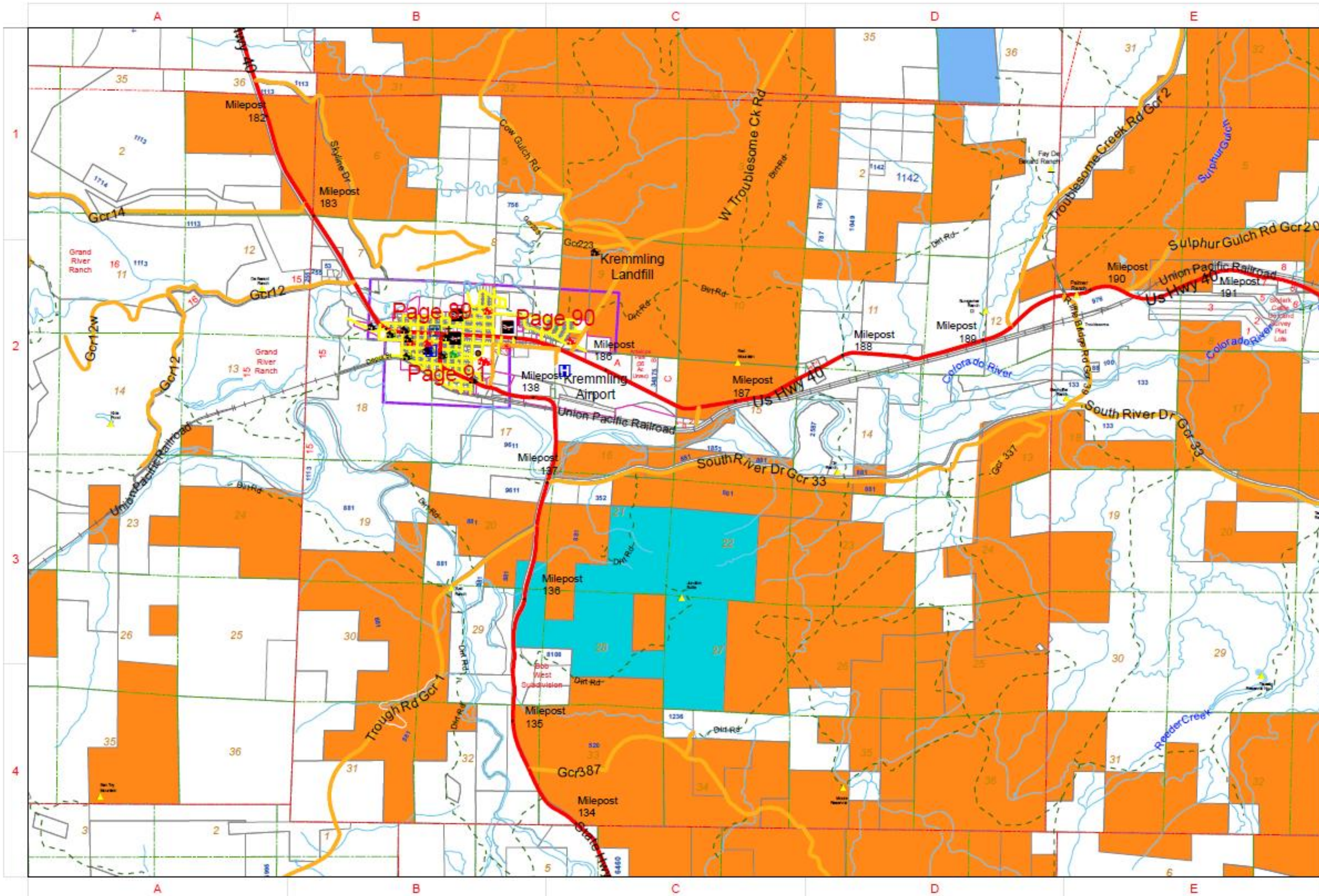
Date Created
4-1-2006

GRAND COUNTY
911_ADDRESS ATLAS

54 58 60
85 86 88
129 131

D20


N
E
S
W
1:9600
Date Created
4-1-2006
GRAND COUNTY
911_ADDRESS ATLAS
"This Map is subject to the use and copyright disclaimer noted on the Map Legend Page"
87
A
B
C
D
E
1
2
3
4
Piney Rd Cr 1450
Golden Trl Gcr 14s
Lost Lodge Rd Gcr 1452
16
21
28
D21
1300
3140
3542
3584
3726
3868
4000
4142
4286
4444
3563
3645
3727
3803
3935
4071
4179
4287
4578
4863
4176
4862
5010
5126
5188
5240
5312
5431
396
314
242
160
78
5167
5085
478
563
469
397
Golden Trl Gcr 14s
Golden Trl Gcr 14s
Golden Trl Gcr 14s
Golden Trl Gcr 14s
Piney Rd Cr 1450
Piney Rd Cr 1450



