COMMUNITY WILDFIRE PROTECTION PLAN

~ CWPP ~

Colfax County

PREPARED BY

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July 30, 2008

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EXECUTIVE SUMMARY

The drought of the early 2000s created very dry conditions in Colfax County, and the accompanying catastrophic wildfires were responsible for a heightened awareness of wildfire risk from the prairie to timberline. The awareness of potential for catastrophic wildfire evolved into a need to identify geographic areas where wildfire would most likely to occur, and where property loss would be greatest.

The Community Wildfire Protection Plan (CWPP) evaluates Colfax County for wildfire potential through the use of maps and public participation. Maps were generated that display wildfire fuel hazard, risk of wildfire ignitions, numerical threat levels, human values, risk assessment, and the wildland urban interface. Several of the maps are a compilation of two or more maps and reflect a cumulative score to develop a rating for various areas.

The maps were on display at core team, public, and Cimarron Watershed Alliance meetings. Those present were encouraged to suggest changes to the maps that would better reflect conditions on the ground as they understood them. Many of the suggested changes were incorporated into the various maps, resulting in final map versions that are a collaborative effort.

At the meetings and in other related conversations, discussions turned to what could be done to mitigate the threat of catastrophic wildfire. The science cited in the plan was the basis for determining what kinds of fuel treatment would be effective in the wildfire mitigation efforts. Numerous fuel mitigation projects were proposed, including projects that would decrease wildfire hazard near communities and projects that would reduce threat fuels in watersheds that are municipal water supply sources. The proposed projects are listed in Chapter 4, and are summarized by priority in a table at the end of Chapter 4.

A supplemental CWPP was developed for the Cimarron Watershed Alliance (CWA) communities of Cimarron, Eagle Nest, Miami, and Ute Park. The CWA Communities CWPP is tiered to the Colfax CWPP and follows a similar format and presents community-specific descriptions and recommendations.

CHAPTER ONE

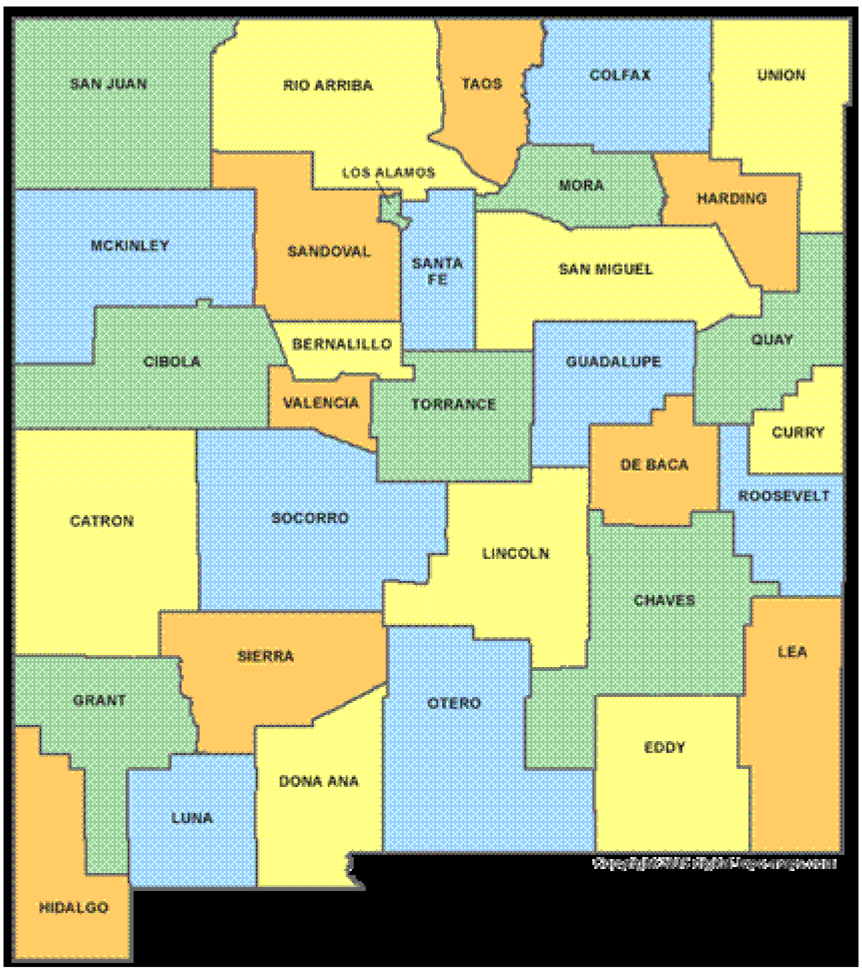
A. BACKGROUND

The Community Wildfire Protection Plan for Colfax County New Mexico has been funded through New Mexico severance taxes.

