Rio Blanco County
Community Wildfire Protection Plan Update

December 2012

Alpenfire, LLC
Wildland Fire Management Solutions

SE Group

executive summary

December 2012

The Rio Blanco Community Wildfire Protection Plan (CWPP) is an important document; it informs emergency responders of the systems that are in place to protect lives and property in the event of a wildfire. It also helps guide decisions regarding how the County prepares for and prevents those events. A primary objective of the 2012 Update to the Rio Blanco CWPP was to develop a document that conveys complex information on hazards, risks and responsibilities in a clear and concise way, so that it becomes a valuable tool for fire managers and decision-makers in the County.

2012 was a year in Colorado that reminded us of the extreme dangers that wildfire presents, with two of the state's most destructive fires taking place in Fort Collins (High Park Fire) and Colorado Springs (Waldo Canyon Fire) over the summer. While we have been fortunate to have not had a large event such as that occur in our area, the 2012 CWPP Update is a small step to ensure that we understand where the greatest likelihood for fire exists and can communicate between fire managers and responders should a wildfire take place.

2012 was also an opportune time to update the CWPP for several other reasons. The Colorado State Forest Service has issued new minimum standards for CWPP's that the 2006 plan did not meet. There also have been advances in fire modeling and hazard assessment since that time that added greatly to the analysis and risk assessments found in this document. And, there have been changes in land use and natural systems, on-the-ground projects, and new priorities that have to be accounted for in Rio Blanco County. Lastly, the federal government recommends updates for CWPP's every 5 years.

Rio Blanco County is a special place with vast amounts of public lands, exceptional recreation opportunities and bustling energy and mining industries. All of this not only makes for an incredible quality of life, but a unique set of challenges that emergency responders and fire managers face. This CWPP outlines those challenges and how to best approach them in the future. One theme that resonated throughout the public process is that effective fire management is based on partnerships. In the case of Rio Blanco County this is especially true, between private land owners, public agencies and operators.

This CWPP Update could not have been possible without the involvement of representatives from the U.S. Forest Service, the Bureau of Land Management, the Colorado State Forest Service, the communities of Meeker and Rangely, White River Electric Association, and the energy and mining industry. Their input provides a solid foundation for preparedness and decision making throughout Rio Blanco County.

This CWPP is a living document with an approximate shelf-life of five years. It is our goal to revisit the action items presented in Chapter 4 on an annual basis to gauge the County's progress and take steps necessary to adjust under changing conditions. It is also our goal to improve the content should development occur, density in the Meeker and Rangely communities grow, and industry operations expand.

signature

Shawn Bolton
Chairman, Board of County Commissioners

signature

Kenneth Parsons
County Commissioner

signature

Kai Turner
County Commissioner

table of contents

acknowledgements

Many agencies and individuals were critical to the completion of the Rio Blanco County Community Wildfire Protection Plan Update. In addition to those listed below, there were others that attended public meetings or provided input, and their participation is also appreciated.

Rio Blanco County

- Shawn Bolton, Chairman, Board of County Commissioners
- Kenneth Parsons, County Commissioner
- Kai Turner, County Commissioner
- Si Woodruff, Sheriff
- Lt. John Hutchins, Emergency Manager
- Mike Dinwiddie, GIS Administrator
- Anna Smith, County Planner

Town of Meeker

- Scott Meszaros, Town Administrator

Town of Rangely

- Vince Wilczek, Chief, Rangely Police Department

Local Fire Districts

- Steve Allen, Chief, Meeker Fire Department
- Andy Shaffer, Chief, Rangely Fire Department

Colorado State Forest Service

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Bureau of Land Management

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White River Electric Association, Inc.

- Ron Spencer, Senior Field Representative
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Additionally, planning support and facilitation were provided by Geoff Butler of Alpenfire, LLC., Darryl Grob of Winter-Grob, Inc., Eric Petterson of Rocky Mountain Ecological Services, and Travis Beck and Melissa Sherburne of SE Group.

1: introduction

1.1 Plan Purpose

What is a CWPP?

Community Wildfire Protection Plans (CWPPs) are authorized and defined by the Healthy Forests Restoration Act (HFRA) passed by Congress in 2003. A CWPP is a community plan that brings together diverse local interests to discuss their mutual concerns for public safety, community sustainability and natural resources. It offers positive, solution-oriented recommendations to address challenges such as: local firefighting capability, the need for defensible space around homes and subdivisions, and where and how to prioritize land management—on both federal and non-federal land.

Need for the Update

Rio Blanco County embarked upon the 2012 Community Wildfire Protection Plan (CWPP) Update for several reasons. First, the Colorado State Forest Service has issued new minimum standards for CWPPs that the 2006 plan does not meet. Secondly, there have been advances in fire modeling and hazard assessment since that time that will add greatly to the Rio Blanco CWPP. There have also been changes in land use and natural systems, on-the-ground projects, and new priorities that have to be accounted for in Rio Blanco County. Lastly, the federal government recommends updates for CWPPs every five years.

Benefits of a CWPP

A CWPP is a great way for community leaders and residents to inventory and review their current conditions for fire risk, as well as the programs that are in place for reducing those risks and responding in the event of a wildfire. Fire knows no boundaries, and the CWPP encompasses private, federal and all other land owners.

A CWPP also allows the community to define its "Wildland Urban Interface" (WUI). The WUI includes lands that are at particular risk of wildfire and should be managed carefully because of that. Defining the WUI is subjective and difficult; it is not a line or boundary, but a zone or range to illustrate where the highest risk occurs. There are many ways to define and map the WUI and the CWPP process that will help Rio Blanco County decide what makes the most sense in this area.

Finally, by having the CWPP and WUI definition in place, Rio Blanco will be eligible for (and even given priority for) federal funds to complete fuels mitigation projects.

Photo courtesy of the USFS.

1.2 Authorization

As previously stated, initial authorities for community fire planning came under the HFRA. Title I of HFRA outlined requirements for reducing hazardous fuels on federal lands. This CWPP was developed to be consistent with requirements of HFRA and provide Rio Blanco County with a countywide baseline from which to begin community fire planning in coordination with the Bureau of Land Management (BLM) and U.S. Forest Service (USFS) at the federal level, and the Colorado State Forest Service (CSFS) and local agencies at the state and regional levels.

The Colorado Legislature has since created specific laws guiding the community planning at a county government level. The statutes providing authorization for this planning are:

- C.R.S. 23-31-312 Community wildfire protection plans, county government, guidelines and criteria, legislative declaration, definitions
- C.R.S. 29-22.5-103 Wildland fires – general authority and responsibilities
- C.R.S. 30-10-512 Sheriff to act as fire warden
- C.R.S. 30-10-513 Sheriff in charge of forest or prairie fire
- C.R.S. 30-10-513.5 Authority of Sheriff relating to fire within unincorporated areas of the County

The CWPP is not a regulatory document and does not impose restrictions or mandate actions. Rather, the CWPP is a community framework that directs wildfire protection activities in the County and recommends measures that homeowners and communities can take to protect properties and infrastructure. Once completed, the plan will be used to prioritize wildfire protection actions in the county and in the Towns of Rangely and Meeker.

1.3 Planning Process

In accordance with the HFRA and state guidelines, this planning process saught collaboration on a variety of levels from affected agencies, organizations and members of the public.

The planning process was carried out over four months and included three joint Fire Working Group (FWG)/ Public Meetings, numerous individual stakeholder meetings, and ongoing communication between the technical experts and the planning team. A "Frequently Asked Questions" flyer was distributed online and throughout the community at the onset of the process to inform people about the purpose of the CWPP and how to become involved. Each FWG/ Public Meeting was advertised in the Herald Times and notifications emailed to people who had provided their contact information.

Process Overview

Phase	June	July	Aug	Sept
Project Coordination				
Existing Conditions				
Wildland Fuel Management Assessment				
Priorities and Implementation Action Plan				

Stakeholder interviews →

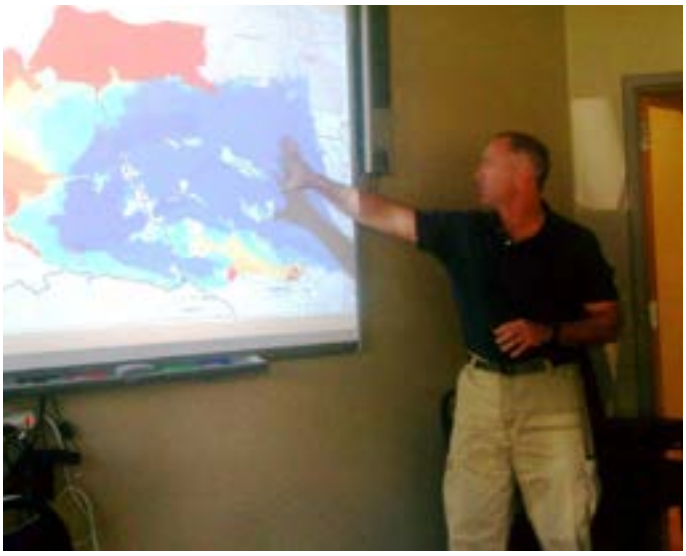
Agency coordination/technical experts →

Local outreach →

Fire Working Group

Technical experts from state, federal and local agencies comprised a working group to ensure that the best information was available and recommendations reflect their management guidance. Specifically, the FWG included representatives from:

- The Board of County Commissioners
- The Colorado State Forest Service
- The US Forest Service
- The Bureau of Land Management
- The Town of Rangely
- The Rangely Fire Protection District
- The Town of Meeker
- The Meeker Fire Protection District



Geoff Butler, FWG/Public Meeting #1.

FWG/Public Meetings

Input from the FWG, as well as from the general public, was critical to developing this CWPP. Three FWG meetings were conducted over the four-month planning period, at important milestones. Each of these meetings were open to the public, advertised in the Herald Times newspaper, and held simultaneously through video-conferencing in both Rangely and in Meeker.

The first meeting was primarily informative, for the planning team to hear specific goals and objectives that agencies and individuals might have for the future. It also helped define how this version could be improved from 2006 so that it is most effective. Additionally, this meeting occurred in the midst of one of Colorado's most intense and destructive fire seasons, which included the High Park Fire outside of Fort Collins. Geoff Butler, who is a Captain for the Poudre Fire Authority in Fort Collins and served as the lead fire consultant for this update, gave a presentation on how that fire was being fought and offered some take-aways on effective mitigation and risk/hazard assessment.

The second FWG meeting was conducted as a small group exercise, in which people with similar interests (industry, fire managers, administrators) evaluated the risk assessment map to identify areas that needed to be refined. The small groups also offered lists of action items for putting this plan into practice and achieving effective mitigation efforts. Those lists were directly translated into this plan.

The third FWG meeting took place on September 10th and was primarily aimed at presenting a complete draft of the CWPP Update and gain feedback from key stakeholders. Attendees from various agencies who had reviewed the draft prior to the meeting provided extremely constructive input on how to improve the draft to not only exceed CWPP guidelines as defined by the Colorado State Forest Service, but to make the action items included in the plan as effective and actionable as possible.

The CWPP Update was adopted by Rio Blanco County Commission on December 10, 2012.

2.1 Overview

Rio Blanco County is in northwestern Colorado, roughly 250 miles west of Denver, Colorado and 250 miles east of Salt Lake City, Utah. The county is approximately 106 miles east-west by 36 miles north-south. The total area of Rio Blanco County is very large, with approximately 2.17 million acres (or 3,263 square miles), 73% of which is federally-owned.

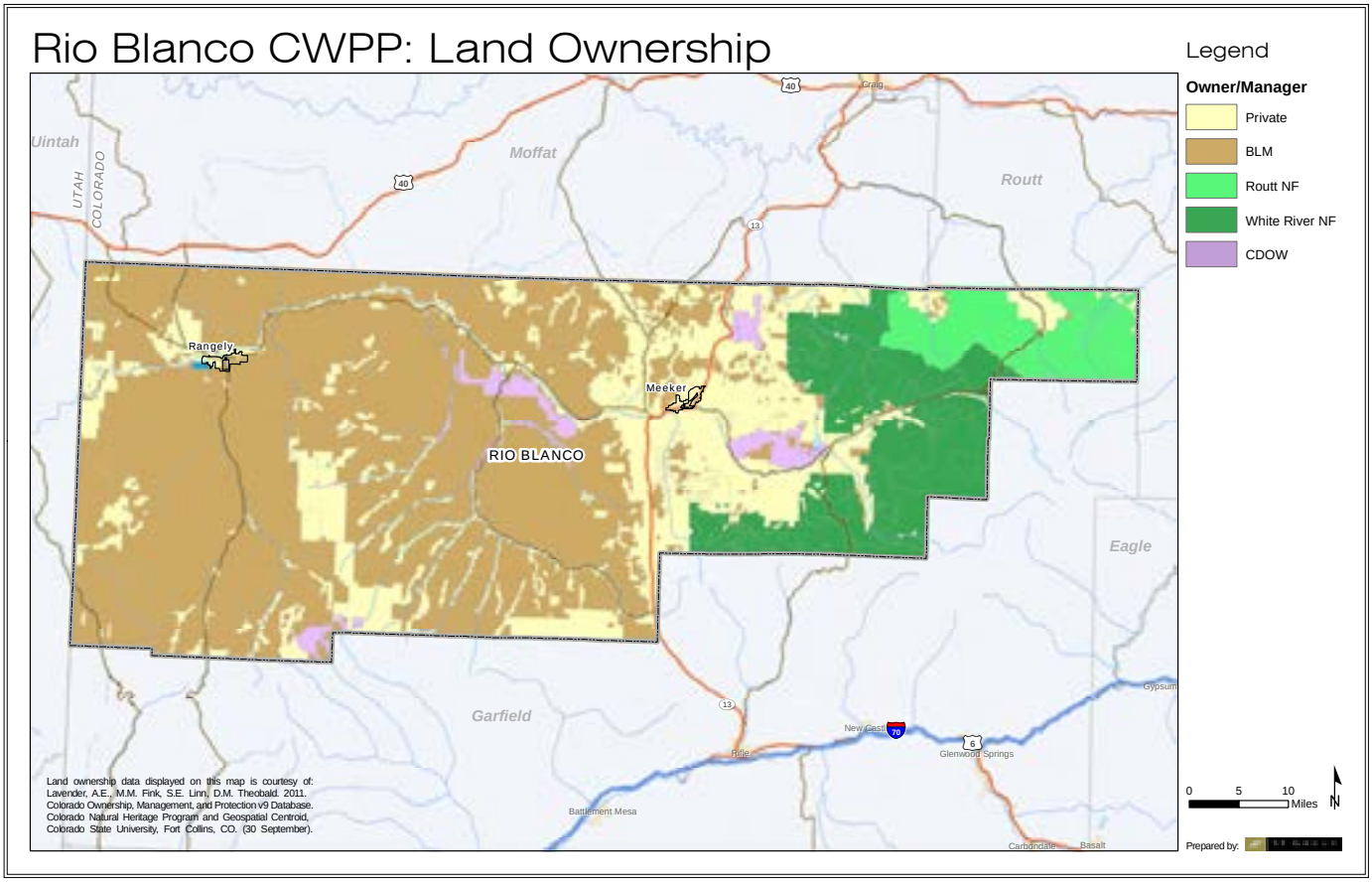
Rio Blanco County is a sparsely populated rural county with a population of 6,666 according to the 2010 U.S Census. Since the 2000 Census, the county has grown at a rate of 11.36% from a population of 5,986 (Colorado Department of Local Affairs and U.S. Census Bureau). The communities of Meeker (pop. 2,455) and Rangely (pop. 2,349) are the county's main population centers and are both located along the White River corridor. Meeker is the county seat and is located just north of the intersection of State Highways 13 (north-south) and 64 (east-west). Rangely is located about 50 miles west of Meeker along State Highway 64, about 15 miles shy of the Colorado-Utah border. The elevation of Meeker is 6,249 feet and the elevation of Rangely is 5,297 feet.

The landscape of Rio Blanco County is sparsely populated and highly varied ecologically. Much of the public land is administered for multiple use; meaning that recreational uses coexist with oil/gas and mineral production, grazing, logging and other permissible land uses. While these factors are conducive to a wealth of natural resource-based economic and recreational opportunities, they also lead the county to face unique challenges for wildfire mitigation and management.

Land Ownership

Approximately 73% of the county falls under federal ownership and encompasses a diverse range of ecological zones and land uses. The Bureau of Land

Map 1



Management (BLM) manages 56%, primarily in the central and western portions of the county. The USFS manages 17%, mostly located in eastern Rio Blanco County and including parts of the White River and Routt National Forests. Private lands account for approximately 25% of the county land area, while the Colorado Division of Wildlife (CDOW) owns 2% of the total area of Rio Blanco County.

Residential development is concentrated along the White River corridor and along major streams. Outside of Rangely and Meeker, settlement can generally be categorized as vacation homes along the White River and dispersed ranches along water and transportation corridors. Industrial uses (primarily gas, oil, and mining industries) are dispersed throughout the county.

Economy

The economy of Rio Blanco County is primarily based on the use, enjoyment and development of natural resources. Presently, the mining of coal, oil, and natural gas, and the appreciation of wildlife and scenic beauty provide the foundation of economic activities within the county.

According to the 2010 Census, there are 3,254 people employed in the labor force in Rio Blanco County. Of that total, the industries with the largest number of employees were: 810 in the agriculture, forestry, fishing and hunting, and mining industry; 644 in the educational services, and health care and social assistance industry; 326 in the construction industry; 261 in the transportation and warehousing, and utilities industry; and 251 in the retail trade industry.

As pointed out in the 2011 Rio Blanco Master Plan, mining is an important component of Rio Blanco County's economy, and will continue to be in the future. Not all mining is energy-related; nahcolite is another abundant resource in the county that is commercially mined. The Master Plan also points out that agriculture, tourism and retail trade provide a long-term foundation for the economy, although those industries also see fluctuations with changing population and broader economic trends.

Agriculture is also a long-standing industry in Rio Blanco County, which has helped shape the area's culture, economy and way of life. Agriculture is diversified and fairly stable, consisting mostly of ranching (cattle and sheep) and the growing of irrigated and non-irrigated hay, pasture and field crops. In total, approximately 61% of the county is rangeland, 4% is irrigated cropland, and 2% is non-irrigated cropland. Much of the rangeland occurs on federal land, particularly BLM property.

The interrelationships of recreation and tourism, wildlife, and agriculture in Rio Blanco County are significant. Much of the local recreation and tourism industry is based on wildlife and hunting, especially hunting elk and deer, and trout fishing. Populations of elk and mule deer largely depend on access to private agricultural lands in the valleys for winter survival. In return, most ranchers receive considerable benefit from wildlife activities through the leasing of hunting rights, outfitting, and the boarding of hunters. The open spaces associated with traditional agriculture and the scenic views of herds of deer and elk from county roads are valuable assets to tourism and a primary reason for the designation of County Road 8 as a scenic byway. The preservation of agricultural open spaces in the major valleys will be necessary to maintain the recreation and tourism industries in the county.

Climate

The following summary originated in the Rio Blanco County Pre-Disaster Natural Hazards Mitigation Program and Plan, 2003.

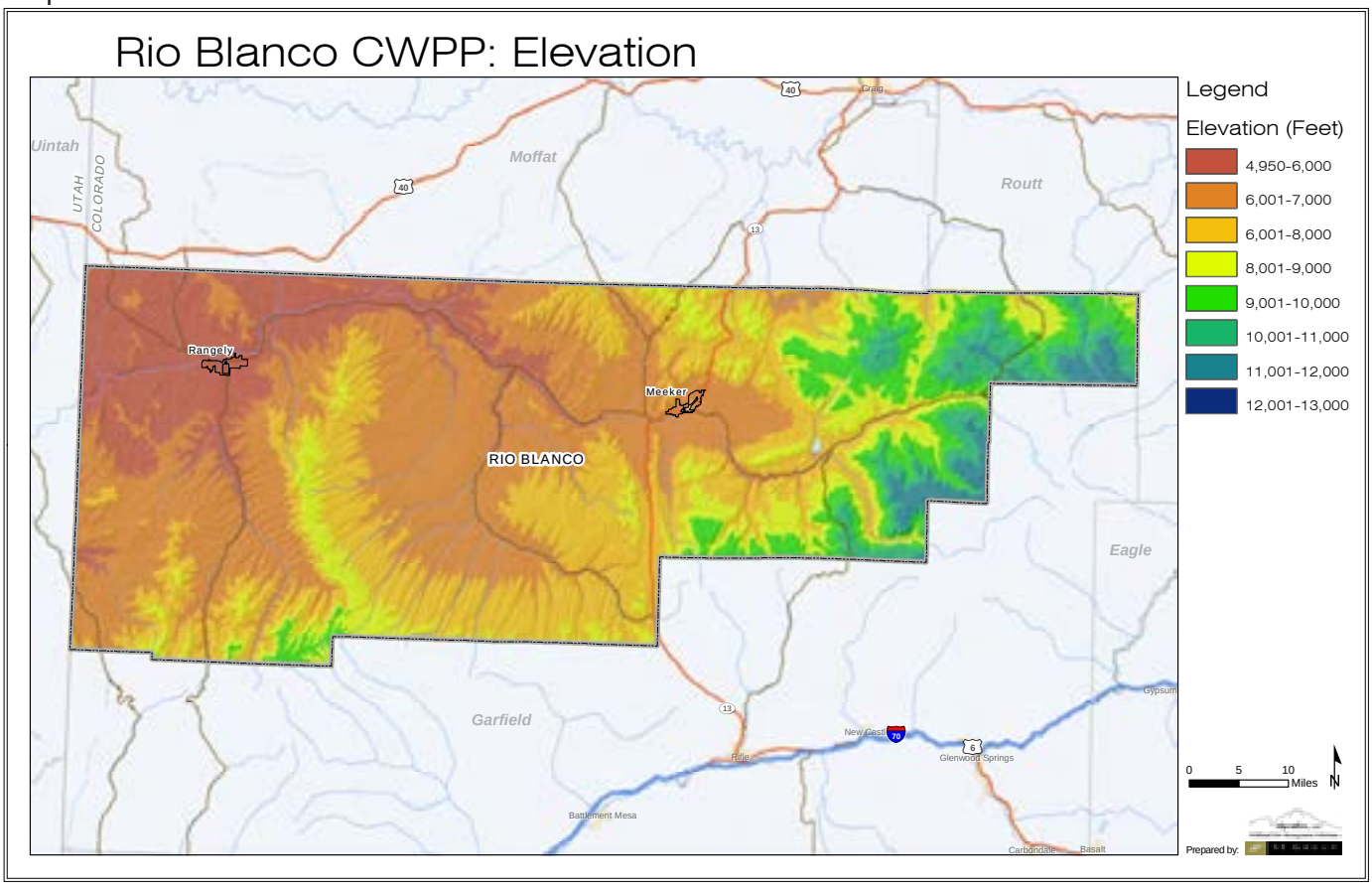
The climate of Rio Blanco County is continental, characterized by dry air, sunny days, clear nights, variable precipitation, moderate evaporation, and large daily temperature changes. Climate is mostly semiarid/high desert in the lower elevations in the western half of the county and along the Utah border. Climate becomes transitional near Meeker and is alpine in the higher elevations of Piceance Basin and eastern Rio Blanco County. Blizzards and extremely frigid conditions occur occasionally (usually due to continental arctic air masses), while severe weather conditions such as tornados and damaging hail are rare.