N
E
S
W

1:50000

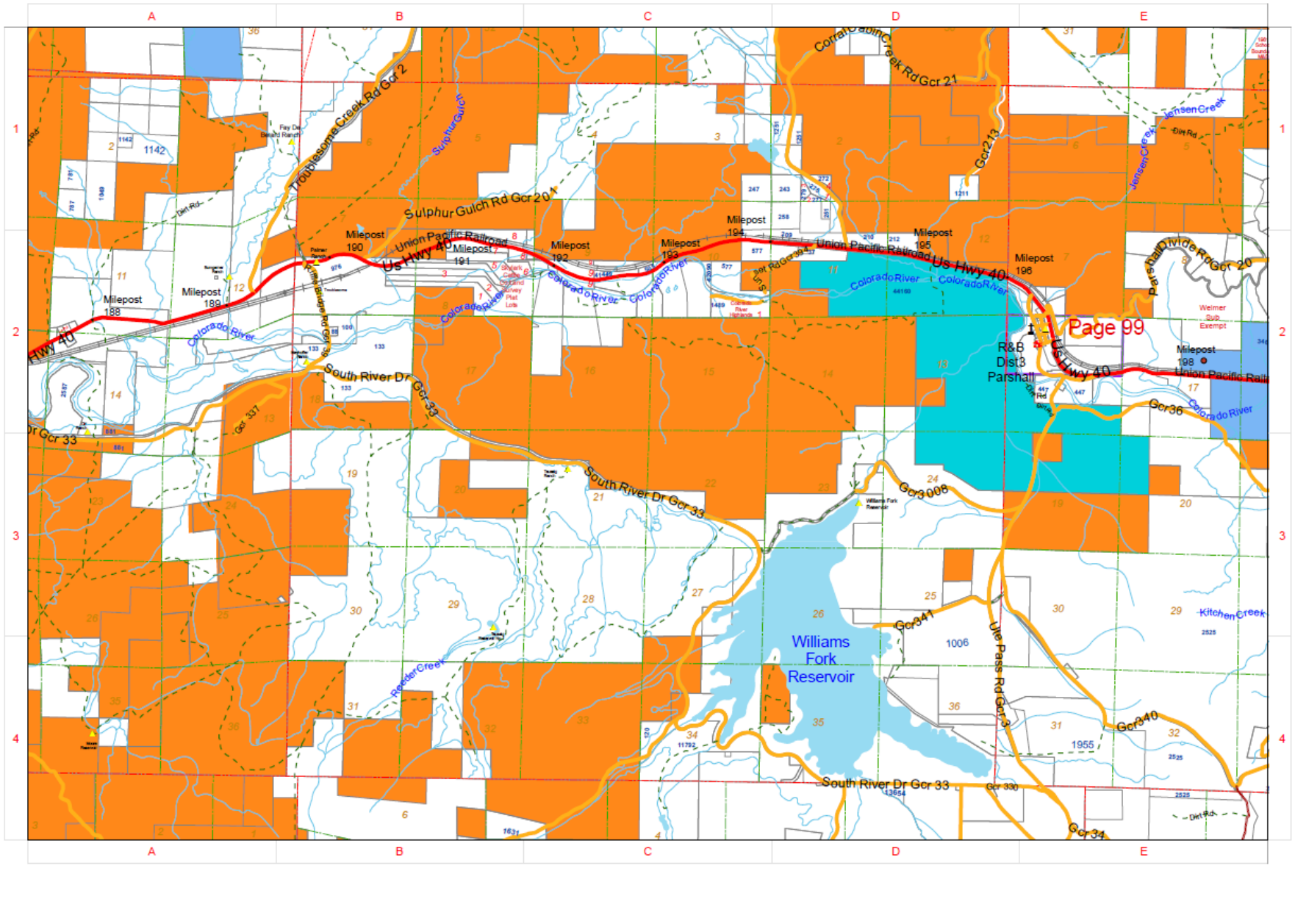
Date Created
4-1-2006

GRAND COUNTY
911_ADDRESS ATLAS

"This Map is subject to the use and copyright disclaimer noted on the Map Legend Page"