B. LOCATION AND DEMOGRAPHICS

Colfax County is located in the northeastern part of New Mexico containing approximately 3,768 square miles ranging in elevation from 12,583 feet at Little Costilla Peak to about 5,700 feet at the head of the Canadian River Canyon in the south-central part of the county.

Figure 1. Colfax County Location



Precipitation in the county averages slightly more than 16 inches per year. About 60 per cent of the precipitation comes in the form of snow, and totals range from 210 inches at

Angel Fire Resort to a few inches in the southeastern part of the County. Most of the remainder of the precipitation comes as rain in July and August.

Colfax County has a population estimated at 13,831 with about one-half residing in Raton.   Other larger communities in the County are, Angel Fire, Cimarron, Eagle Nest, Springer and Maxwell. Within the County are the well known Philmont Boy Scout Ranch and the National Rifle Association's Whittington Center.

The vegetation types in the County change as the annual precipitation changes with elevation. Within the County, the vegetation ranges from short grass prairie in the lower elevations to spruce-fir forests in the higher elevations. In between the grasslands and the spruce-fir forests are the pinyon-juniper forests, the ponderosa pine and scrub oak forests, and mixed conifer and aspen forests. Alpine meadows are also common, with some being quite large in size.

The Cimarron, Canadian, and Vermejo Rivers have their headwaters in the County, and several water impoundments associated with these rivers are very important sources of water for both domestic and agricultural use.

C. FIRE HISTORY

In recent years there has been considerable study on wildfires and the effect their presence or exclusion has had on ecosystems. As a result of these studies, people have changed the way they think about the history of wildfire and the use of fire in ecosystems.

Prior to the 20th century, low severity fires burned regularly in most dry forest and grassland ecosystems, with ignitions caused by both lighting and humans. Low intensity fires controlled regeneration of fire-intolerant species (plants unable to physiologically withstand heat produced by fires), promoted fire-tolerant species (for example, ponderosa pine and Douglas-fir), maintained an open forest structure, reduced forest biomass, decreased the impacts of insects and diseases, and maintained wildlife habitats for many species that utilize open stand structures. In addition to the accumulation of fire intolerant vegetation, dense forest canopies with homogeneous and continuous horizontal and vertical stand structures (for example, dense trees with low crown base heights) developed resulting in an increased potential for crown fires in many forests of the western United States. These changes in structure and composition have dramatically altered how wildfires now burn in these forests from how they burned historically (USDA Forest Service Gen. Tech. Rep. RMRS-GTR-120.2004, page 3).

Large fires burning under extreme conditions of high winds and low humidity are difficult, if not impossible, to suppress. These extreme weather conditions are expected regularly during the fire seasons of the western United States. The prevalence of extreme fire behavior in low-elevation forests is, however, partly a consequence of effective fire suppression during the past century. Exclusion of historically frequent fire from these ecosystems has resulted in dramatic changes to vegetation structure and fuels compared to conditions in the 19th century. These alterations of the fuel structure, specifically the in-growth of trees and accumulation of dead woody fuels, tend to readily support extreme fire behavior (crown fire, spotting). This reduces the effectiveness of fire suppression and creates uncharacteristically severe effects in those ecosystems compared to pre-existing ecological disturbance regimes. Management of these fuels directly is, therefore, seen as a proactive means to change fire behavior and effects. The need for fuel management solutions has recently been made especially acute in these low-elevation areas because of human encroachment and development of areas formerly classified as wildlands (Finney, Mark A. and Jack D. Cohen. 2003. Expectation and evaluation of fuel management objectives. USDA Forest Service Proceedings RMRS-P-29: 353-354).

In recent years, as wildfires in the Southwest have begun to become larger and more destructive, both land managers and homeowners became increasingly concerned that conventional suppression methods were no longer effective in rapidly containing wildfires that ignited during severe conditions. This concern gave rise to a fear that everything downwind from a wildfire was vulnerable to destruction.