Changes in topography cause considerable variations in local temperatures, precipitation, and surface winds. Variations in annual precipitation in the county are primarily due to orographic (mountain related) control. Annual precipitation ranges from less than 10 inches near Rangely to greater than 50 inches near Marvine Peaks in eastern Rio Blanco County. Most of the county receives an average of 10 to 20 inches of precipitation per year. Snowfall amounts vary from about 30 inches of snow at the lower elevations to 180 inches of snow at the Marvine Ranch. Most mountainous areas typically receive 30 to 50 inches of annual snow pack.

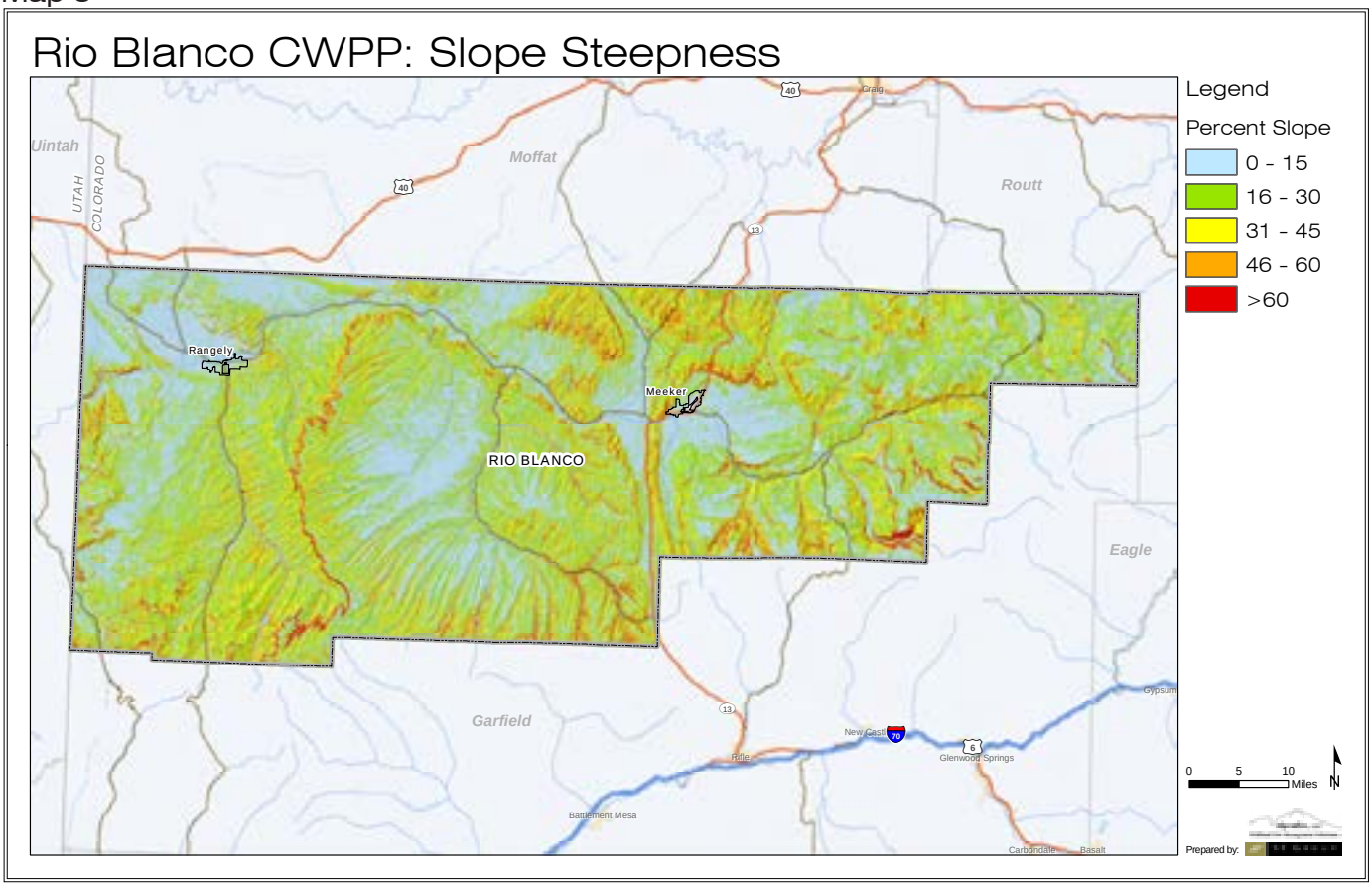
Seasonal and daily temperatures vary with elevation and, to a lesser extent, local microclimates. Daily temperatures (in degrees Fahrenheit) in summer usually range from the upper 40s to the 80s (in mountain terrains) and mid 90s (western valleys). In winter, cold air commonly accumulates in the valleys. Maximum daytime temperatures in winter typically range from 10 to 40 degrees; nighttime temperatures commonly average 20 to 30 degrees colder than daytime temperatures. Extreme temperatures have ranged from -48 degrees (Little Hills in 1963) to 104 degrees (Rangely in 1954). At the higher elevations, freezing temperatures are possible throughout the year and snow may accumulate from October to May. At lower elevations, freezing temperatures and snow accumulation are likely from October to April. Prevailing winds in the upper levels of the atmosphere are mostly from the southwest, but local air movements are strongly influenced by topography.

Natural vegetation cover in the county at elevations generally greater than 7,000 feet primarily consists of conifer and aspen forests; pinon pines, junipers, mixed grasslands, and sagebrush predominate at elevations generally less than 7,000 feet. The conifer and aspen forests are common in the eastern parts of the county and the high elevations along the rim of the Piceance Basin. Pinyon pines, junipers, mixed grassland, and sagebrush are common in the central parts of the county; sagebrush, sparse growths of grasses, pinyon

Map 2



Map 3



pines, and juniper are typical in the western parts of the county. Irrigated and dry-land crops of grains, mixed grasses, and alfalfa hay are grown in the central parts of the county and along stream valleys throughout much of the county.

Average and severe case weather and fuel moisture conditions were determined using records from the local remote automated weather station (RAWS), which collects weather and fuel moisture data specifically for fire danger and fire behavior predictions.

Terrain

Western Rio Blanco County is in the north-eastern part of the Colorado Plateau physiographic province; eastern Rio Blanco County lies within the north-central part of the Southern Rocky Mountains physiographic province. The Grand Hogback, a monoclinic structure of steeply dipping sedimentary strata, traverses the county in a general north-south direction near State Highway 13 and separates the two major provinces. East of the Grand Hogback and the Meeker area, the White River uplift has raised the land to elevations ranging from about 6,000 to 12,000 feet. Subsequent stream and glacial erosion of this topographic high has exposed some of the oldest rocks in the county. West of the Grand Hogback, the Piceance Basin forms the principal geologic structure in the west central part of Rio Blanco County. The basin extends from the Grand Hogback westward to Cathedral Bluffs and contains sedimentary strata rich in oil shale, gas, and alkaline minerals. West of Cathedral Bluffs, in the most western parts of Rio Blanco County, the geologic landforms are controlled mostly by an anticlinal structure known as the Douglas Creek arch. The axis of the arch trends north-south and the arch contains significant resources of recoverable gas and oil.

2.2 WUI General Description

Of Rio Blanco County's 3,226 square miles, approximately 73% falls under federal ownership. The USFS manages 17%, mostly in eastern Rio Blanco County, and the BLM manages 56% in the central and western portions of the county. Private lands account for approximately 25% of the county land area, while the CDOW owns 44,237 acres or 2% of the total area of Rio Blanco County (Rio Blanco County 2003).

Rio Blanco County stretches over a range of elevations and ecosystems. Elevation ranges from 4,950 feet in the high desert to peaks over 12,000 feet. Vegetation types include the greasewood and sage brush of the lower elevations, juniper and Gambel oak shrub and woodlands, and the aspen and mixed conifer forests of the higher elevations. The weather, vegetation, and the resultant fire environments reflect this diversity. For the purposes of the WUI assessment, the county has been divided into four areas (Map 4), roughly corresponding to the county's hazard regions as defined in the pre-disaster mitigation plan (Rio Blanco County 2003).

The WUI has come to include much more than residential areas. To have a true sense of the values at risk to wildfire within an area, one must consider the commerce, industry, and infrastructure that sustain the communities. Major concerns within Rio Blanco County include areas of gas and oil development, mining operations, travel corridors, electrical transmission lines, agricultural areas, cultural landmarks, and watersheds. Such an extensive list of concerns can be overwhelming and requires prioritization according to potential loss of life, susceptibility to unrecoverable damage, and criticality of asset.

The Rio Blanco County WUI will be defined in terms of high density residential, medium housing residential, areas of active oil and gas development, and high priority critical infrastructure.

Map 4

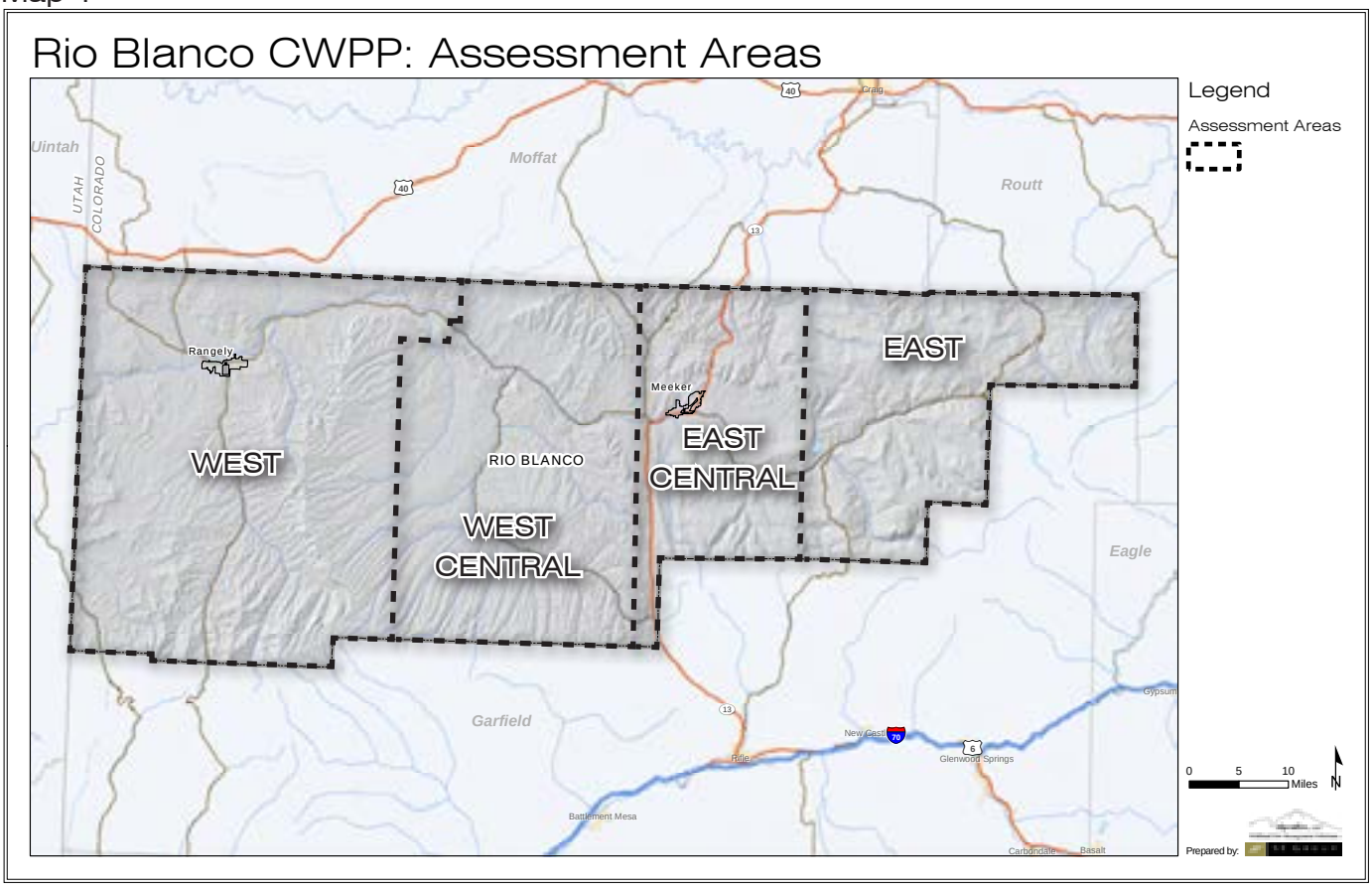


Table 1: Assessment Areas

Area	Corres. Hazard Region	Approx. Size	WUI Areas
West	Northwest, Southwest	1,340 sq mi	Town of Rangely, CO 139 and CO 64 corridors, Douglas area gas fields, Pintado National Historic District, Desperado Mine
West Central	North Central, South Central	800 sq mi	CO 64 corridor, Piceance area gas fields, Piceance SWA, Natural Soda Mine
East Central	East Central, South Central	500 sq mi	Town of Meeker, CO 13 and CR 8 corridors
East	East Uplands	625 sq mi	Village of Buford, CR 8 - White River corridor

Communities

The majority of the county's population is concentrated in the towns of Rangely and Meeker with populations of 2,365 and 2,475, respectively, according to the 2010 Census. The remaining 1,826 residents live in lower density housing patterns, concentrated along travel corridors. The dispersed housing consists largely of vacation homes along the White River and ranches along valley floors.

In its 2011 Master Plan, Rio Blanco County identified future land use mapping (FLUM) catagories that include medium and high density residential development. These classifications are defined as 1 home per 35 acres or more and 1 home per 2 to 35 acres respectively. Each classification allows for denser clusters of homes if the average denstiy is met across the development area. While these areas are not legally zoned, they are intended to provide guidance for future land use codes and zoning. These FLUM areas also represent the county's developing high density WUI and medium density wildland-urban *intermix* very well.

Industry

The Piceance Basin that extends into central Rio Blanco County contains nationally significant deposits of oil shale and nahcolite. Historically the energy and mining industry have constituted a major portion of the county's economy, including tax revenue and employment (Rio Blanco County 2003). Given their criticality and potential exposure to wildfire, the facilities, infrastructure, and life safety of this sector must be considered in the WUI assessment.

The location of at-risk equipment and personnel in the gas fields are transient, subject to where new development is occurring and industry activity as dictated by the marketplace. As such, the areas of greatest concern tend to shift, hence the areas of concern identified in maps in a general sense by the location of gas fields.

Infrastructure

Electrical substations and transmission lines are the most critical and vulnerable to wildfire infrastructure in the county. They are vital to the continuity of operations in the oil, gas, and mining sector, as well as to the population centers of Rangely and Meeker.

Electricity to the eastern end of the county is supplied by the White River Electric Association while the western end is supplied by Moon Lake Electric Association. White River Electric Association is supplied by Tri-state Generation and Transmission Association Inc.

Natural Resources

Agriculture and outdoor recreation constitute significant portions of the county's economy and have been explicitly identified as core community values in the Rio Blanco County Master Plan (2011). While these values are by their nature not part of the WUI, these resources should be considered in any wildfire planning document not only for their intrinsic value, but for their very tangible market value and role in the local economy.

Water quality can be very negatively impacted by wildfire. The White River, reservoirs, and the White River aquifer are susceptible to siltation or contamination by post-fire erosion and runoff. Damage to these water sources would directly impact agriculture, domestic use, and industrial use throughout major portions of the county.

Cultural Sites

There are a number of archeological and historic sites in Rio Blanco County. As home to the Fremont Culture and Ute, the area boasts the Canyon Pintado Historic District and several smaller archeological sites. Additionally, there are a dozen historic settlement sites throughout the county. While these sites may be of modest value to the local tourism industry, their historic significance warrants attention.

2.3 Local Fire Environment

Averaging over 160 fires and over 4,000 acres burned per annum (1993-2011, BLM 2012b) it is clear that wildland fire is a major natural force in Rio Blanco County. The local ecosystems are adapted to, and to a large degree dependent upon, the role of fire. It is incumbent upon communities and industry to become equally adapted to the inevitability of wildland fire as well.

The Rio Blanco County Pre-Disaster Natural Hazards Strategic Mitigation Program and Plan (2003) recognizes two distinct wildfire conditions: 1) normal periodicity wildfires, and 2) drought related wildfires.

Table 2. Ecological Communities

Ecological Community	Acres	% of County
Colorado Plateau Pinion-Juniper Woodland & Shrubland	683,787	33.1%
Inter-Mountain Basins Big Sagebrush Shrubland	356,638	17.3%
Rocky Mountain Aspen Forest and Woodland	224,442	10.9%
Rocky Mountain Gambel Oak-Mixed Montane Shrubland	201,403	9.8%
Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest & Woodland	115,521	5.6%
Inter-Mountain Basins Montane Sagebrush Steppe	103,779	5%
Agriculture	102,629	5%
Rocky Mountain Lower Montane-Foothill Shrubland	73,084	3.5%
Inter-Mountain Basins Greasewood Flat	24,135	1.2%
Southern Rocky Mountain Montane-Subalpine Grassland	20,848	1%
Inter-Mountain Basins Mixed Salt Desert Scrub	18,415	0.9%
Rocky Mountain Montane Dry-Mesic Mixed Conifer Forest & Woodland	17,900	0.9%
Rocky Mountain Subalpine-Montane Riparian Woodland & Shrubland	14,562	0.7%
Inter-Mountain Basins Mat Saltbush Shrubland	12,629	0.6%
Rocky Mountain Subalpine Mesic Meadow	8,284	0.4%
Rocky Mountain Lodgepole Pine Forest	6,982	0.3%
Inter-Mountain Basins Shale Badland	4,471	0.2%
Rocky Mountain Lower Montane Riparian Woodland & Shrubland	4,365	0.2%
Inter-Mountain Basins Semi-Desert Grassland	1,920	0.1%

Only normal periodicity wildfires are consistent with mapping of the wildfire hazard risks. The area west of the Great Hogback experiences the majority of wildfires and wildfire growth potential under most conditions. Under normal conditions, the area east of the Great Hogback is markedly less prone to fire occurrence and growth but is more impacted by drought conditions, displaying a notable increase in fire behavior during drought.

The ecological communities in Rio Blanco County vary widely, from sagebrush and pinion-juniper woodlands in the west to aspen and conifer forests in the high elevations of the east. The county's vegetation types are listed in terms of ecological communities (Table 2), and are described in terms of their fuel characteristics in the hazard section.

The dominant vegetation cover is Utah juniper (*Juniperus osteosperma*) or Rocky Mountain juniper (*Juniperus scopularum*) and pinion pine (*Pinus edulis*) with an understory of sagebrush. This community is characterized by high intensity fires with fire return intervals greater than 150 years (Michels 2008, BLM 2012).

Sagebrush shrublands are the second most common vegetation cover in the county. Basin big sagebrush (*Aretemisia tridentate var. tridentate*) is the most common variety, while mountain big sagebrush (*Artemisia tridentate var. vaseyana*) and Wyoming big sagebrush (*Artemisia tridentate var. wyomingensis*) are also prevalent. Mean fire return intervals in sagebrush are often less than twenty years, and fire suppression allows for the encroachment of pinion-juniper woodlands (Miller et al. 2001). Gamble oak (*Quercus gambelii*) is another common shrub type with a short fire return interval that can be found in dense stands throughout the county.

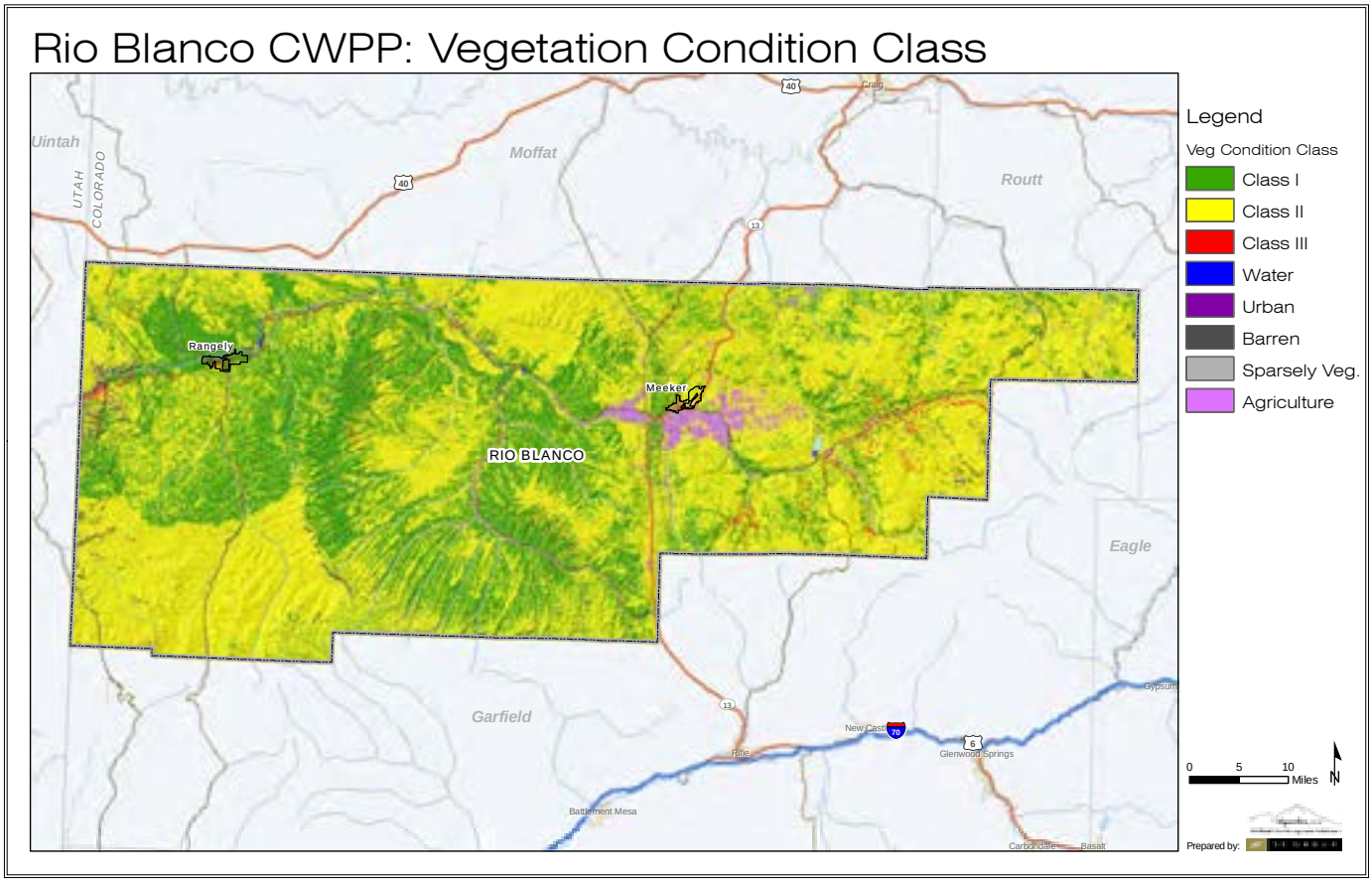
In the eastern portion of the county, and in isolated pockets throughout the rest of the county, a mix of forest types can be found. These include ponderosa pine (*Pinus ponderosa*) forests with low intensity fire return intervals as frequent as ten to twenty years, mixed conifer forests of ponderosa pine and Douglas fir (*Pseudotsuga menziesii*) with a mix of fire severity and frequency, and Englemann spruce (*Picea engelmannii*)-subalpine fir (*Abies lasiocarpa*) forests that may not experience fire for decades or even centuries (BLM 2012a).