86	60	61	92
	88		
131	132		

D22



N
W E
S

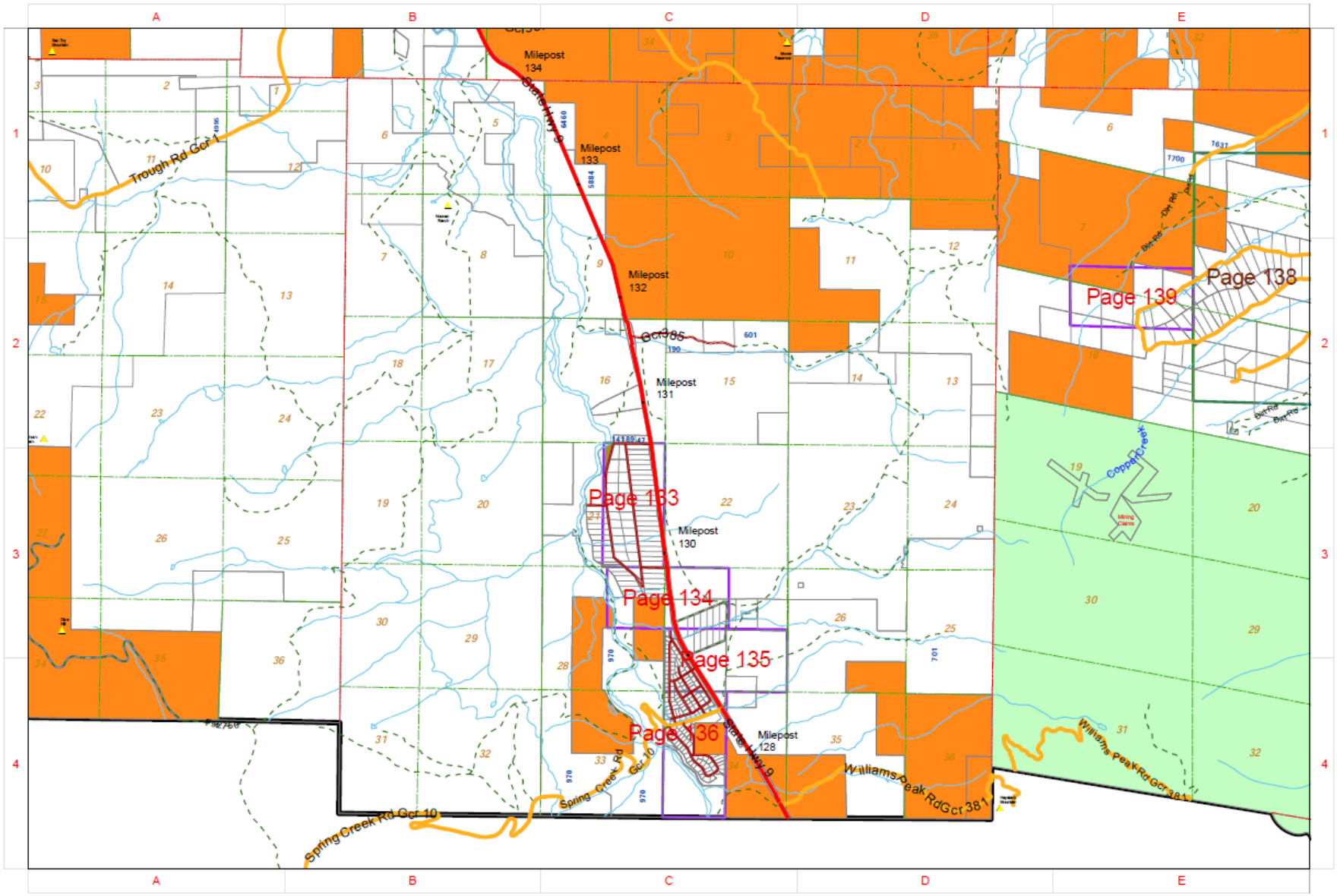
1:50000

Date Created
4-1-2006

GRAND COUNTY
911_ADDRESS ATLAS

60 61 62
88 92 93
132 137

D23



N
W E
S

1:50000

Date Created
4-1-2006

GRAND COUNTY
911_ADDRESS ATLAS

88 92
131 132 137

D24