The LANDFIRE program (USGS 2011) determines vegetation condition class by identifying the degree departure from historic conditions in terms of species composition and structural stage. This provides insight

into the health of an ecosystem as well as the potential for fuel build-up. The results from LANDFIRE are inconsistent with the fire regime condition class as determined by the BLM (2012a). Though both recognize the majority of the county as moderately divergent from historic conditions, LANDFIRE indicates the remainder of the vegetation communities are in a low departure state while the BLM identifies the remainder as high departure condition.

While further discussion of this incongruity is merited, several key points can be asserted. Sagebrush steppe experiences relatively frequent fire, the absence of which leaves it prone to pinion-juniper encroachment. The degree to which fire exclusion has impacted sagebrush communities in Rio Blanco County may not be fully understood. The pinion-juniper woodlands and spruce-fir forests of Rio Blanco County experience fire much less frequently. As a result, the impact of fire exclusion is far less of an issue in these ecological communities.

Map 5


Rio Blanco CWPP: Vegetation Condition Class
Uintah
UTAH
COLORADO
Moffat
Routt
Eagle
Garfield
RIO BLANCO
Rangely
Meeker
Battlement Mesa
Glenwood Springs
Carbondale
Basalt
Gypsum
Legend
Veg Condition Class
Class I
Class II
Class III
Water
Urban
Barren
Sparsely Veg.
Agriculture
0 5 10
Miles
N
Prepared by:

3: hazard/risk assessment

Hazard and risk are terms that have distinct meanings as they pertain to mergency management. A hazard is a natural or man-made agent of harm. In the specific context of wildland fire, hazard is often described in terms of fire behavior as dictated by the characteristics of fuels, weather, and topography. Risk is a measure of potential damage or loss contingent upon the probability of a harmful event (Texas Engineering Extension Service 2009).

This section illustrates hazard through a description of wildland fuels and potential fire behavior. Ignitions are analyzed in terms of seasonal occurrence, geographic location, and cause. The risk analysis is based on community assessments that study the local hazards (potential fire behavior as an agent of harm) and vulnerability of assets (subdivision attributes and general characteristics of the homes as indicators of consequences).

3.1 Modeling Assumptions and Parameters

The resolution and precision of fire behavior modeling in this study can be useful for strategic planning but should not be relied upon to provide accurate detailed predictions. The limitations of the input data as well as the fire behavior models themselves should be considered when applying the outputs of this study.

LANDFIRE Data- The geographic data are derived from LANDFIRE 1.0.2 (USGS) completed in 2010. This dataset is in 30 meter resolution from imagery obtained from 1999 through 2003. Comparisons between LANDFIRE fuel models and photo points taken in 2012 indicate that while the data represent the general characteristics of the jurisdiction's fuels at the strategic level, the accuracy is variable at the tactical or neighborhood level.

Fuel Models- The standard fire behavior fuel models (Scott and Burgan 2005) were used for fire behavior modeling. Agricultural lands were changed from a non-combustible fuel model to low load very coarse humid climate grass (grass model 6). While the variability of fuel conditions on agricultural lands make it very difficult to model, converting it to a combustible fuel model at least represents its potential to burn.

Modeling Tools- Geographic fire behavior modeling was performed using FlamMap 5.0.1.1 (Finney et al. 2012).

Fuel Moisture Data- Historic fuel moistures were taken from six RAWS. The 1-hour, 100-hour, 1000-hour, woody and herbaceous live fuel moistures are all derived from algorithms based on 13:00 MST daily weather observations.

The fire season was identified from historic fire occurrence data, and moderate and severe fuel moistures were identified for the months of June through September. This was based on percentile weather analysis for the Energy Release Component using the FireFamily Plus 4.1 program (Bradshaw 2009). The same data were also analyzed by creating multi-station special interest groups for each assessment area. These two approaches yielded virtually identical results for dead fuel moistures.

Live fuel moisture values were determined using the National Fuel Moisture Database, and live woody fule moistures were calibrated for each assessment area using the local RAWS stations. Live woody fuel moistures of below 80% in Juniper and below 75% in sagebrush are thresholds that indicate an increased potential for large fire growth and problematic fire behavior (BLM 2012a).

Fire Occurrence Data- Geographic fire occurrence data was available for federal fires from 1980 through 2011 (BLM 2012b). Fire occurrence data from 1983 through 2011 was used for analysis with the program FireFamily Plus.

3.2 Ignitions Profile

Wildfires are a common occurrence in Rio Blanco County. Over the past thirty years (1980–2011) there has been an average of 115 fires per annum burning an average of 3,485 acres a year. Looking at just the past 18 years (1993–2011) those averages increase to 160 fires and 4,154 acres per annum, indicating an increase in fire frequency and size.

Fire records for 1993 through 2011 were evaluated using the FireFamily Plus program (Table 4). Fire records were obtained from the National Wildfire Coordinating Group's (NWCG) Fire and Aviation Management Web (FAMWEB) program. The fire records used were USFS fires on the Blanco District of the White River National Forest and fires occurring south of Rio Blanco County's northern border within the South Zone of the BLM's Craig Interagency Fire Danger Planning Area. Fires not recorded in the federal data sets were not included.

Most of wildland fires in Rio Blanco County (93%) result from lightning strikes and occur on BLM land. Debris burning is distant second cause. Of the seventeen fires larger than 1,000 acres since 1993, only three were caused by humans, all by campfires. This is of obvious significance to wildfire prevention programs, indicating that the criticality of fire patrol and detection within the county.

Rio Blanco's fire season runs from May or June through September, peaking in July. This is consistent with lightning from summer storms being the primary cause of fires. While the earlier comparison of the 18-year and 30-year average seems to indicate an increase in fire activity, the histogram of fires by year does not indicate a discernible upward trend, but rather a peak around the turn of the century. Colorado state records, however illustrate a marked increase over the past five decades in acres burned.

Seventy-four percent of fires in the past eighteen years have remained under 1/4 acre in size, and ninety-one percent of fires have been less than ten acres. Forty-eight percent of fires occur on the same day as one or more other fires. This sort of fire occurrence pattern may be used to configure suppression resources into squads or engine crews that can be split-up to deal with smaller fires independently. While this information may seem self-evident to local firefighters, it can prove helpful when ordering or briefing severity crews.

Table 4. Fires >1000 acres in Rio Blanco County, 1993-2011.

DiscoveryDate	Acres	FireName	Lat	Long	Agency
7/19/2002	17056	BIG FISH	39.9942	-107.2867	USFS
6/6/2004	7815	GREASEWOOD	39.9508	-108.1889	BLM
7/22/2000	4030	SCANDARD	39.775	-108.2228	BLM
7/30/2002	3906	N BARCUS	40.0983	-108.435	BLM
8/7/2009	3603	MELLON	40.1592	-108.9497	BLM
7/12/1994	3190	UTE CREEK	39.965	-107.475	USFS
7/7/2005	2896	PACK TRAIL	40.0461	-108.1061	BLM
7/17/1999	2280	PINTO MESA	40.0408	-108.3964	BLM
6/22/2002	2141	PINYON RID	40.2294	-108.3961	BLM
8/12/2001	1919	JELLY	40.0739	-108.4808	BLM
6/26/1994	1798	FLETCHER2	40.1333	-108.6339	BLM
7/20/2000	1589	SWITCHBACK	40.0806	-108.6383	BLM
6/16/2003	1503	YANKEE GUL	39.7803	-108.4369	BLM
9/30/1999	1384	WAGONROAD	39.775	-108.5108	BLM
7/28/2009	1340	SPRING CREEK	40.0242	-108.5978	BLM
7/4/2001	1133	E GREASEWD	40.0839	-108.4697	BLM
8/25/2008	1031	JORDAN	40.1136	-108.0328	BLM

Figure 1

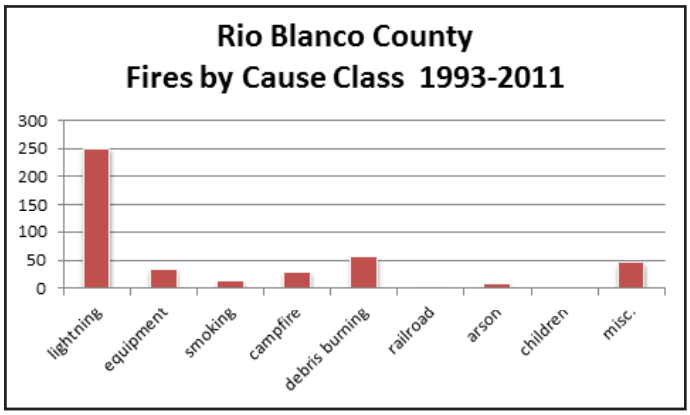


Figure 2

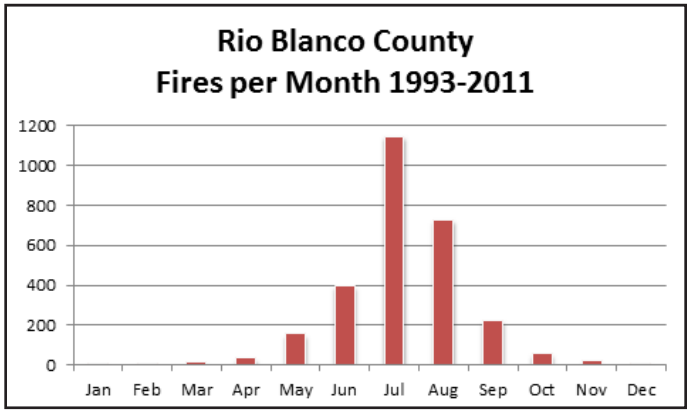


Figure 3

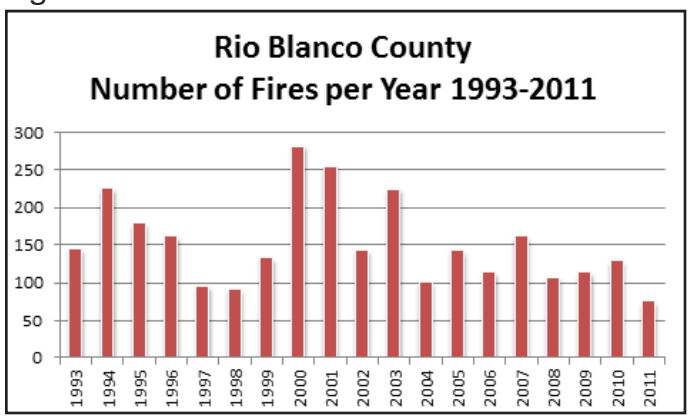
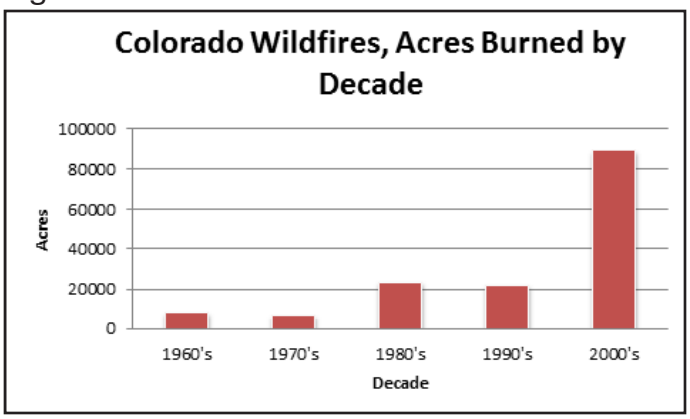


Figure 4



(CSFS: http://csfs.colostate.edu/pages/documents/COLORADOWILDFIRES_reprt_table_cb_000.pdf)

Figure 5

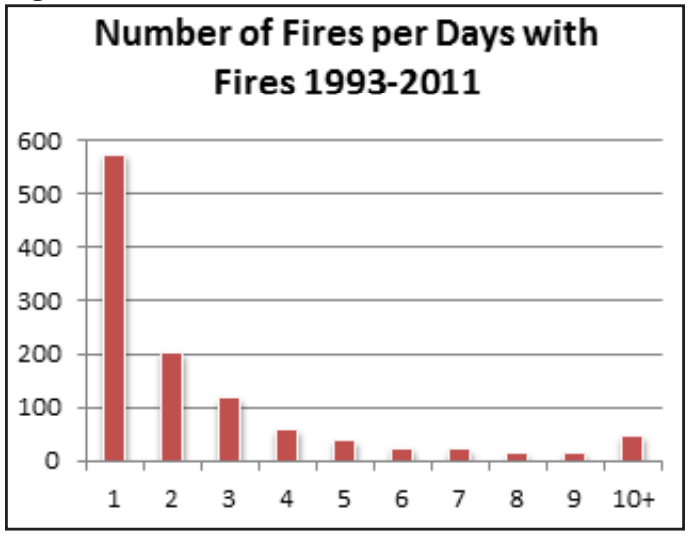
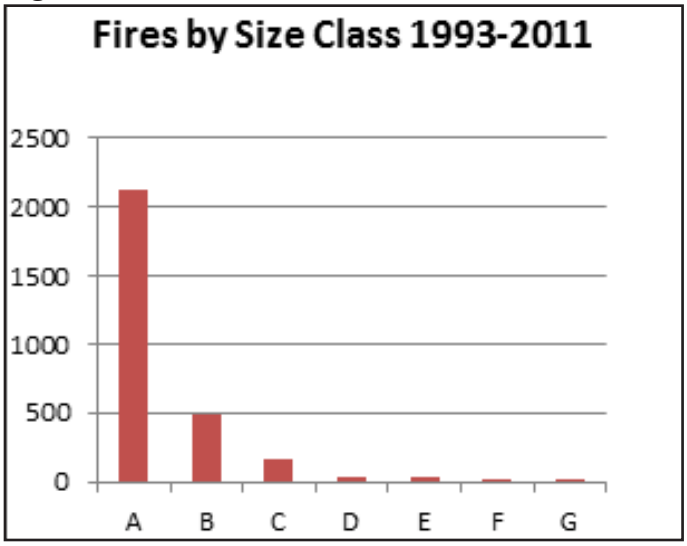
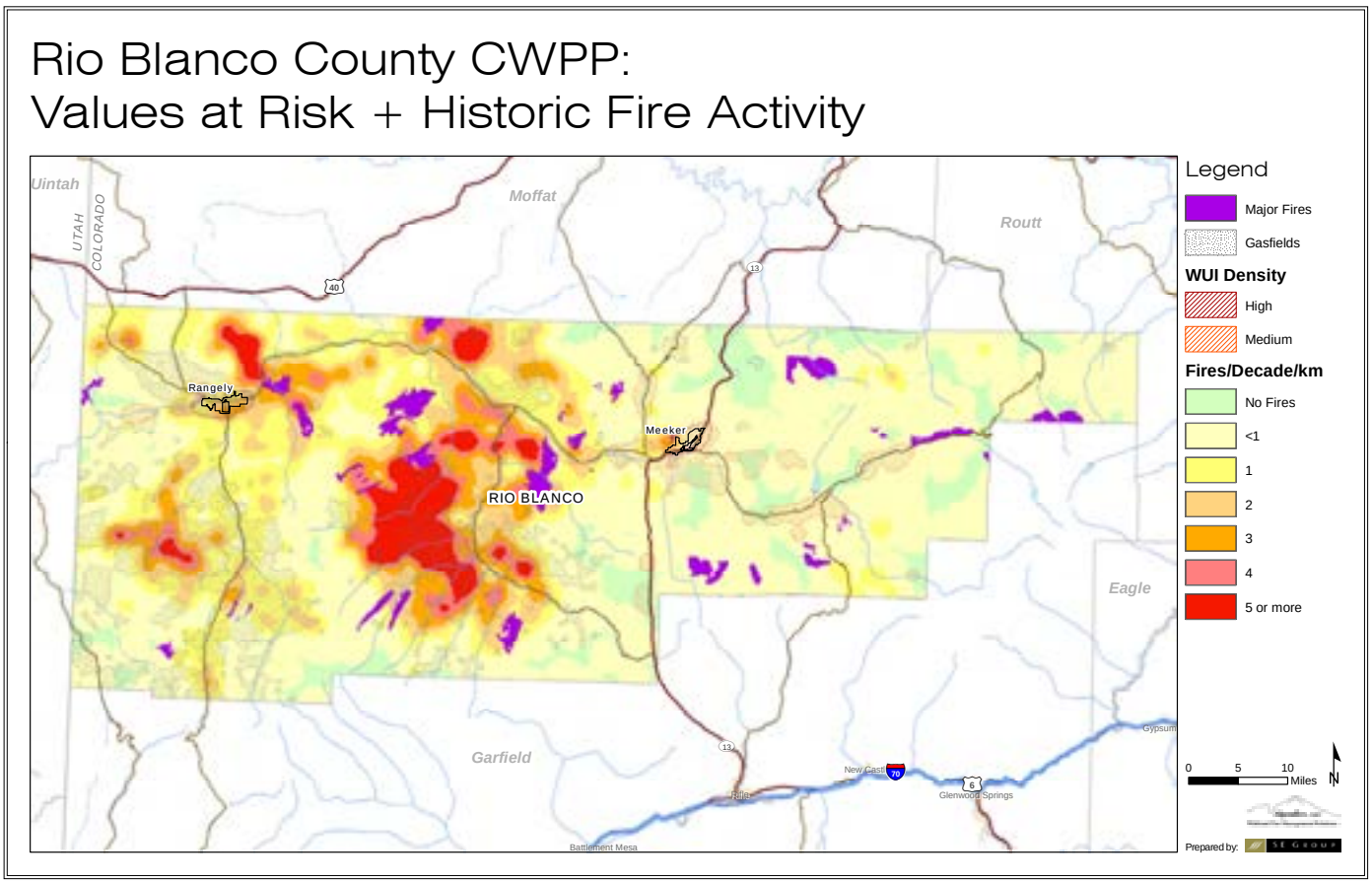


Figure 6



Fire size class: A<1/4 ac, B= 1/4 to 9 ac, C= 10 to 99 ac, D= 100 to 299 ac, E= 300 to 999 ac, F= 1,000 to 4999 ac, G> 5,000 ac

Map 6



3.2.1 Geographic Distribution

Ninety-three percent of the county's fires occur west of the Great Hogback or Highway 13.

Table 3. Proportion of Wildland Fires by Assessment Area, 1980–2011

Assessment Area	% of Fires
West	46%
West Central	47%
East Central	3%
East	4%

Table 5. Standard Fuel Models by Percent of Surface Cover in RBC.

Fuel Model	West	West Central	East Central	East	County
NB1: Urban	<1%	<1%	1%	<1%	<1%
NB3: Agriculture	<1%	1%	7%	<1%	2%
NB8: Water	<1%	<1%	<1%	<1%	<1%
NB9: Bare ground	2%	2%	<1%	1%	1%
GR1: Short, sparse dry climate grass	5%	5%	8%	5%	6%
GR2: Low load, dry climate grass	4%	3%	2%	2%	3%
GS1: Low load, dry climate grass-shrub	13%	16%	7%	2%	11%
GS2: Moderate load, dry climate grass-shrub	41%	39%	30%	10%	33%
SH1: Low load dry climate shrub	2%	1%	<1%	1%	1%
SH2: Moderate load, dry climate shrub	1%	<1%	2%	<1%	1%
SH5: High load, dry climate shrub	19%	20%	4%	<1%	14%
SH7: Very high load, dry climate shrub	2%	5%	20%	5%	6%
TU1: Low load dry climate timber-grass-shrub	1%	1%	11%	30%	8%
TU2: Moderate load, humid climate timber shrub	<1%	<1%	<1%	<1%	<1%
TU5: Very high load, dry climate timber-shrub	<1%	<1%	2%	24%	5%
TL1: Low load compact conifer litter	<1%	<1%	<1%	<1%	<1%
TL2: Low load broadleaf litter	<1%	<1%	<1%	<1%	<1%
TL3: Moderate load conifer litter	8%	6%	6%	18%	9%
TL5: High load conifer litter	<1%	<1%	<1%	<1%	<1%
TL6: Moderate load broadleaf litter	<1%	<1%	<1%	<1%	<1%
TL8: Long-needle litter	1%	<1%	<1%	1%	1%

Most Common | 2nd Most Common | 3rd Most Common

3.3 Hazard Profile

No single composite hazard was created as in some reports. While this can be a helpful and simple illustration for the lay person, the subjectivity and lack of standard methodology limit the utility of the results.

Wildfire hazard is identified in terms of potential fire behavior. This section examines the characteristics of vegetation, climate, and terrain and their effect on fire behavior. Potential fire behavior is modeled using moderate and severe fuel moisture conditions. Predicted flame length and crown fire potential are then used to identify hazard.

Hazard is illustrated by the fire behavior outputs of flame length, crown fire potential, and rate of spread.

3.3.1 Fuels

Fuels are described using Scott and Burgan's (Scott and Burgan 2005) Standard Fire Behavior Fuel Models. Geographic fuel models were obtained from the LANDFIRE data base (USGS 2010). Field visits

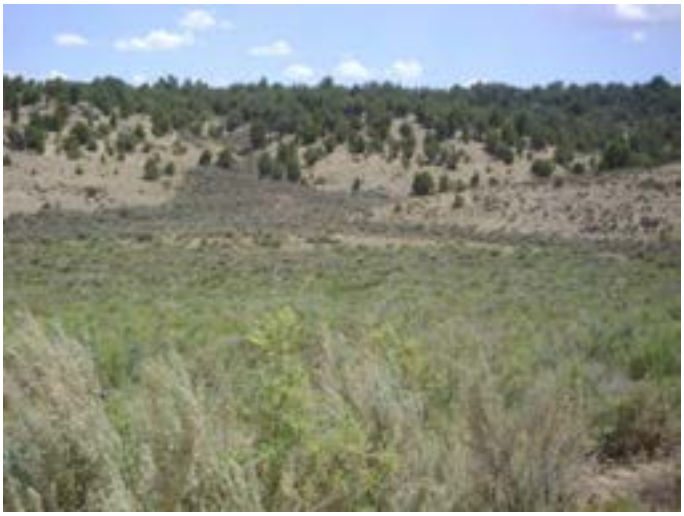
using photo series were conducted to determine the quality of the data. The LANDFIRE data provide a sound basis for generalized hazard evaluation at the strategic level as required for this report. It lacks the precision desirable for more detailed analysis, such as fire behavior modeling for specific incidents.

Grass

GR1: Short, Sparse Dry Climate Grass
Short grass that is patchy and possibly heavily grazed. Spread rates are moderate; flame length is low.

GR2: Low Load, Dry Climate Grass
One foot high, low density grass. Low flame length and rate of spread. Moderate flame lengths and moderate to high rates of spread. Fire behavior is characterized by high rates of spread and moderate flame lengths.

GR1 emerging from a fire scar.



A mix of GS2 in the foreground, transitioning to greener GS1, then to the short grass of GR1 on the slope, and eventurally the high load shurb of SH5 in the background.

Brush

GS1: Low Load, Dry Climate Grass-Shrub
Low density grass and shrub approximately 1 foot high. Moderate spread rate and low flame length. Represents conditions found in sage brush and pinion-juniper woodlands.

GS2: Moderate Load, Dry Climate Grass-Shrub
Shrubs are 1 to 3 feet high, grass load is moderate. Spread rate is high; flame length moderate. Fire behavior is characterized by high spread rates and moderate flame lengths. Characteristic of sage brush.

SH5: High Load, Dry Climate Shrub
This is a heavy shrub load 4 to 6 feet high. Fire behavior exhibits very high rates of spread and flame lengths. Typical of thick pinion-juniper woodlands.

SH7: Very High Load, Dry Climate Shrub
This is a heavy shrub and litter load with a fuel bed 4 to 6 feet high, exhibiting high spread rates and very high flame lengths. This is largely representative of Gambel oak in this area.

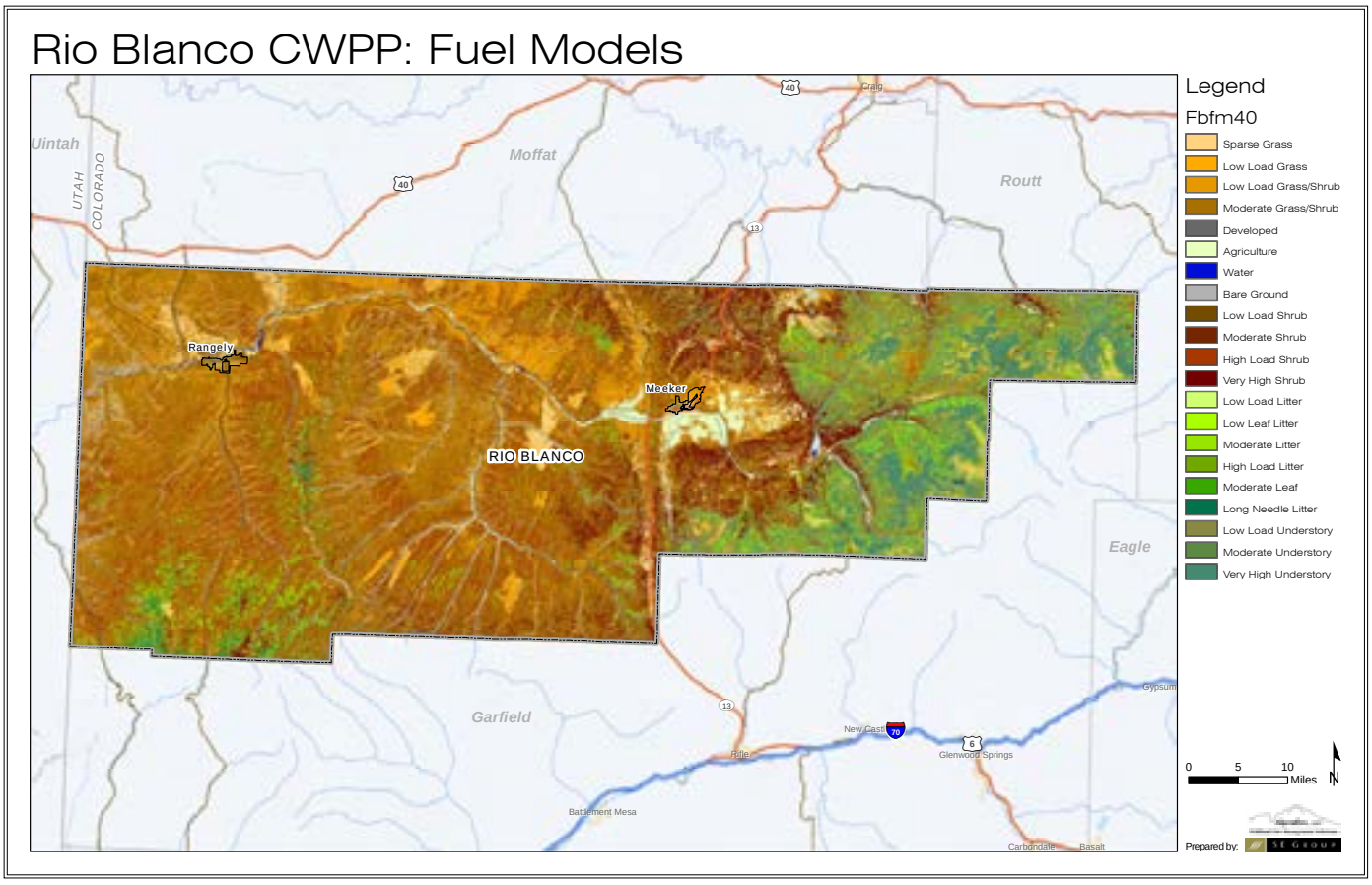
Timber

TU1: Low Load, Dry Climate Timber-Grass-Shrub
This is relatively light grass and shrub loads that support low rates of spread and flame lengths. Typical of aspen/mixed conifer or montane mixed conifer stands.

TU5: Very High Load, Dry Climate Timber-Shrub
Surface fire is carried by heavy forest litter with a shrub or small tree understory. Fire behavior is characterized by moderate spread rates and flame lengths. This is typical of spruce-fir stands in the eastern part of the county.

TL3: Moderate Load Conifer Litter
This is a relatively light load of coarse fuels that supports low flame lengths and very low spread rates. This may be used for some pinion-juniper stands, as well as aspen/mixed conifer or montane mixed conifer stands.

Map 7



The hillside along the White River has a mix of TL3 and TU5.

3.2.2 Potential Fire Behavior

Moderate and severe case fuel moisture conditions for the typical fire season of June through September were determined using records from the local RAWS, which collects weather and fuel moisture data specifically for fire danger and fire behavior predictions.

Each of the assessment areas has slightly different inputs for fire behavior based on slightly different climatic conditions indicated by the relevant RAWS. Maps were created for each of the four assessment areas based on fuels and slope for two climatic scenarios:

1. Moderate fuel moistures (50th percentile) with 10 mph 20 foot winds
2. Severe fuel moistures (90th percentile) with 15 mph 20 foot winds

Potential fire behavior was modeled geographically utilizing the FlamMap program (Finney et al. 2004). Crown fire potential was modeled using the Scott algorithm option. FlamMap was used to illustrate flame lengths, crown fire behavior, and rate of spread for each of the four assessment areas.

Table 6. Remote Access Weather Stations

Assessment Area	Station Name	Station ID	Elevation (feet)	Years of Data Used
West	Dinosaur	050105	5960	1993, 1998-2011
West	Dragon Road	051407	6240	1993-2011
West Central	Pinto	051402	6660	1993-2011
West Central, East Central	Ernie Gulch	051408	7000	1993-2011
East	Deadhorse	051404	8960	1993-2011
East	Hangman	051608	7834	2006-2011

Table 7. Moderate & Severe Case Fuel Moisture Conditions

Assessment Area	Conditions	1 hr Fuel Moisture	10 hr Fuel Moisture	100 hr Fuel Moisture	Herbaceous Live Fuel Moisture*	Woody Live Fuel Moisture
West	Severe	2%	2%	4%	30%	70%
	Moderate	3%	4%	7%	90%	106%
West Central	Severe	2%	3%	4%	30%	75%
	Moderate	4%	5%	7%	90%	117%
East Central	Severe	3%	3%	6%	30%	75%
	Moderate	5%	6%	10%	100%	117%
East	Severe	4%	6%	6%	40%	134%
	Moderate	6%	11%	11%	110%	152%

3.4 Risk Assessment

Values at risk for the WUI in each of the four assessment areas are categorized as communities, industry, infrastructure, or cultural sites. These categorizes were briefly introduced in the preceding WUI General Description (section 2.1), and are here discussed in terms of their vulnerability to wildfire within each of the four assessment areas. Specific areas and facilities were rated using the NFPA form 1144, Wildland Fire Risk and Hazard Severity Form in conjunction with the modeled fire behavior for the area. Assessments from the 2006 wildland fire management plan were also utilized where applicable. Areas are rated as Low, Moderate, High, or Extreme.

Communities

Communities are categorized as high density, medium density, and low density or dispersed. High density communities are the towns of Meeker and Rangely. Moderate density WUI areas are found adjacent to these towns and along Highways 64, 139, 13, and County Roads 6, 7, and 9. Low density areas dispersed throughout the county and are not specified on these maps.

Industry

The primary industry in Rio Blanco County is natural gas extraction and mining. These sites are often remote and are generally defensible against wildland fire due to the fire resistant nature of the structures and the vegetation clearance associated with installation. Activity at these locations is variable depending on the stage of development. Gas field sites are most active and vulnerable to wildfire during drilling and the initial establishment of gathering systems. Once the infrastructure is in place, equipment and personnel are moved away from the area, leaving a system of pipes that are less susceptible to damage from wildfires. Permanent compressor stations tend to have low level staffing and substantial vegetation clearance.

General concerns in these areas are:

1. The transient nature of personnel (including man-camps) and equipment, making it difficult to prioritize and track values at risk.
2. Notification and evacuation of sites.
3. Pipelines that can be damaged by heavy machinery used in fire suppression.
4. Maintenance of vegetation clearance around permanent facilities.

Infrastructure

Electrical transmission infrastructure has been identified as the primary concern in both the county's pre-disaster plan (Rio Blanco County 2003) and the wildland fire management plan (Rio Blanco County 2006). Communication towers and VOR transmission sites are also critical infrastructure sites within the county. Mitigation of hazardous fuels around these sites has benefits that extend far beyond the immediate treatment area or even the county as a whole. These sites are often components of interstate networks, and the damage from a wildfire can have large-scale regional impacts. Much of this infrastructure is located on federal lands. As such, fuels treatment is often performed by or must be coordinated with the BLM or other agencies.

Such projects require compliance with the National Environmental Protection Act (NEPA). While this is often provided for as a stipulation of easement maintenance in the original NEPA documents, the coordination of multiple mitigation projects under a single program may afford a more efficient NEPA process where necessary.

Natural gas pipelines are generally not at great risk of damage from wildland fires. These steel pipes are buried underground, insulated from the impacts of the typically fast moving fires of Rio Blanco County. Damage to these pipelines may be of concern where heavy equipment is being used in fire suppression or defensive operations. The location of all transmission and gathering pipelines should be clearly marked.

Projects involving critical infrastructure will require coordination between the BLM, Rio Blanco County, and the relevant infrastructure owner. Western Area Power Authority is already coordinating GIS data directly with the county. Specific locations of

critical infrastructure are not included in this public document.

See Appendix C for specific detail on priority areas within each of the following Assessment Areas.

3.4.1 Western Area

The western assessment area is defined by the boundaries of the Rangely Rural Fire Protection District. The fuels in this area are predominantly moderate load grass-shrub and high load shrub characteristic of the sagebrush steppe and pinion-juniper woodlands that dominate the area. Under moderate fire season conditions, the moderate load sagebrush can sustain flame lengths up to 8 feet, while the high load areas can support flame lengths of over eleven feet. Crown fire potential under moderate conditions is primarily passive crown fire. Under severe fire season conditions the majority of the area can experience flame lengths over 11 feet and active crown fire throughout the pinion-juniper woodlands.

Communities

The Town of Rangely is the only incorporated town in this part of the county. Located on the south bank of the White River, the town is classified as high density WUI tapering to moderate density WUI north of the river. Moderate density WUI extends for approximately ten miles to the west along County Road 2.

The fuels adjacent to these WUI areas are predominantly light to moderate grass and grass-shrub. This results in expected flame lengths below 8 feet in both moderate and severe conditions with the exception of isolated bands of dense fuels along the river. Fire behavior modeling predicts the absence of crown fire near these WUI areas, though torching is possible in isolated pockets of juniper or poorly maintained areas of introduced trees.

A neighborhood in Rangely with moderate load brush fuels adjacent to homes.

Area or Facility	Risk Rating
Dragon Trail Plant	Moderate
Southwest Rangely: Hillcrest Cir. & La Mesa Cir. Areas	Moderate
County Road 2	Moderate
South Rangely: Taos Dr. & Crest St. areas	Moderate
Deserado Coal Mine	Low
Chevron CO_2 Plant	Low

The river and light fuel loads afford relatively good protection along the northern edge of Rangely. The areas of greatest threat to structures lie on the southwest edge of town where sagebrush is found in close proximity to structures. These conditions can be found along Taos Drive as well as Crest Street, Hillcrest Circle, and La Mesa Circle where slopes in excess of 20 degrees increase the potential fire behavior. These areas were all rated moderated, though Hillcrest Circle and La Mesa Circle were very close to rating high. While the relatively low sagebrush can appear benign, a wind driven fire in these areas has the potential to threaten numerous structures quickly, potentially exceeding the capabilities of local responders.

The moderate density WUI extending west of Rangely is characterized by relatively large lots on flat terrain that have been partially cleared of sagebrush in most cases. Of concern on many of these properties are the numerous outbuildings and outside storage of combustibles. Sheds, firewood, stored building materials, and other items are often more susceptible to ignition from grass fires or embers than a typical home. This can rapidly result in fire spreading to the primary residence on the property.

The Rangely area is also home to several larger ranches. Some ranchers have expressed an interest in allowing fire to burn on their land under certain circumstances

for rangeland restoration benefits. The Cripple Cowboy Cow Outfit Inc. has entered into an MOU for fire management with the county.

Industry

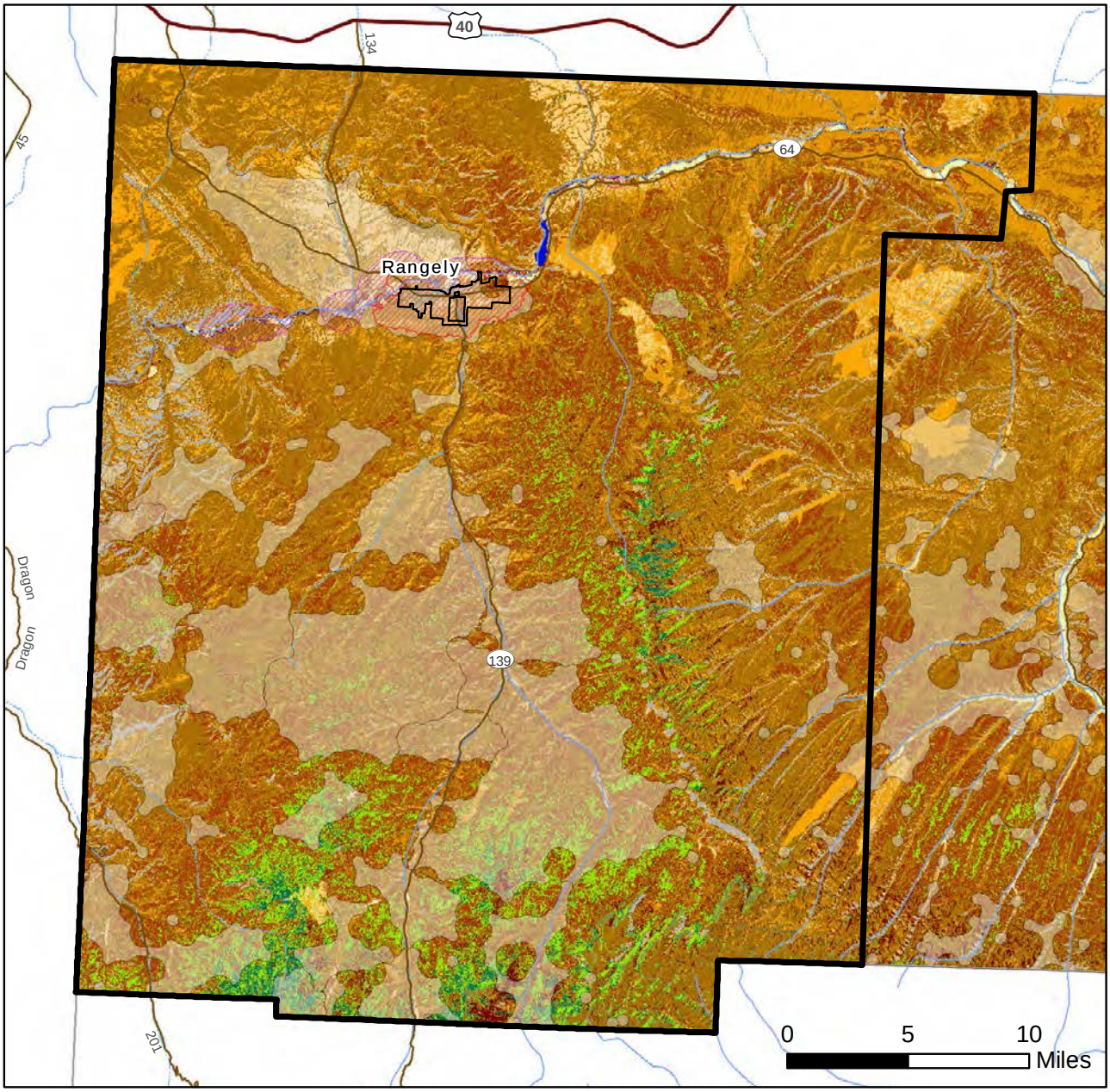
The western area of Rio Blanco County has extensive gas field development as well as the Deserado coal mine. The Deserado mine is located 7 linear miles northeast of Rangely. While surrounded by brush fuels, the surface facilities have substantial defensible space. Primary issues for this site in the event of a wildfire will likely be continuity of operations due to compromised road access or air handling systems.

The Chevron CO_2 plant is located 4 miles west of Rangely on Highway 64. There is good access to and substantial defensible space around the entire facility. The Encana Dragon Trail Plant is more remote, approximately 20 miles south of Rangely, in heavier brush fuels with less defensible space. The Dragon Trail and Rabbit Mountain areas have numerous pump units and extensive infrastructure as well.

Cultural Sites

The western area of Rio Blanco County is rich in archeological sites, hosting the Canyon Pintado National Historic District, as well as other sites. In total, there are sixteen listed historic and archeological sites in this area, mainly concentrated south of Rangely along Highway 139 and County Road 23. These sites are generally resistant to wildland fires and pose little life safety risk and were not individually assessed.

Assessment Area: West
Fire Behavior Fuel Models

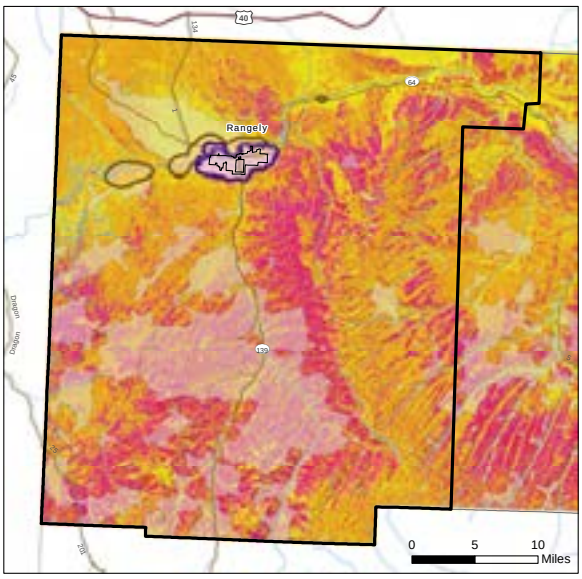


Legend

Gasfields	Low Load Grass	Water	Very High Shrub	Moderate Leaf
WUI Density	Low Load Grass/Shrub	Bare Ground	Low Load Litter	Long Needle Litter
High	Moderate Grass/Shrub	Low Load Shrub	Low Leaf Litter	Low Load Understory
Medium	Developed	Moderate Shrub	Moderate Litter	Moderate Understory
Sparse Grass	Agriculture	High Load Shrub	High Load Litter	Very High Understory

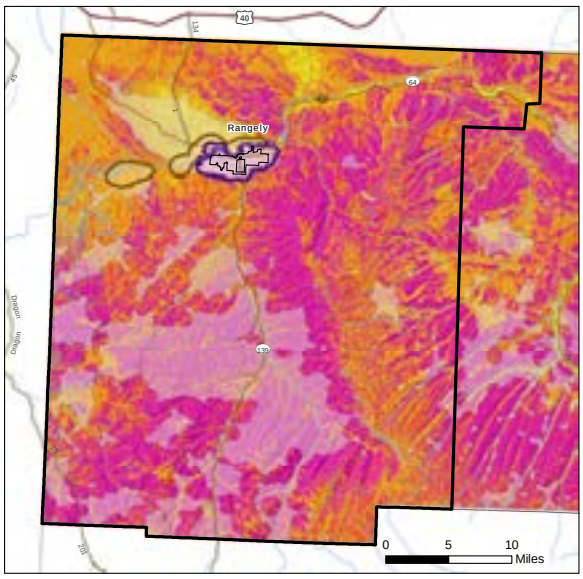
Assessment Area: West
Fuel Behavior Model Results

Flame Length: Moderate Conditions, 10 mph West Winds



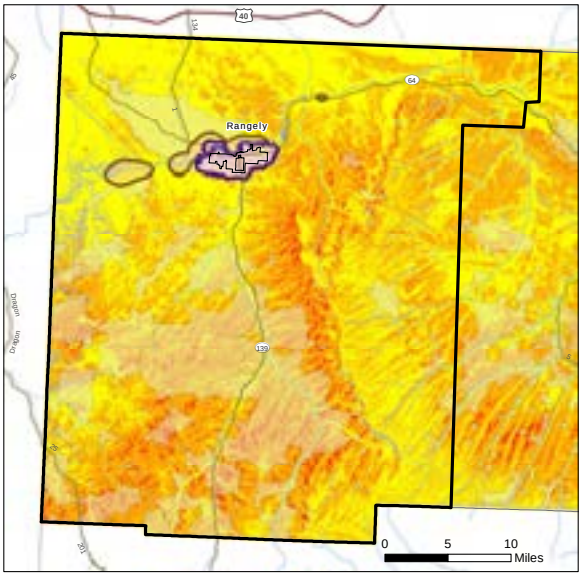
Legend
Gasfields
WUI Density
High
Medium
Flame Length
4-8' Flames
Fire Resistant
8-11' Flames
0-4' Flames
>11' Flames

Flame Length: Severe Conditions, 15 mph West Winds



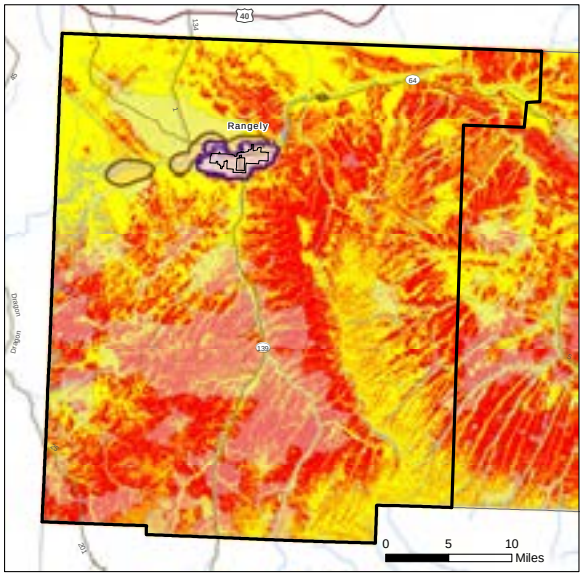
Legend
Gasfields
WUI Density
High
Medium
Flame Length
4-8' Flames
Fire Resistant
8-11' Flames
0-4' Flames
>11' Flames

Crown Fire Potential: Moderate Conditions, 10 mph West Winds



Legend
Gasfields
WUI Density
High
Medium
Fire Resistant
Surface Fire
Passive Crown
Active Crown

Crown Fire Potential: Severe Conditions, 15 mph West Winds



Legend
Gasfields
WUI Density
High
Medium
Fire Resistant
Surface Fire
Passive Crown
Active Crown

3.4.2 West Central Area

This area extends from the eastern border of the Rangely Rural Fire Protection District to Highway 13 and encompasses the northern end of the Piceance Basin. The area is dominated by pinion-juniper woodlands with a substantial sagebrush component. The west central area has the highest concentration of wildfires in the county and the potential for extreme fire behavior across much of the area even under moderate fire season conditions. Fortunately the region is largely uninhabited.

Area or Facility	Risk Rating
Natural Soda Mine	Moderate
Enterprise central treating facility	Moderate
Enterprise Meeker gas plant	Moderate
East end of Highway 64 neighborhood	Low
Meeker Massacre historic site	Low

Communities

The central west area is the least populous area of the county. Residential areas are limited to low density population at the east end of Highway 64, 10 to 15 miles west of Meeker. These easily accessible homes are on agricultural lands along the White River and will be low risk in all but the most severe conditions.

The Natural Soda mine located in the Piceance Basin.

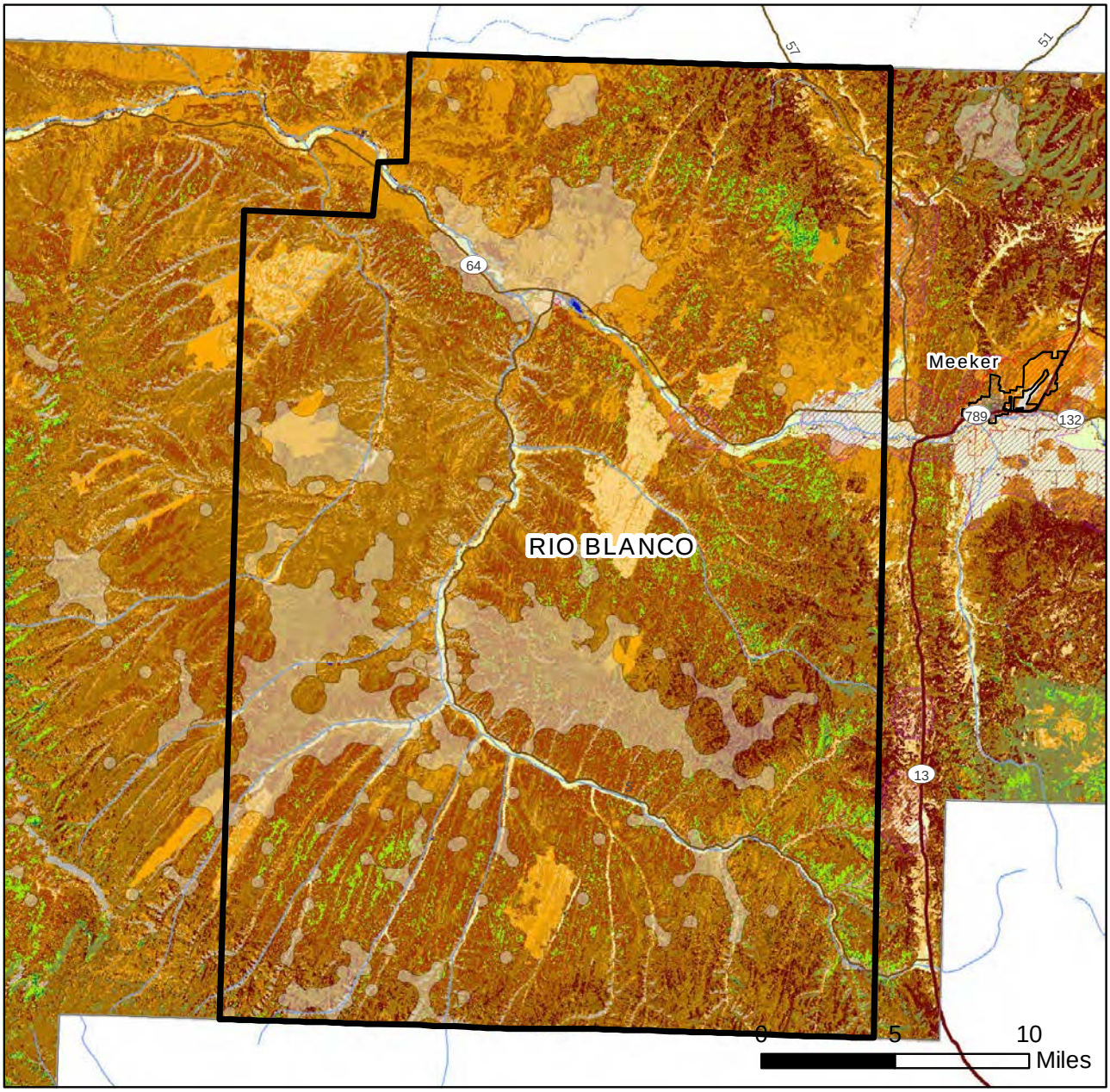
Industry

The Piceance Basin is located in this part of the county, and is currently home to extensive natural gas development. This includes the Yellow Creek, Sulphur Creek, and Piceance Creek gas fields, as well as the central treating facility and Meeker gas plant operated by Enterprise Products. As previously discussed, values at risk are relatively transient in the gas fields. The two major Enterprise facilities are located in flat terrain with good access and substantial defensible space. The Natural Soda mine is similar in condition. Though relatively resistant to wildfires, the remote nature of these facilities in a very fire prone area warrants a moderate rating.

Cultural Sites

The Meeker Massacre historic site is located in the same area as the east Highway 64 homes which is a low risk area.

Assessment Area: West Central Fire Behavior Fuel Models

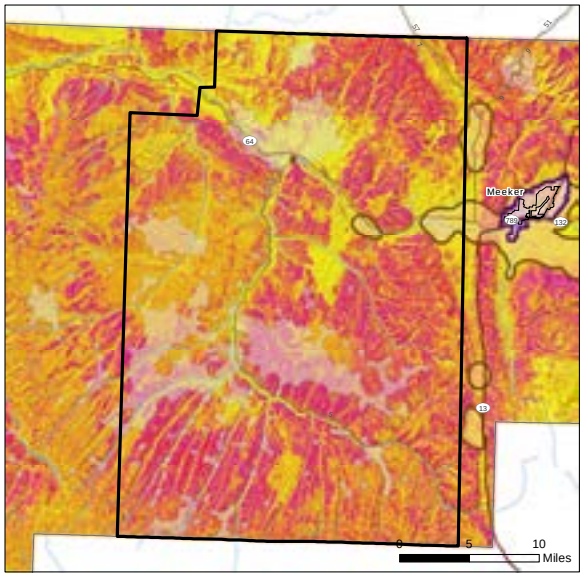


Legend

Gasfields	Low Load Grass	Water	Very High Shrub	Moderate Leaf
WUI Density	Low Load Grass/Shrub	Bare Ground	Low Load Litter	Long Needle Litter
High	Moderate Grass/Shrub	Low Load Shrub	Low Leaf Litter	Low Load Understory
Medium	Developed	Moderate Shrub	Moderate Litter	Moderate Understory
Sparse Grass	Agriculture	High Load Shrub	High Load Litter	Very High Understory

Assessment Area: West Central
Fuel Behavior Model Results

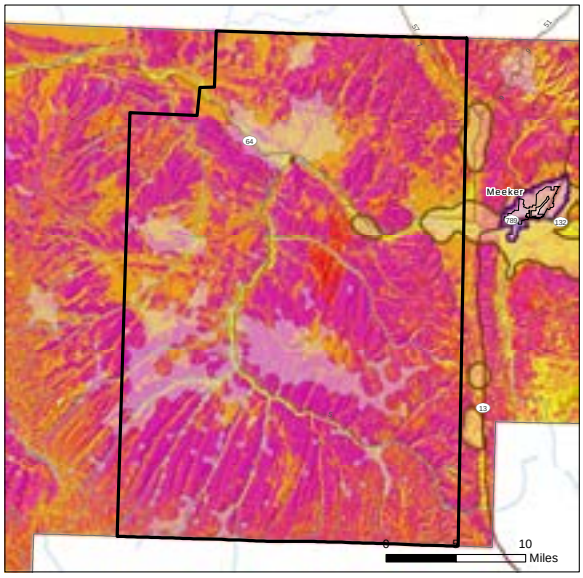
Flame Length: Moderate Conditions, 10 mph West Winds



Legend

Gasfields	Flame Length	4-8' Flames
WUI Density	Fire Resistant	8-11' Flames
High	0-4' Flames	>11' Flames
Medium		

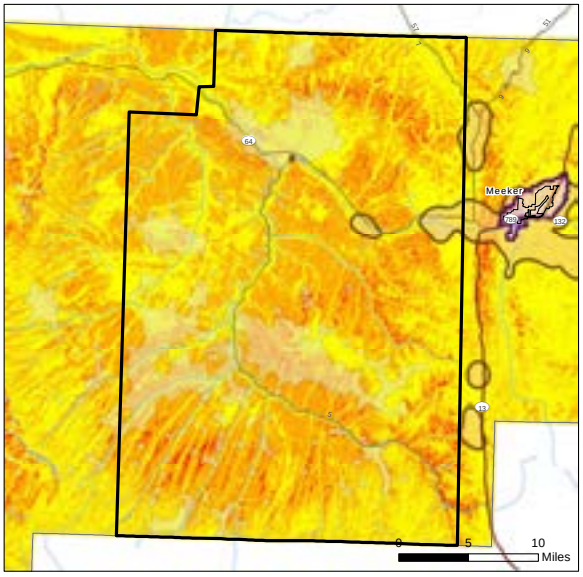
Flame Length: Severe Conditions, 15 mph West Winds



Legend

Gasfields	Flame Length	4-8' Flames
WUI Density	Fire Resistant	8-11' Flames
High	0-4' Flames	>11' Flames
Medium		

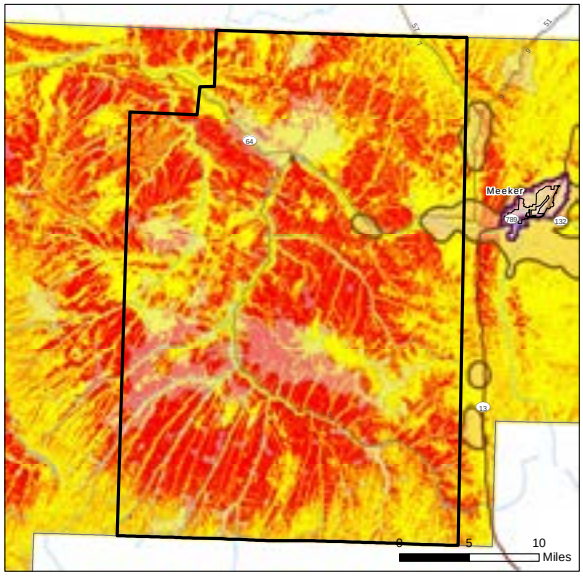
Crown Fire Potential: Moderate Conditions, 10 mph West Winds



Legend

Gasfields	Fire Resistant	
WUI Density	Surface Fire	
High	Passive Crown	
Medium	Active Crown	

Crown Fire Potential: Severe Conditions, 15 mph West Winds



Legend

Gasfields	Fire Resistant	
WUI Density	Surface Fire	
High	Passive Crown	
Medium	Active Crown	

3.4.3 East Central Area

The east central assessment area has the largest concentration of WUI areas but lacks the industrial activity of the western areas. It is bounded on the west by Highway 13 and ends on the east as vegetation transitions from shrub fuels to forest. The dominant fuel in this area is moderate load grass-shrub (30%) with a substantial component of heavy load brush (20%). With substantially fewer fires and more moderate fire season conditions, this area is less vulnerable to wildfire. However, large portions of the area can sustain flame lengths over 11 feet, even under moderate fire season conditions.

Communities

The main community is the Town of Meeker. Bounded on three sides by agricultural lands and on south by the White River, Meeker is relatively well insulated form wildfire. The north side is the exception. From Mountain View Road at the far north end of town to Ninth Street and the northwest end of town, densely configured neighborhoods along the northern edge of town lie adjacent to steep, juniper covered slopes capable of supporting active crown fire.

West of Meeker lies the Lions Canyon or Strawberry Creek area, extending north along County Road 7. While generally of moderate risk, individual structures range from low to high in their risk ratings. A similar situation exists along County Road 8 to the east of town. This lower river area extends from Miller Creek east to Sleepy Cat and has a range of home sites and characteristics. The more easily accessible homes along valley bottom generally rate as moderate risk, while home sites among the heavier fuels and steeper topography of the hillsides are generally high risk. To the south of town along County Road 4 and East of town along Little Beaver Road, homes are situated on agricultural lands and are at the lower end of moderate risk.

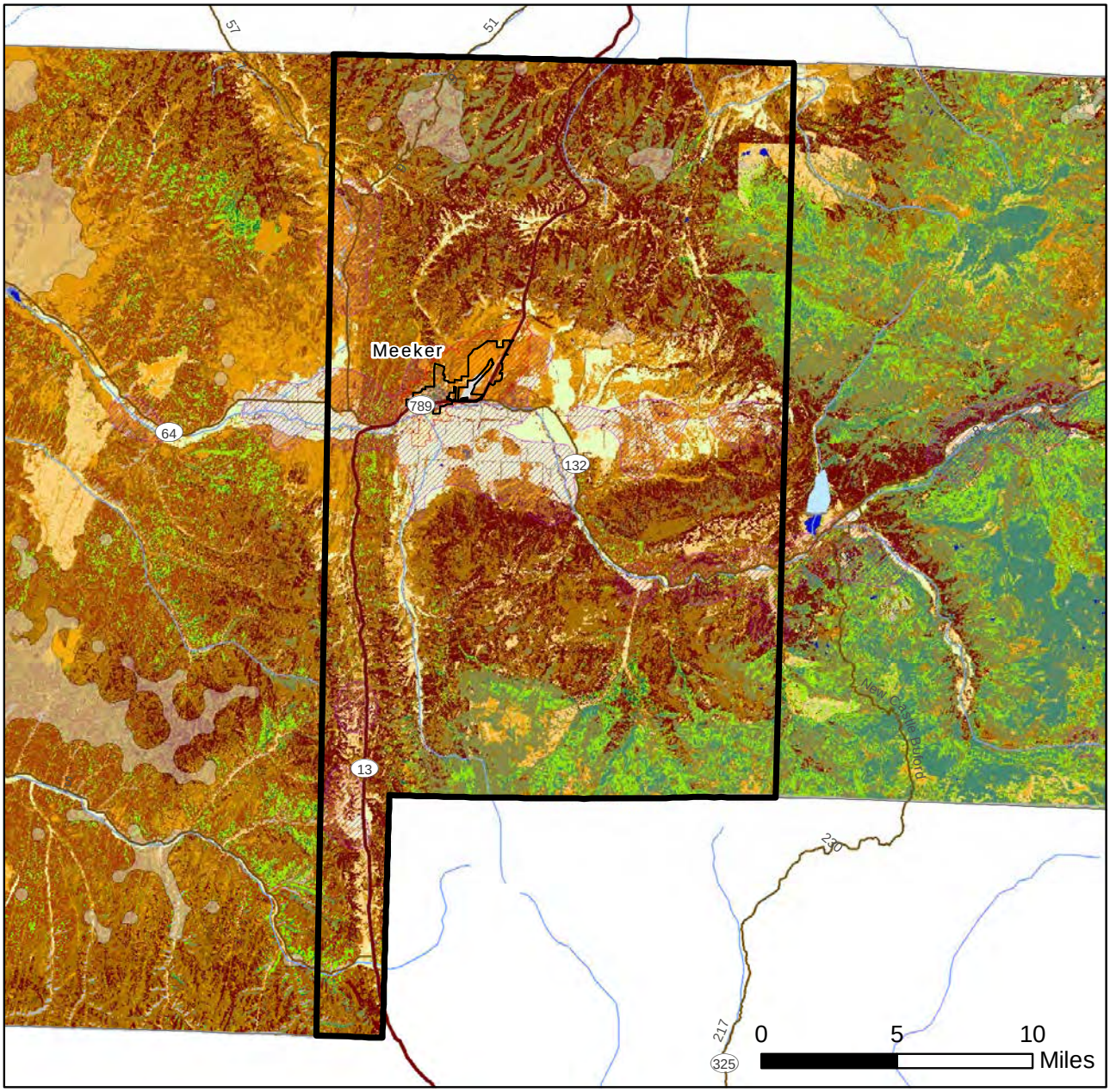
Infrastructure

Defensible space measures have been implemented at the communications tower site west of town, but the surrounding fuels, slope, and criticality of the site combine to give this site a rating of high. Applying CSFS defensible space guidelines (see Appendix D) on this site would include extending defensible space for a minimum of 150 feet downhill of these structures in which there is a minimum of 20 feet of space between the crowns of trees and groups of shrubs.

Area or Facility	Risk Rating
North Meeker (9th St. area to Mountain View Rd.)	High
Communications Site	High
Lower River sites (Miller Creek, Elk Creek, Sleepy Cat)	High/Moderate
County Road 7 (Strawberry Creek)	High/Moderate
County Road 4 area	Moderate
County Road 6 (Little Beaver Rd.) area	Moderate
Highway 13 (moderate density south of Meeker)	Moderate

Homes in the Elk Creek area range from moderate to high risk.

Assessment Area: East Central Fire Behavior Fuel Models

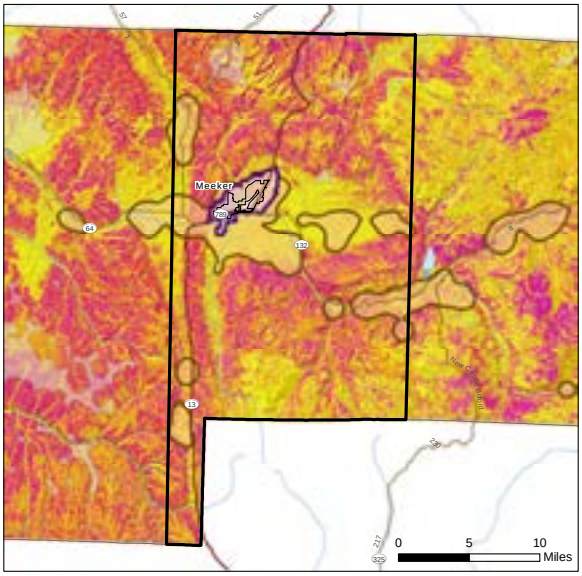


Legend

Gasfields	Low Load Grass	Water	Very High Shrub	Moderate Leaf
WUI Density	Low Load Grass/Shrub	Bare Ground	Low Load Litter	Long Needle Litter
High	Moderate Grass/Shrub	Low Load Shrub	Low Leaf Litter	Low Load Understory
Medium	Developed	Moderate Shrub	Moderate Litter	Moderate Understory
Sparse Grass	Agriculture	High Load Shrub	High Load Litter	Very High Understory

Assessment Area: East Central
Fuel Behavior Model Results

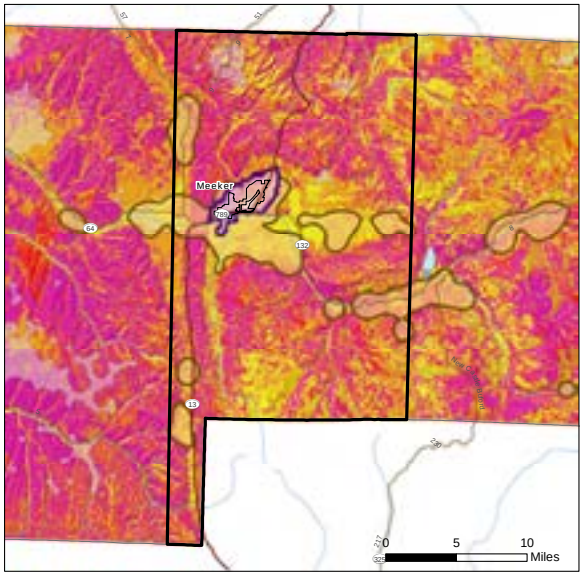
Flame Length: Moderate Conditions, 10 mph West Winds



Legend

Gasfields	Flame Length	4-8' Flames
WUI Density	Fire Resistant	8-11' Flames
High	0-4' Flames	>11' Flames
Medium		

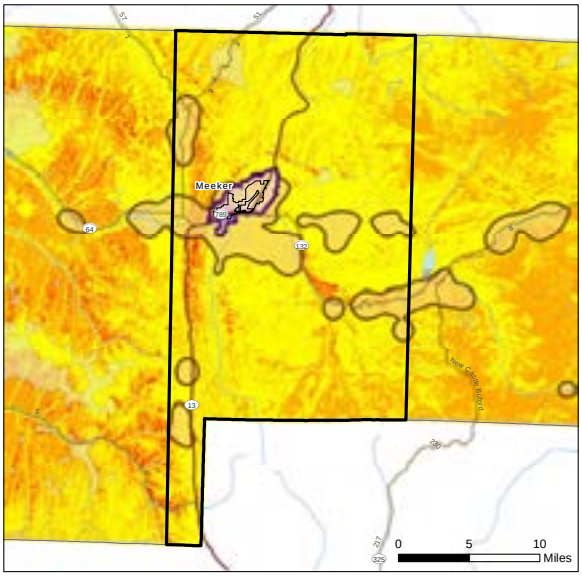
Flame Length: Severe Conditions, 15 mph West Winds



Legend

Gasfields	Flame Length	4-8' Flames
WUI Density	Fire Resistant	8-11' Flames
High	0-4' Flames	>11' Flames
Medium		

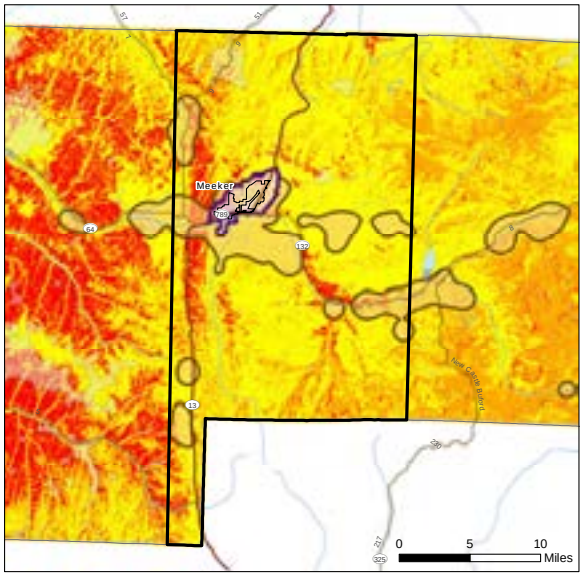
Crown Fire Potential: Moderate Conditions, 10 mph West Winds



Legend

Gasfields	Fire Resistant	
WUI Density	Surface Fire	
High	Passive Crown	
Medium	Active Crown	

Crown Fire Potential: Severe Conditions, 15 mph West Winds



Legend

Gasfields	Fire Resistant	
WUI Density	Surface Fire	
High	Passive Crown	
Medium	Active Crown	

3.4.4 Eastern Area

The eastern area of the county is unique in its high elevation and forests. Fires are far less frequent in this area. Forest canopies shade surface fuels, keeping the forest floors cooler and moister than the fuels to the west. The forests also shelter surface fires from the full impact of winds. The low forest canopies, however, support passive crown fire in many cases, even under moderate conditions.

As a result of this canopy sheltering, severe conditions with 15 mile per hour winds fail to produce any change in crown fire potential compared to moderate conditions. It is not until winds are modeled at over 30 miles per hour that there is a transition to active crown fire behavior. While the following simulations were run at a modest 15 miles per hour, it should be noted that higher winds are not rare in this area.

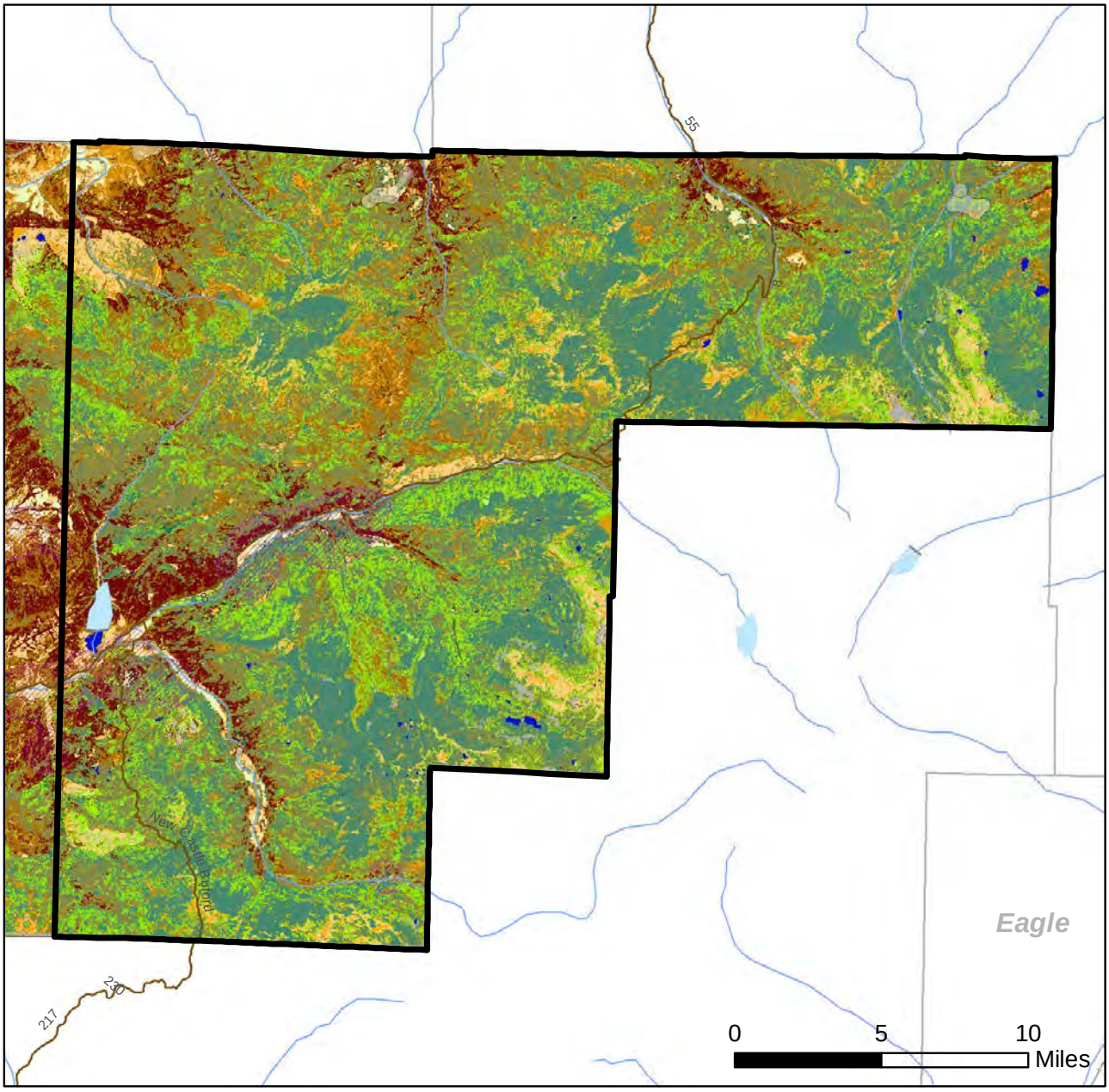
While lodgepole pine stands make up a relatively small portion of the overall vegetation cover for the county as a whole, they are a consequential component of the forests in the eastern area. These stands have been substantially impacted by the mountain pine beetle, and will transition through a series of different fuel profiles during their demise and renewal or conversion over the next few decades.

Communities

The primary WUI values at risk in this area are the village of Buford and the upriver area neighborhoods and ranches. Buford and the Lost Creek area are along the White River Valley floor, with ease of access and defensible space. Conversely the Crooks Park area is characterized by steep and narrow access through heavy timber fuels to structures with inadequate defensible space. Ute Creek, Adams Lodge, Campbell Creek, and Lost Creek have reasonable access, but have structures with inadequate defensible space. Marvine Creek has good turn-arounds and defensible space around some structures, but is remote and located amidst heavy timber fuels.

Area or Facility	Risk Rating
Crooks Park	Extreme
Ute Creek	High
Adams Lodge	High
Campbell Creek Ranch	High
Marvine Creek	High
Lost Creek	Moderate
Buford	Moderate

Assessment Area: East
Fire Behavior Fuel Models

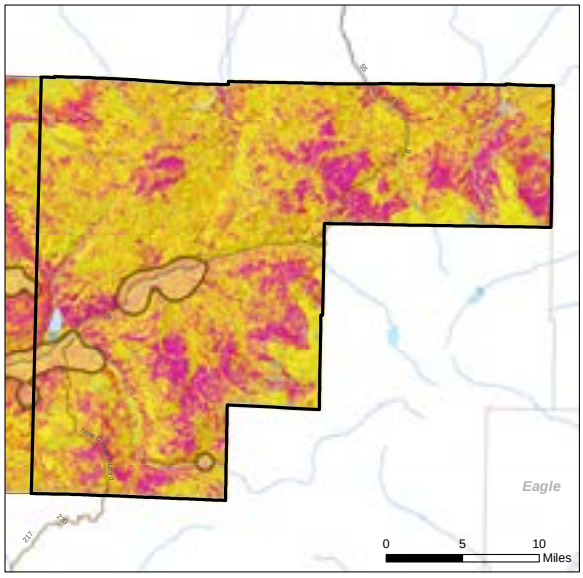


Legend

Gasfields	Low Load Grass	Water	Very High Shrub	Moderate Leaf
WUI Density	Low Load Grass/Shrub	Bare Ground	Low Load Litter	Long Needle Litter
High	Moderate Grass/Shrub	Low Load Shrub	Low Leaf Litter	Low Load Understory
Medium	Developed	Moderate Shrub	Moderate Litter	Moderate Understory
Sparse Grass	Agriculture	High Load Shrub	High Load Litter	Very High Understory

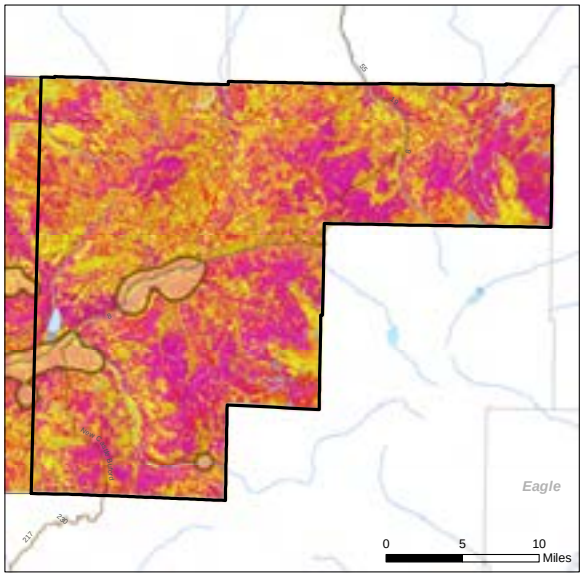
Assessment Area: East
Fuel Behavior Model Results

Flame Length: Moderate Conditions, 10 mph West Winds



Legend
Gasfields
Flame Length
4-8' Flames
WUI Density
Fire Resistant
8-11' Flames
High
0-4' Flames
>11' Flames
Medium

Flame Length: Severe Conditions, 15 mph West Winds



Legend
Gasfields
Flame Length
4-8' Flames
WUI Density
Fire Resistant
8-11' Flames
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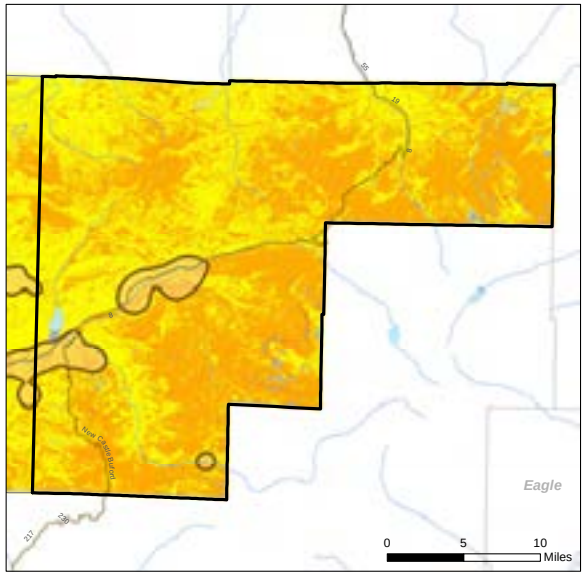
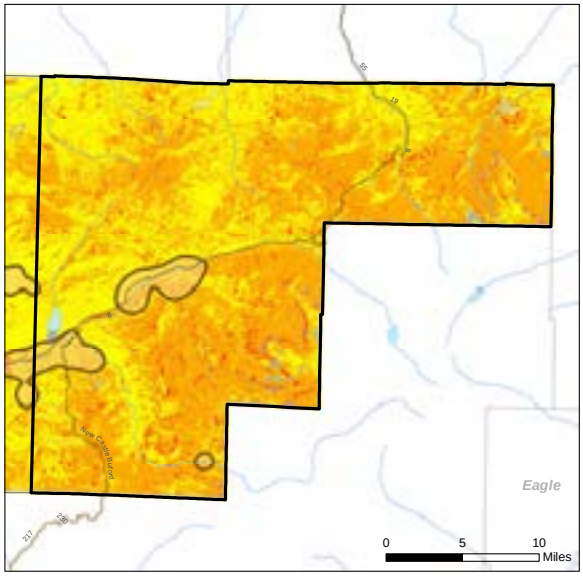
0-4' Flames
>11' Flames
Medium

Crown Fire Potential: Moderate Conditions, 10 mph West Winds



Legend
Gasfields
Fire Resistant
WUI Density
Surface Fire
High
Passive Crown
Medium
Active Crown

Crown Fire Potential: Severe Conditions, 15 mph West Winds



Legend
Gasfields
Fire Resistant
WUI Density
Surface Fire
High
Passive Crown
Medium
Active Crown

4: strategies, priorities + actions

The scale of the WUI issue in Rio Blanco County requires a strategic approach involving all phases of emergency management: mitigation, preparedness, response, and recovery. Successful action will require a coordinated effort among multiple stakeholders. Rio Blanco County does not have the authority to require these actions, so they should be taken as recommendations and suggestions for moving wildfire protection forward across agencies, municipalities, property boundaries and fire districts.

Mitigation: Plan and implement action to reduce potential negative impacts on human and natural values from wildland fire.

- Preparedness: Plan the most effective level of resources to protect human and natural resources.
- Response: Protection of human and natural resource values from wildland fire through suppression or other management activities.
- Recovery: Assess the impact of wildland fire on human and natural values and provide for healthy restoration.

To ensure currency and monitor progress, it is recommended that the CWPP be reviewed on an annual basis by the cooperating agencies. This might best be accomplished at the AOP annual review meeting. The CWPP should be updated on a five-year basis, including an update of fuels maps and fire behavior modeling.

The following table provides a list of action items and a proposed timeline for addressing the high priority WUI issue in Rio Blanco County. These action items are further elaborated upon in the remainder of this section.

Year	Action	Lead
MITIGATION		
2013	Defensible space coordination and outreach	Fire Protection Districts with CSFS
2013	Implementation of defensible space in high density WUI	Fire Protection Districts with CSFS
2013	Finalize and adopt WUI hazard map for code development	County Planning Dept. and Commissioners
2014–2015	Implementation of defensible space in medium density WUI	Fire Protection Districts with CSFS
ongoing	Maintenance and improvement of defensible space at industrial facilities and critical infrastructure sites	Private Sector with BLM
ongoing	Fuel breaks protecting electrical infrastructure	BLM
ongoing	Public Fire Danger Postings	County and Federal Agencies
as appropriate	Fuel breaks adjacent to WUI	BLM
PREPAREDNESS AND RESPONSE		
2013	Codify Emergency Notification Procedures	Dispatch Center
2013–2018	Pre-Attack Plans and Tactical Maps	Response Agencies
2013–2018	Interagency Training and Exercise Plan	County with Response Agencies
2018	Apparatus and Equipment Needs Evaluation	Fire Protection Districts
RECOVERY		
2013	Interagency Recovery Coordination	County
2014	Develop loss calculation methodology	County

4.1 Mitigation

Mitigation strategies are designed to reduce the negative impacts of wildland fires to the identified values at risk. The three recommended strategies for Rio Blanco County are public engagement, fuels treatment, and fire adapted development. Each strategy has associated action items.

4.1.1 Public Engagement

Public engagement encourages individual and community actions on the part of residents in the WUI through continued outreach and support from public agencies. The CSFS works with the Sheriff's Offices, local Offices of Emergency Management, and local fire departments to organize educational programs to encourage fire hazard mitigation on private lands. The BLM provides technical and financial assistance to support these community fire education programs.

There are many methods that can be employed to engage the public. These may include:

- Door to door visits by the local fire department.
- Fire station open houses where a WUI message is combined with food, children's activities, and even raffles of a chainsaw or other popular items.
- WUI informational booths or outreach at the county fair or other community events.

A major issue with any outreach effort is the time and effort required to make it successful. This is often an unrealistic burden for a volunteer fire depart to add to its workload. Involving state and federal agencies may help, but it may be worth considering seeking grant funding for a part-time or term position of WUI coordinator to get these efforts off the ground.

Action Items

- Defensible Space Outreach: Priority should be given to encouraging property owners to establish defensible space around their homes. This action should be initiated in Meeker's northern neighborhoods and Rangely's southwestern neighborhoods and proceed through the medium density WUI according to the risk ratings provided in section 3.
- Public Postings: As recommended in the county's 2006 Fire Management Plan, public postings of fire danger should continue to be utilized. During periods of high fire danger, this can include the use of digital roadway signs posted at the county gateways described in the 2011 master plan along State Highway 64, State Highway 139, State Highway 13, and County Road 8. Cautionary signs should also be considered at high use trail heads that are near WUI areas.

4.1.2 Fuels Management

By altering the arrangement and loading of vegetation fuels, fire behavior can be reduced and values at risk rendered more defensible. These treatments can be categorized as defensible space, fuel breaks, and area treatments, of which defensible space and fuel breaks will be discussed WUI action items. The CSFS, BLM, and USFS each play a role in supporting fuels treatments in Colorado's WUI. The CSFS takes the lead in guiding residents in their WUI efforts. Federal agencies implement or manage the vast majority of fuels management projects in Colorado, many of which are focused in the WUI.

BLM Fuels Management Projects

The BLM conducts approximately 15,000 acres of fuels treatment per annum in Colorado, and plays the biggest fuels management role in Rio Blanco County. The following treatments occurred from the listed projects identified within the 2006 Fire Management Plan (Michels 2011):

Date	Name	Notes
2007–2008 Winter	Tri-State Powerline	116 acres mechanical treatment.
2011 Winter	Three Mile Powerline	100 acres mechanical treatment completed.

Although not identified in the 2006 Fire Management Plan, the following treatments were implemented:

Date	Name	Notes
2005 Fall	Natural Soda	1.175 acres through mechanical, biological and pile burning.
2006 Fall	Puckett Mechanical	100 acres mechanical adjacent to powerlines.
2006 Winter	Wikiup Villages	72 acres mechanical and pile burn to protect cultural sites.
2008 Fall	Steadman Mesa Communications Site	12 acres mechanical.
2008 Fall 2009 Spring	East Jordan Rx	1980 acres broadcast burn adjacent to the Strawberry Patch Subdivision.
2009 Spring	Carl's Hole Rx	40 acres broadcast burn in the Western Piceance Basin to interrupt fuel community.
2009 Fall	Oak Ridge	300 acres broadcast burn and mechanical on CO State and BLM lands adjacent to the RBC 8 corridor and Little Beaver Estates.
2008 Fall 2010 Fall	Lower Fletcher Gulch Chaining	300 broadcast burn, 300 acres biological for cheat grass prevention.
2010 Winter 2011 Summer	Shell Freeze Wall Fuels Reduction	335 acres broadcast burn, pile burn and mechanical treatment adjacent to Shell Freeze Wall Oil Shale Research Facilities.
2011 Winter	Dragon Compressor Stations	65 acres mechanical and pile burning.
2012–2013 Winter	Dragon Compressor Stations	35 acres mechanical and pile burning planned.

In 2012 the current five-year planning estimates that the BLM will attempt to complete 1,100 acres of vegetation treatments within areas identified by the 2006 fire management plan as having importance through either subdivisions or industrial infrastructure.

Defensible Space

The most effective fuels management method for protecting structures in the WUI is the creation of defensible space around structures. By managing the fuels and reducing the potential fire intensity immediately adjacent to the structure, firefighters may more safely defend the home. Defensible space may even increase the probability of the structure withstanding a fire in the absence of firefighters.

Defensible space consists of pruning trees, applying low flammability landscaping, and cleaning up surface fuels and other fire hazards near the home. These efforts are typically concentrated within 30 to 75 feet of the home, ideally tapering beyond that into the natural vegetation.

A 2009 study (Michels) of fuels treatment cost/benefit for natural gas development substantiated current BLM fuels management strategies of not constructing extensive fuel breaks around gas field drill sites. The transient nature of equipment and personnel at these sites renders suppression or wildland fire use more cost effective approaches. Defensible space around

compressor stations, permanent gas field plants, and mines in the western and central west assessment areas remains a priority. These facilities generally have adequate defensible space at this time. Additionally, defensible space around man-camps should be maintained due to the life safety issue. Most of these facilities are located on or adjacent to federal lands, therefore creation and maintenance of defensible space will require coordination with the BLM.

Fuels treatment around WUI residential areas is the highest mitigation priority at this time and should be coordinated with strong public outreach. Treatments on the north side of Meeker and the south side of Rangely should be considered the top priorities due to the high concentration of residents. A combination of defensible and neighborhood scale fuels treatments should be examined for these areas. Projects for the remaining residential WUI should be prioritized by the fire districts, county, and BLM in conjunction with local resident participation with consideration given to the risk assessment set forth in this document.

CSFS guidelines for defensible space may be found at http://csfs.colostate.edu/pdfs/06302.pdf and for community fuel breaks at http://csfs.colostate.edu/pdfs/fuelbreak_guidellines.pdf. Both of these documents are included in the appendices of this CWPP.

Reducing structure ignitability can also be addressed during community development and construction. This can be encouraged through the county building and planning departments through the use of guidelines or codes.

The resolution at which fire behavior is modeled in this CWPP is too coarse for directing site specific mitigation efforts. It is, however, useful for indicating WUI areas in need of closer evaluation. It is recommended that those parcels with the potential for flame lengths in excess of 8 feet under moderate fire season conditions as identified in this plan, be considered for an on-site wildfire risk assessment prior to development. Other parcels not meeting this criterion may be considered on a case-by-case basis for an onsite wildfire risk assessment.

Action Items

- High Density Defensible Space: Support of defensible space efforts following public outreach for Meeker and Rangely.
- Medium Density Defensible Space: Support medium density WUI prioritized by risk rating and public support.
- Industrial Facility and Critical Infrastructure Defensible Space: Maintenance of defensible space around man-camps, industrial facilities, and critical infrastructure sites.
- Utilize fire behavior maps to specify high hazard WUI areas for on-site assessments prior to development.

Fuel Breaks

By breaking-up vertical and horizontal fuel continuity in a strategic manner, fire suppression resources are afforded better opportunities to contain wildfires and community assets will have an increased probability of survival. In addition to the creation of defensible space, fuel breaks may be utilized to this end. These are strategically located areas where fuels have been reduced in a prescribed manner, often along roads. These fuel breaks may be associated with or tapered into larger area treatments. When defensible space, fuel breaks, and area treatments are coordinated, a community and the adjacent natural resources are afforded an enhanced level of protection from wildfire.

The objectives of a specific fuels treatment may include reducing surface fire intensity, reducing the likelihood of crown fire initiation, reducing the likelihood of crown fire propagation, and improving forest health. These objectives may be accomplished by reducing surface fuels, limbing branches to raise canopy base height, thinning trees to decrease crown density, and/or retaining larger fire resistant trees. Fuel reduction projects should also be consistent with other community values such as wildlife habitat and esthetics.

Improperly implemented fuels treatments can have negative impacts in terms of forest health and fire behavior. Thinning forest stands in wind prone areas

too rapidly can result in subsequent wind damage to the stand. Thinning can also increase the amount of sun and wind exposure on the forest floor, which can increase surface fire intensity if post treatment debris disposal and monitoring are not properly conducted. The overall benefits of properly conducted mitigations treatments are, however, well established.

Implementing defensible space and fuel break projects should be coordinated with neighboring federal agencies. This may provide opportunities for cross jurisdictional projects and improve efficiency and cost effectiveness for planning, permitting, and implementation.

Action Items

- WUI Fuel Breaks: Coordinate fuel breaks on federal lands with defensible space initiatives in the WUI.
- Electrical Infrastructure Fuel Breaks: Continue to coordinate with electrical utilities for the creation of fuel breaks protecting that infrastructure.

4.1.3 Fire Adapted Development

Creating fire adapted home sites and communities from their inception is a safe and more cost effective approach than retroactive mitigation measures. This can be encouraged and enforced through thoughtful zoning and code adoption. The hazard maps included in this document can serve as a basis for adopting such measures per county resolution.

Action Item

- County Adoption of a WUI Hazard Map: For use in determining application of fire codes.

4.2 Preparedness/Response

The two emergency management phases of prepared and response are integral to one another, effective response being predicated upon preparedness and preparedness being irrelevant without response. These are strongly addressed in Rio Blanco County in the 2003 Pre-Disaster Natural Hazards Mitigation Plan and through the Annual Operating Plan.

4.2.1 Preparedness

All interagency fire suppression organizations in Rio Blanco County meet annually prior to April 1 of each year to discuss a variety of topics. Topics may include, but are not limited to: the review, revision, and adoption of the Annual Operating Plan (AOP); cooperative agreements; mutual aid agreements; Wildfire Emergency Response Fund; Emergency Fire Fund; anticipated local, state, and national suppression resource availability; fire department preparedness and mitigation grants; training; physical fitness requirements, qualifications and certifications (including qualification cards); resource ordering procedures and dispatching for personnel, equipment, and aircraft; communications and notification procedures; climate trends; fire weather; fire behavior; local and national Incident Management Teams; coordination of fire restrictions and burn bans; county fire plan revisions; development or revision of community wildfire protection plans; and hazardous fuel treatments.

Emergency notification and evacuation procedures for energy development and industrial sites should be standardized and coordinated between dispatch centers and appropriate industry contacts. Dispatch centers should have a standard protocol for notifying industrial facilities of developing fires and should update contact information on an annual basis. Detailed communication and evacuation plans specific to wildfire incidents should be included in industry Emergency Response Plans.

Establishing written service levels for local agencies will help to guide preparedness activities and prioritize needs for apparatus, equipment, training, and pre-fire planning. Apparatus, equipment, and communication needs and replacement schedules should be drafted by the fire districts to serve as a basis for funding priorities and grant applications.

Wildland fire training is an essential component of preparedness for emergency service agencies. The local fire districts should coordinate with state agencies, county emergency management, and the BLM to define wildland fire training priorities and emergency exercise opportunities. We recommend a five-year plan

for wildland fire classes and exercises be drafted. While time and fiscal constraints can inhibit the execution of overly ambitious training cycles, a mid-term plan can facilitate obtaining grant funding and interagency assistance to improve county wide emergency response effectiveness. Safety and emergency personnel from private industry should be invited to participate as appropriate.

Pre-attack plans for high priority WUI areas can also enhance response effectiveness. Issues of access, water sources, evacuation routes, communications, pre-planning of dozer lines near industrial facilities, infrastructure locations, minimum impact concerns near archeological sites, and helicopter landing zones are all items for consideration. Coordination with electrical utilities to identify and map priority facilities is an important component. Pre-attack plans can also serve as a basis for training and exercises. As with training, constraints of personnel availability, time, and ultimately costs are the limiting factors for this initiative. A modest plan and well prioritized plan assisted by grant funding are important tools.

4.2.2 Response

While wildland fire suppression on unincorporated private lands has historically been the purview of the sheriff as fire warden, the passage of Senate Bill 20 in 2009 stipulated that wildland fire suppression is the duty of the fire protection districts. This duty can be delegated to or shared with the county sheriff. The BLM and the USFS have suppression responsibilities on their respective lands, which comprise the majority of Rio Blanco County.

The Colorado Division of Fire Prevention and Control was created by the enactment of House Bill 12-1283 in 2012. The Division of Fire Prevention and Control was created in the Department of Public Safety from the former Division of Fire Safety and transfers fire responsibilities from Colorado State University/ Colorado State Forest Service to the new Division. Previously the Colorado State Forest Service could have jurisdiction on any lands after responsibility was transferred by mutual consent from the County Sheriff under the State's Emergency Fire Fund (EFF) procedures.

Meeker Volunteer Fire and Rescue serves 2,700 people living in an area of 1,940 square miles. Meeker Fire operates out of one station that protects a primarily rural area. All department members are volunteers. Operating under authority of the Rio Blanco Fire Protection District, the department was established in 1933 and became "Meeker Volunteer Fire and Rescue" in March of 1997 with the merger of the Meeker Volunteer Fire Department and the Meeker Ambulance Service. The department has an ISO rating of 5.

During the fire season, BLM engines and initial attack crews are staffed five to seven days a week. In addition to the agencies' regular initial attack forces, BLM Colorado also hosts a 20-person interagency hotshot crew based in Craig, which is available nationally. Other resources include a Type-3 helicopter in Rifle and a seven-person Unaweep Wildland Fire Module in Grand Junction.

Action Items

- Codify Emergency Notification Procedures: In the event of a wildfire, have an established system of notifying affected industrial facilities in addition to the general public.
- Interagency Training and Exercise Plan: Convene an interagency group to develop a realistic five year plan for wildland fire training and exercises.
- Apparatus and Equipment Needs Evaluation: The fire protection districts should identify apparatus and equipment needs and replacement schedules to support the management and pursuit of funding.
- Pre-Attack Plans and Tactical Maps: These should be developed for each of the four assessment areas by combining and augmenting information from each of the responding agencies.
- Continue annual table-top trainings at the AOP review meetings.

4.3 Recovery

Between fire seasons, BLM Colorado devotes staff and resources to rehabilitating burned landscapes, reseeding vegetation, protecting watershed quality and preventing the spread of noxious weeds following severe wildfires. Vegetation management projects may be planned across public and private lands in ways adapted to the topography and fuels. Typically, this kind of planning reduces costs and provides protection from wildfire. In some cases where public lands will also benefit, the BLM may share the cost of vegetation treatments on private land and provide technical assistance in project planning. In Colorado, the BLM's policy is to use the priorities established in the county wildfire management plans to guide the selection and prioritization of fuels management projects on public lands.

The USFS and BLM are responsible for burn area emergency rehabilitation (BAER) on affected National Forest lands and BLM lands. Close coordination and cooperation with other agencies is necessary to determine values at risk that may be affected by BAER activities on adjacent lands. CSFS provides technical assistance to property owners, with consulting and financial support of the Natural Resources Conservation Service. Rio Blanco County can coordinate with other County departments, state and federal agencies and qualified contractors to assist private landowners affected by wildland fire occurrence.

The county's Emergency Manager is typically responsible for initiating recovery efforts in unincorporated areas of the county. During and after wildland fire incidents, there will often be impacts on the infrastructure in burn areas. These impacts may require a variety of county, state or federal agencies to mitigate the impact and assure quality of life for the citizens of Rio Blanco County. Additional funding sources may need to be identified and applied that could impact service providers. To prepare for these situations, a list of possible fire impacts on the infrastructure and what agency/department would be involved in assessment and mitigation will be coordinated through the Rio Blanco County Emergency Manager.

Another essential process for post-fire recovery are the damage assessments and loss estimated required for Federal Emergency Management Agency assistance. Establishing pre-established methodology for calculating loss using data from the county assessors office may greatly increase the efficiency of this time-sensitive process.

Action Items

- Interagency Recovery Coordination: It may be helpful to have members of a local BAER Team meet with the Emergency Manager and local utilities managers to discuss recovery strategies and needs.
- Work with the county assessor's office to ensure there is a practical method for calculating damage and dollar loss in the event of a large incident.

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Appendix A. Risk Assessment Priority Areas

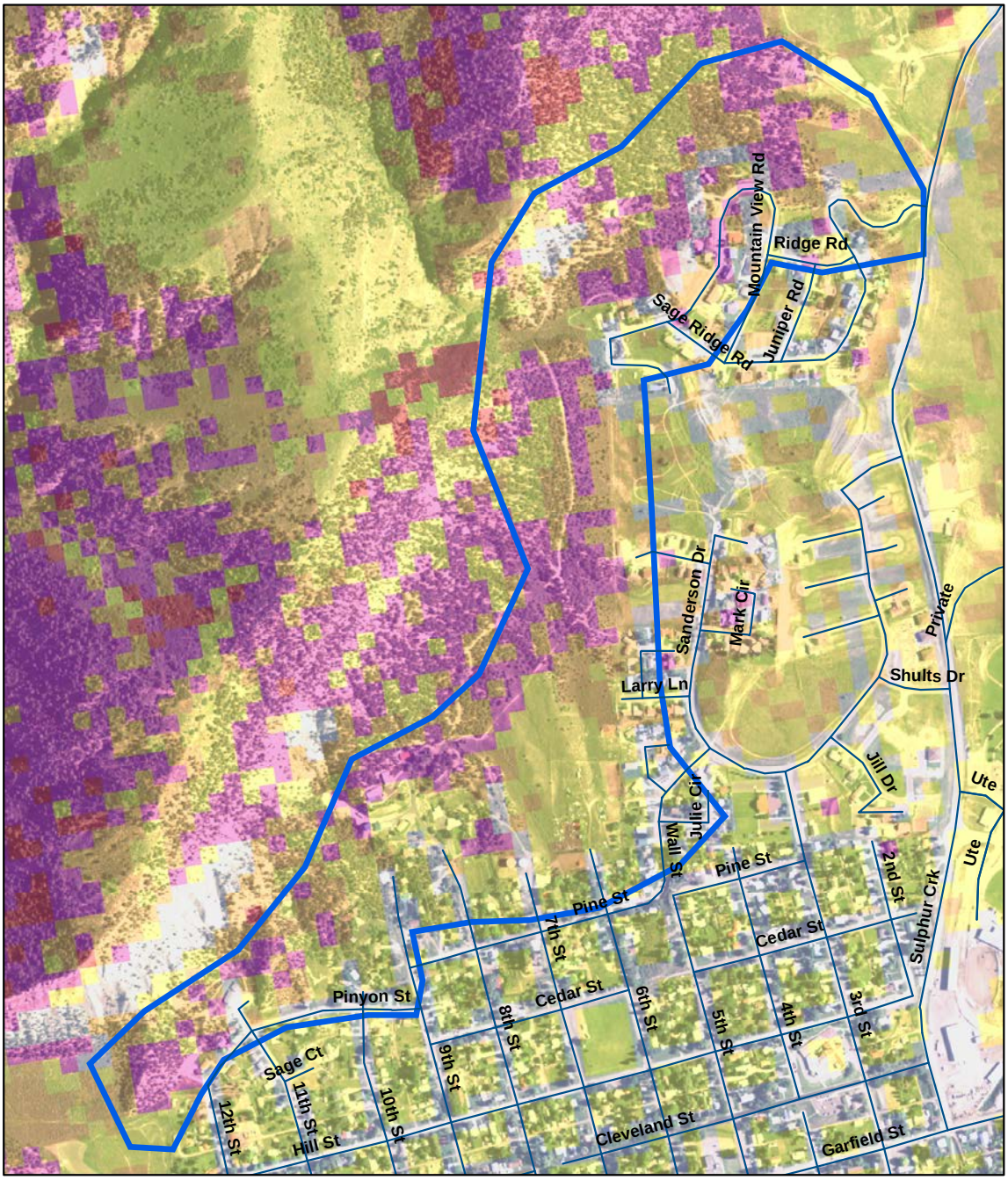
North Meeker Priority Areas

Risk Rating: High

From Mountain View Road at the far north end of town to Ninth Street and the northwest end of town, densely configured neighborhoods along the northern edge of town lie adjacent to steep, juniper covered slopes capable of supporting active crown fire. The northern ends of 8th Street and 9th Street and the west side of Mountain View Road are particularly exposed to dense juniper woodlands. These neighborhoods are adjacent to undeveloped city lands and are in close proximity to BLM lands. A wind driven fire through this area has the potential to expose multiple structures to extreme fire behavior.

Within the mapped treatment area, first priority should be the creation of defensible space around individual structures. This could be augmented by fuel breaks at the neighborhood level. Existing trails in this area may serve as a starting point for these fuel breaks. Additionally, as public use of the trail systems in this area increases, posting signs reminding users of the potential for wildfire may encourage fire safety.

North Meeker Treatment Area



Legend

Flame Length

- Fire Resistant
- 0 - 4 ft
- 4-8 ft
- 8-11 ft
- >11 ft

Treatment Area

0 265 530 1,060 1,590 2,120
Feet

N

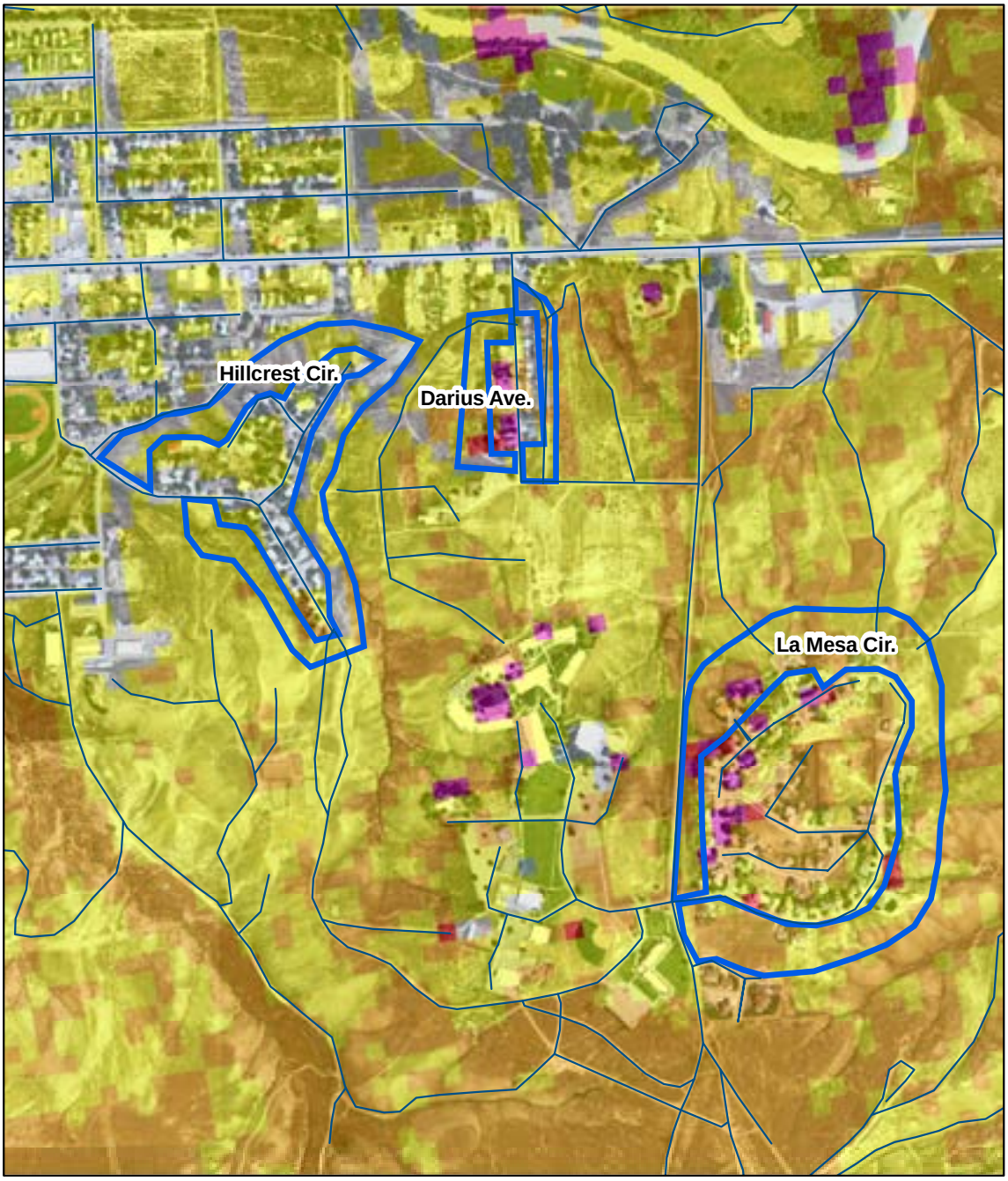
South Rangely Priority Areas

Risk Rating: Moderate

The southern edge of Rangely has several neighborhoods that are set against grass and sage fuels. On the southeast end of town, La Mesa Circle and Hillcrest Circle are set above slopes of approximately twenty percent. While set on flat terrain, Darius Avenue has combustible privacy fences adjacent to tall grass and sage. On the southwest end of town Taos Road and Tropic Road are exposed to these same fuels. While there are other homes with similar issues on the edge of Rangely, these neighborhoods are of particular concern given the density of surface fuels and density of homes. These areas rate out as moderate risk due to the ease of fire department response and egress, but wildfire could rapidly threaten dozens of homes.

Defensible space should be encouraged in all of the neighborhoods. Using tractor drawn mowing decks on a seasonal basis should be considered behind the neighborhoods of Tropic Road, Taos Road, and Darius Avenue. This is not appropriate on slopes beneath La Mesa Circle and Hillcrest Circle due to limitations of equipment and issues of erosion. In these areas extending defensible space beyond the backyard may be an appropriate treatment.

Southeast Rangely Treatment Area



Legend

Flame Length

- Flame Resistant
- 0-4 ft
- 4-8 ft
- 8-11 ft
- >11 ft

Treatment Area

0 250 500 1,000 1,500 2,000
Feet

N

Southwest Rangely Treatment Area

Legend

Flame Length

- Flame Resistant
- 0-4 ft
- 4-8 ft
- 8-11 ft
- >11 ft

Treatment Area

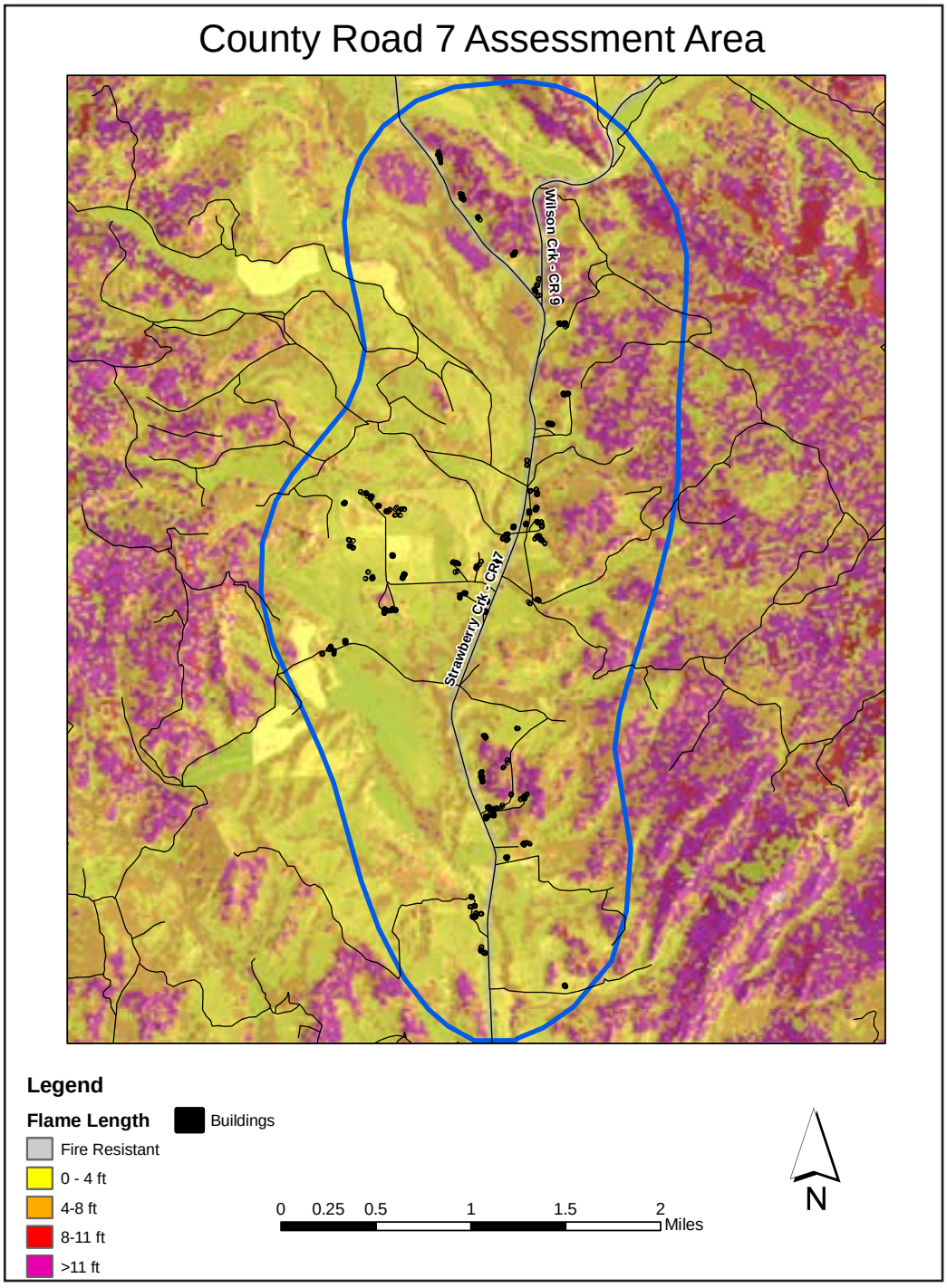
0 145 290 580 870 1,160
Feet

N

County Road 7 Assessment Area

Risk Rating: High/Moderate

West of Meeker lies the Lions Canyon or Strawberry Creek area, extending north along County Road 7. While generally of moderate risk, individual structures range from low too high in their risk ratings due to differences in access and proximity to heavier fuels. Due to the dispersed nature of housing the creation of defensible space around individual structures, and in some cases clusters of structures, will be the most cost effective method of fuels management in this WUI.



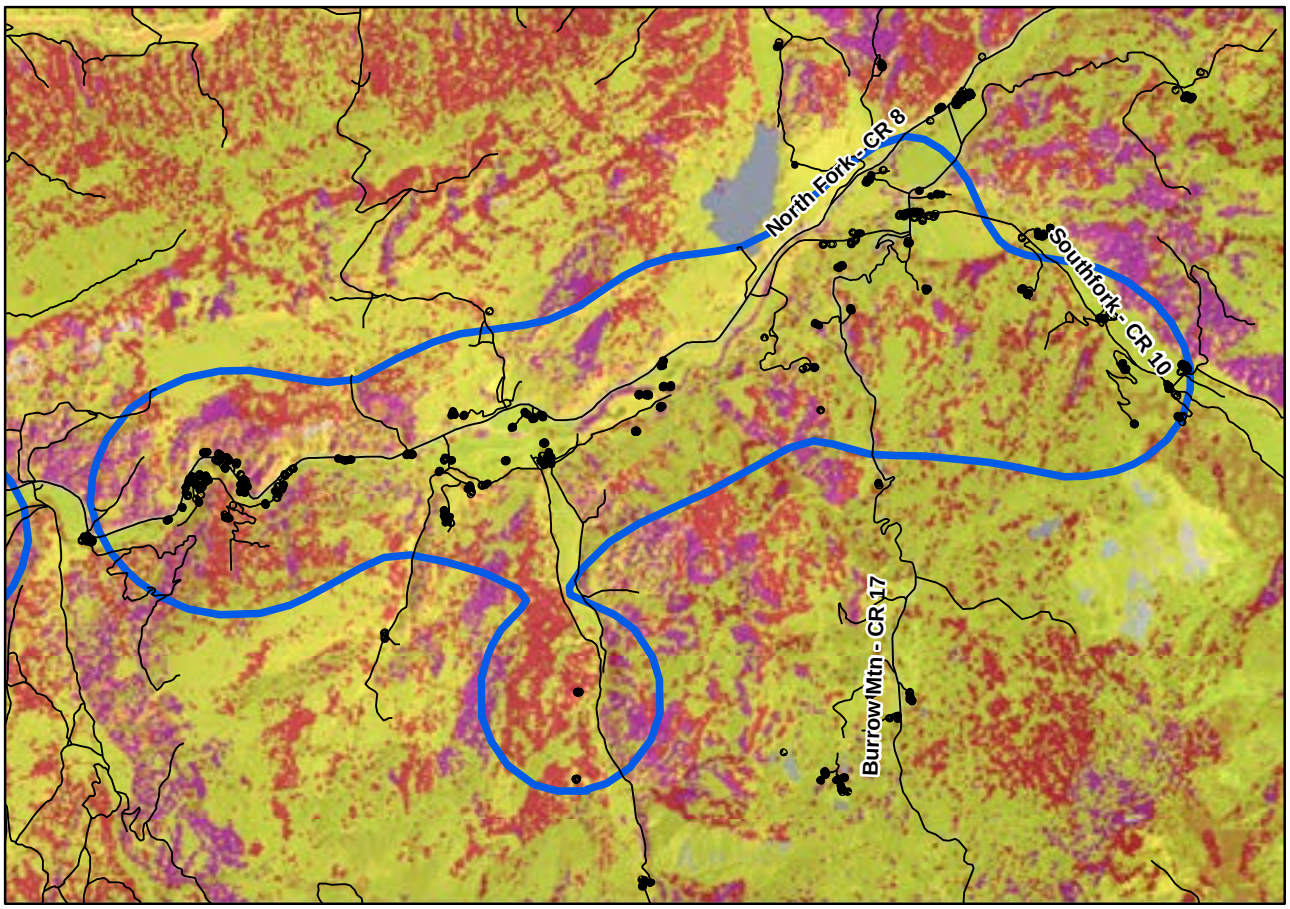
Lower River Assessment Area

Risk Rating: High/Moderate

This area extends from Miller Creek east to Sleepy Cat and has a range of home sites and characteristics. The more easily accessible homes along valley bottom generally rate as moderate risk, while home sites among the heavier fuels and steeper topography of the hillsides are generally high risk. Drier conditions, steeper terrain, heavier fuels, and more difficult access are all conditions that contribute to the higher risk ratings as one moves away from the valley floor and up the hillsides.

Due to the dispersed nature of housing the creation of defensible space around individual structures, and in some cases clusters of structures, will be the most cost effective method of fuels management in this WUI. Maintenance of roads, clearance along roads, clear road signs and address will all contribute to the defensibility of this area. These issues along with water availability and fire resistant construction should all be considered for further development in these areas.

Lower River Assessment Area



Legend

Flame Length

- Fire Resistant
- 0 - 4 ft
- 4-8 ft
- 8-11 ft
- >11 ft

Buildings

0 0.5 1 2 Miles

N

Upper River Assessment Area

Risk Rating: Extreme/ High/ Moderate

This area is in the higher elevations of the White River Basin. Similar to the lower river assessment area, risk ratings vary depending on access and fuels, with lower risk areas generally located along the valley floor. Drier conditions, steeper terrain, heavier fuels, and more difficult access are all conditions that contribute to the higher risk ratings as one moves away from the valley floor and up the hillsides.

This area is comprised of several small and separately rated neighborhoods. Crooks Park area is characterized by steep and narrow access through heavy timber fuels to structures with inadequate defensible space. Ute Creek, Adams Lodge, Campbell Creek, and Lost Creek have reasonable access, but have structures with inadequate defensible space. Marvine Creek has good turn-arounds and defensible space around some structures, but is remote and located amidst heavy timber fuels.

Due to the dispersed nature of housing the creation of defensible space around individual structures, and in some cases clusters of structures, will be the most cost effective method of fuels management in this WUI. Maintenance of roads, clearance along roads, visible road signs and address will all contribute to the defensibility of this area. These issues along with water availability and fire resistant construction should all be considered for further development in these areas.

Area or Facility	Risk Rating
Crooks Park	Extreme
Ute Creek	High
Adams Lodge	High
Campbell Creek Ranch	High
Marvine Creek	High
Lost Creek	Moderate
Buford	Moderate

Appendix B. List of Fire Management Terms

Canopy Bulk Density (CBD)	The mass to volume ratio of forests in the forest canopy.
Chain	A unit of linear measurement equal to 66 feet.
Chimney	A steep gully or canyon conducive to channeling strong convective currents, potentially resulting in dangerous increases in rates of fire spread and fireline intensity.
Crown Fire	The movement of fire through the crowns of trees or shrubs relatively independent of the surface fire.
Dead Fuels	Fuels with no living tissue in which moisture content is governed almost entirely by atmospheric moisture (relative humidity and precipitation), dry-bulb temperature, and solar radiation.
Defensible Space	An area, either natural or manmade, where material capable of causing a fire to spread has been treated, cleared, reduced, or changed to act as a barrier between an advancing wildland fire and values at-risk, including human welfare.
Dominant	Trees with crowns extending above the general level of crown cover. Larger than average tree with a well-developed crown.
Fire Behavior	The manner in which a fire reacts to the influences of fuel, weather, and topography.
Fire Danger	The broad-scale condition of fuels as influenced by environmental factors.
Fire Hazard	The presence of ignitable fuel coupled with the influences of terrain and weather.
Fire Intensity	A general term relating to the heat energy released by a fire.
Fireline Intensity	The level of heat radiated from the active flaming front of a fire, measured in British thermal units (BTUs) per foot.
Fire Regime	The characterization of fire's role in a particular ecosystem, usually characteristic of particular vegetation and climatic regime, and typically a combination of fire return interval and fire intensity.
Flame Length	The distance from the base to the tip of the flaming front. Flame length is directly correlated with fire intensity.
Flaming Front	The zone of a moving fire where combustion is primarily flaming. Light fuels typically have a shallow flaming front, whereas heavy fuels have a deeper front.
Fuel	Combustible material that includes vegetation such as grass, surface litter, plants, shrubs, and trees that feed a fire. Not all vegetation is necessarily considered fuel. Deciduous vegetation such as aspen actually serve more as a barrier to fire spread and many shrubs are only available as fuels when they are drought-stressed.
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.
Fuel Loading	The amount of fuel present expressed in terms of weight of fuel per unit area.

Fuel Model	Simulated fuel complex (or combination of vegetation types) for which all fuel descriptors required for the solution of a mathematical rate of spread model have been specified.
Ground Fire	Fire that consumes the organic material beneath the surface litter ground, such as a peat fire.
Ground Fuel	Combustible materials below the surface litter, including duff, tree or shrub roots, decomposing wood, and peat that normally support glowing combustion without flame.
Ladder Fuels	Fuels that provide vertical continuity between strata, allowing fire to carry from surface fuels into the crowns of trees or shrubs with relative ease. Ladder fuels help initiate and ensure the continuation of crowning.
Overstory	The forest canopy.
Regeneration	The new growth within a forest.
Risk	The probability that a fire will start from natural or human-caused ignition.
Stand Replacement	An event that kills the majority of the mature trees in a forest stand such as a crown fire or clear cut.
Surface Fire	Fire that burns loose debris on the surface, which includes dead branches, leaves, and low vegetation.
Surface Fuels	Surface litter normally consisting of fallen leaves, needles, cones, and small branches. It also includes grasses, forbs, shrubs, tree seedlings, heavier branchwood, downed logs, and stumps interspersed with or partially replacing the litter.
Torching	The burning of the foliage of a single tree or a small group of trees, from the bottom up. Passive crown fire.
Understory	Vegetation growing on the forest floor, under the canopy.
Wildfire	An unplanned and unwanted wildland fire that is not meeting management objectives and thus requires a suppression response.
Wildland Fire	Any fire burning in wildland fuels, including prescribed fire, fire use, and wildfire.
Wildland Fire Use	The management of naturally ignited wildland fires to accomplish specific pre-stated resource management objectives in pre-defined geographic areas outlined in fire management plans.

Appendix C. Wildland Fire Primer

A basic understanding of wildland fire is essential for understanding the analysis and conclusions of this report. This section provides an introduction to wildland fire behavior, ecology, and the WUI as pertinent to this document.

Wildland fire is defined as any fire burning in wildland fuels and includes wildfire, prescribed fire, and wildland fire use (WFU). Wildfires are unwanted and unplanned fires that result from natural ignition or human-caused fire. Prescribed fires are planned human-ignited fires for specific natural resource management objectives. Natural ignitions that are allowed to burn for natural resource benefits under specific conditions are termed WFU.

While wildland fire bears many benefits, this plan is largely concerned with mitigating its negative impacts on human society. The threat of wildland fire can be described in a variety of ways. Fire risk is the probability that wildfire will start from natural or human-caused ignitions. Fire hazard is the presence of ignitable fuel coupled with the influences of topography and weather, and is directly related to fire behavior. Fire severity, on the other hand, refers to the effects a fire has on vegetation and soils. Fire intensity generally refers to the amount of energy released by the flaming front. Rate of spread and flame length are often used as key measures of fire behavior.

Wildland Fire Behavior

Fire behavior is the manner in which a fire reacts to the influences of fuel, weather, and topography. Vegetative fuels are characterized by size, shape, and quantity and are classified in terms of fire behavior fuel models (FBFM). These fuel characteristics determine responsiveness to weather conditions and ignition. Important weather elements include temperature, relative humidity, and wind. Temperature and relative humidity help determine how easily fuels will ignite and burn, while wind is the dominant force in determining a fire's rate and direction of spread. Topography also influences spread rate and direction, and also influences wind and the reception of sunlight.

Wildland fires may be classified as ground, surface, or crown fires. Ground fire involves smoldering materials such as duff and roots. Surface fire includes the burning of forest litter, down woody materials, grass, low shrubs and small trees. Crown fire moves through the canopy of trees or shrubs and can be further classified as active or passive. In passive crown fire, often called "torching", individual or small groups of trees are ignited by surface fire on an isolated basis. Fuels that support fire spread from the surface to the canopy, such as low branches or tall shrubs, are called ladder fuels. Active crown fire spreads through the forest canopy as a flaming front. High intensity surface fires and crown fires pose the greatest challenge to suppression resources and the greatest threat to community values.

Fuels, weather, and topography are used as inputs for modeling potential fire behavior. Fire behavior is typically modeled at the flaming front of the fire and described most simply in terms of fireline intensity (flame length), the rate of forward spread, and the potential for developing into a passive or active crown fire. Passive crown fire is largely determined by flame height relative to crown base height, essentially how close the fire comes to the tree crowns. Active crown fire is a modeled as a function of canopy bulk density, or how much fuel is in a given volume of forest canopy. This sort of modeling can help guide fire preparedness, suppression planning, and mitigation activities.

Fire Ecology

Fire is an essential component of most vegetated ecosystems in the western United States. Some vegetative communities, such as Southwest ponderosa pine woodlands, experience relatively frequent fire, burning every ten to thirty years. Other forest types, like the local spruce-fir forests, may go for hundreds of years without burning. The frequency of burning is determined by the continuity of vegetation, dryness of fuels, and prevalence of ignition sources as well as other factors.

Wildland fire also varies in terms of its severity. In very general terms, where fire is more frequent it tends to burn with less severity. Frequent burning inhibits the build-up of large amounts of fuel. Areas that burn less frequently often have heavy concentrations of surface fuels and/or dense canopies that can sustain more severe burning. There are also vegetative communities that fall into intermediate or mixed fire frequency and severity categories. The characteristic fire behavior and frequency is referred to as the fire regime.

Agriculture, human development, and fire suppression have effectively reduced fire frequency across much of the American landscape. In areas with high frequency – low severity fire regimes, these activities have led to fuel build-ups outside of the historic norm, resulting in abnormally severe fires. For low frequency fire regimes, there has been little or no impact. The spruce-fir and lodgepole pine forests of the Upper Blue River Basin are classified as a low frequency - high severity fire regime, essentially meaning that severe crown fires can be expected to burn large portions of the forest on order of every 100 to 300 years (U.S. Geologic Survey 2010). In other words, stand replacing fires that consume large portions of the forest canopy are quite natural in this area, though infrequent.

Wildland Urban Interface (WUI)

The highest potential for negative and even deadly impacts of wildland fire is where communities abut or mix with forests and open spaces. This zone is most commonly known as the wildland – urban interface (WUI) and is the central focus of this report.

Every fire season catastrophic losses from wildfire plague the WUI. Homes are lost, businesses are destroyed, community infrastructure is damaged, and, most tragically, lives are lost. Precautionary action taken before a wildfire strikes often makes the difference between saving and losing a home. Creating a defensible space around a home is an important component in wildfire hazard reduction. This involves reducing combustible vegetation around the structure.

The attributes of the structure itself are also essential to determining survivability during a wildfire. Experiments indicate that even the intense radiant heat of a crown fire is unlikely to ignite a structure that is more than 30 feet away as long as there is no direct flame impingement (Cohen and Saveland 1997). Post fire home survivability studies determined that homes with noncombustible roofs and a minimum of 30 feet of defensible space had an 85% survival rate. Conversely, homes with wood shake roofs and less than 30 feet of defensible space had a 15% survival rate (Foote and Gilles 1996).

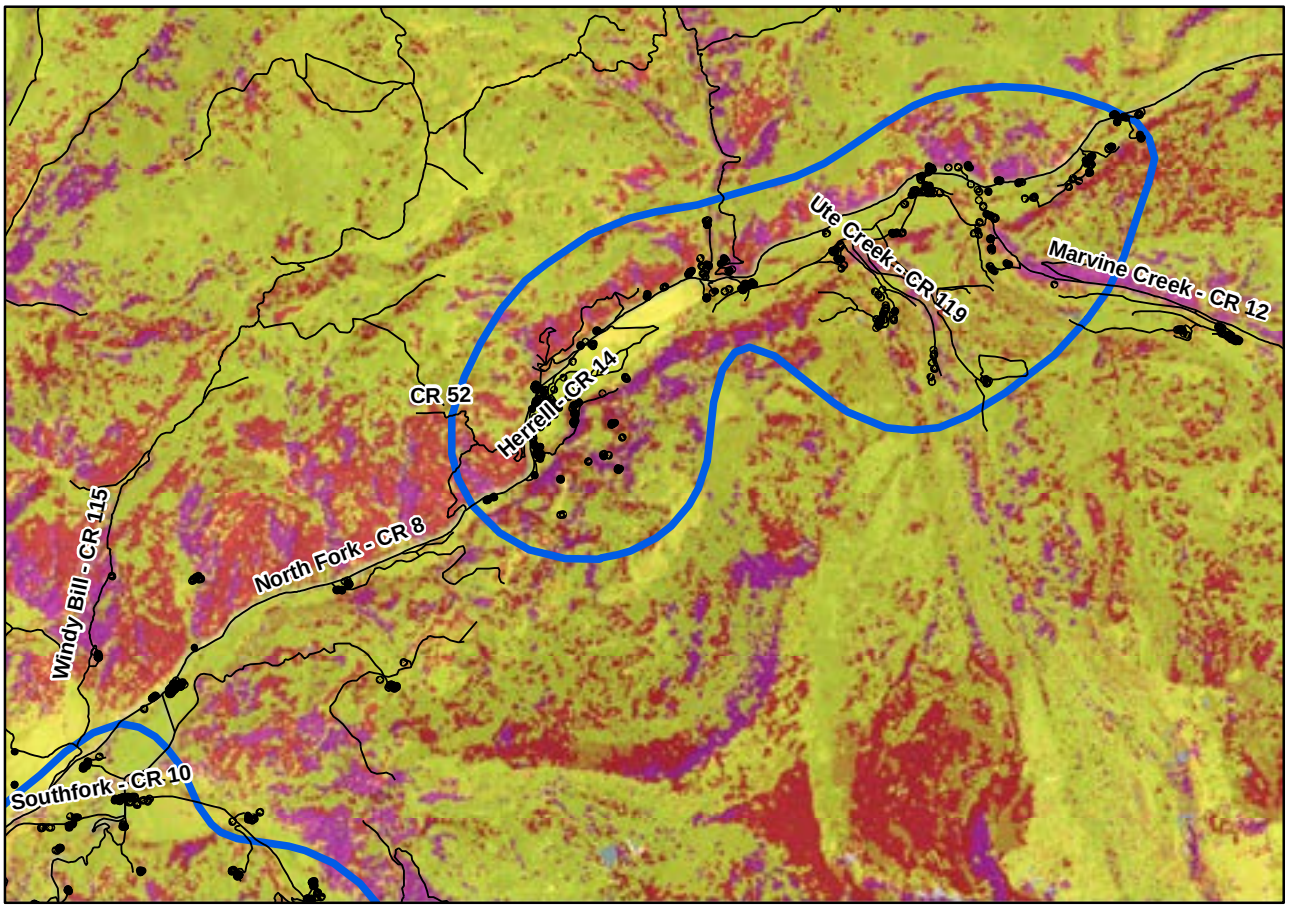
Hazardous Fuels Mitigation

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

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

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

Upper River Assessment Area



Legend

Flame Length

- Fire Resistant
- 0 - 4 ft
- 4-8 ft
- 8-11 ft
- >11 ft

Buildings

0 0.5 1 2 Miles

N

Appendix D. Hazard Reduction Methods

There are a number of hazard reduction strategies and methods. This includes fuels management on a variety of scales to alter fire behavior as well as a number of infrastructural changes that can facilitate suppression efforts. The most often used methods are briefly introduced here.

Defensible Space

The WUI, where communities and wildland meet, is the central focus of this CWPP. The past several decades have seen an alarming loss of life and property in the WUI, and the creation of defensible space around homes is of critical importance to reducing such losses. Defensible space consists of pruning trees, applying low flammability landscaping, and cleaning up surface fuels and other fire hazards near the home. These efforts are typically concentrated within 30 to 75 feet of the home to increase the chance for structure survival or create an area for firefighters to work in the event of a wildfire.

Resource: Creating Wildfire Defensible Zones, http://csfs.colostate.edu/library.htm

Fire Resistant Construction Features

While reducing hazardous fuels around a structure is of great importance to preventing fire loss, recent studies indicate that the attributes of the structure itself determine ignitability to a great extent. Experiments suggest that even the intense radiant heat of a crown fire is unlikely to ignite a structure that is over 30 feet away as long as there is no direct flame impingement. Studies of home survivability indicate that homes with noncombustible roofs and a minimum of 30 feet of defensible space had an 85 percent survival rate. Conversely, homes with wood shake roofs and less than 30 feet of defensible space had a 15 percent survival rate.

Resource: Construction Design and Materials Factsheets, Firewise Construction: Design and Materials, http://csfs.colostate.edu/library.htm

Fuel Breaks and Area Fuel Treatments

By breaking-up vertical and horizontal fuel continuity in a strategic manner, fire suppression resources are afforded better opportunities to contain wildfires and community assets will have an increased probability of survival. In addition to the creation of defensible space, fuel breaks may be utilized to this end. These are strategically located areas where fuels have been reduced in a prescribed manner, often along roads. These fuel breaks may be associated with or tapered into larger area treatments. When defensible space, fuel breaks, and area treatments are coordinated, a community and the adjacent natural resources are afforded an enhanced level of protection from wildfire.

The objectives of fuels management may include reducing surface fire intensity, reducing the likelihood of crown fire initiation, reducing the likelihood of crown fire propagation, and improving forest health. These objectives may be accomplished by reducing surface fuels, limbing branches to raise canopy base height, thinning trees to decrease crown density, and/or retaining larger fire resistant trees. Fuel reduction projects should also be consistent with other community values such as wildlife habitat and esthetics.

Improperly implemented fuel treatments can have negative impacts in terms of forest health and fire behavior. Thinning forest stands in wind prone areas too rapidly can result in subsequent wind damage to the stand. Thinning can also increase the amount of sun and wind exposure on the forest floor, which can increase surface

fire intensity if post treatment debris disposal and monitoring are not properly conducted. The overall benefits of properly conducted mitigations treatments are, however, well documented.

Resource: Fuelbreak Guidelines for Forested Subdivisions and Communities, http://csfs.colostate.edu/library.htm

Infrastructural Changes

In many WUI areas, improvements to fire service water supplies and access can greatly facilitate suppression efforts. Issues of cost and land ownership can prove substantial hurdles to these efforts, but they should be closely considered.

Water supply may be improved with the installation of cisterns or by adding dry hydrant attachments to existing static water sources. Widening roads, adding turn-outs, adding turn-arounds large enough for fire apparatus, and creating secondary points of access can improve both fire depart ingress, as well as evacuation.

Resource: NFPA 1144 Standard for Protection of Life and Property from Wildfire 2002, http://www.nfpa.org