The changes in fire behavior as well as the increasing presence of structures in the rural areas were a cause for concern among those charged with fighting fires and managing for emergencies. In neighboring Taos County, the Hondo fire in 1996 was a harbinger of how wildfire behavior was changing, and just how fast and destructive a wildfire in the pinyon-juniper type could be. The Hondo fire holds the national record for rate of spread through pinyon-juniper fuel type (Ben Kuykendall, Pot creek community wildfire protection plan, 2005). Since the Hondo fire there have been numerous other large fires in the western United States, and cumulatively have given cause for the people who reside and recreate in and near the wildlands to express concern about the ever increasing danger and potential destruction they are facing. As information about wildland vegetation structure and its relationship to catastrophic wildfire became more commonly known, the by words began to be “not IF it burns, but rather WHEN it burns”.

CHAPTER TWO – COMMUNITY ASSESSMENT

A. COLLABORATION

A Core team comprising of fifteen people was convened on September 26, 2007 in Cimarron. At the meeting the core team was introduced to the process of developing a Community Wildfire Protection Plan and the role of a core team. The Base map along with a Hazard map based on Fire Regime Condition Class (FRCC) map and a Risk map were on display, and the core team made suggestions for adjusting the rating in specific areas based on their localized knowledge. Specifically, an area along the Interstate 25 and the railroad were changed from low Risk (ignition points) to medium risk. Some members of the team requested that an alternative to the FRCC map be prepared, and that the map be based on vegetation type, because they were not confident that the FRCC map had captured their understanding of wildfire potential within the county. The alternate map was prepared and sent to the team members for inspection, and they were asked to choose between the two wildfire potential maps for use in this plan. Consensus of the team called for using the Fire Regime Condition Class map.

Additional items brought up by the core team were concerns for the Cimarron Canyon, Eagle Nest Lake, the accumulation of grassy fuels in Eagle Nest State Park, the dense forested areas west of the communities occupying the western edge of Moreno Valley (Angel Fire, Taos Pines, Agua Fria, Lakeview Pines, and Idyllwild), grass fires in the central and eastern parts of the county, and heavy fuel accumulations on the Philmont Scout Ranch, Collin Neblett State Wildlife Area, and on Taos Pueblo lands. There was also a concern for the fuel conditions on the Carson National Forest in the southwest part of the county.

The initial public meetings were held in Springer, Raton and Eagle Nest on November 13 and 14, 2007. The updated FRCC and Risk maps were on display along with Threat Level and Values maps. The maps were explained and comments and suggestions were noted. A power point presentation clarifying wildfire type terminology and soil movement after a fire was available at each meeting. The power point presentation also displayed the results of the wildfire modeling data collected at Ute Park.

Two plan update meetings were held in conjunction with Cimarron Watershed Alliance meetings on December 5, 2005 and January 23, 2008. At these meetings those in attendance at the Watershed Alliance meeting were invited to inspect the latest maps and draft text, and give their comments.

Additional formal public meetings were held in Cimarron, Ute Park, and Eagle Nest on February 15, 16 and 18 respectively. At these meetings, in addition to displayed maps, a power point presentation on wildfire types and wildfire modeling results was made. The participants were invited to comment on the maps and suggest wildfire related projects for fuels mitigation and protection. The project ideas were incorporated into the plan in the recommendations chapter.

B. MAPS

The factors of fuel load, risk of ignition, and potential loss can singly or in combination give cause for specific geographic areas of concern. These geographical areas of concern are usually called the Wildland Urban Interface (WUI), and are defined using a number of methods and techniques, ranging from vegetation type and fire history to population density. In general the WUI is defined as "The line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels" (roadless.fs.fed.us/documents/feis/glossary.shtml).

One of the primary purposes of the Community Wildfire Protection Plan (CWPP) is to define the specific boundary of the WUI and to identify areas, within the wildland urban interface, that have a high probability of experiencing a severe wildfire with possible loss of valuable human infrastructure. The specific maps developed were the Ownership, FRCC (Hazard), Risk, Threat Level, Values, Risk Assessment, and WUI maps.

Each map has a detailed analysis section further in this document, but a brief description of each map is as follows: 1) Land Ownership Map, a map of Colfax County showing human infrastructure, ownership and geopolitical boundaries; 2) Vegetation map showing the dominant vegetation type; 3) Fire Regime Condition Class map shows the departure of current conditions from historic fire regimes and is defined as conditions classes 1, 2 or 3 with condition class 3 having the greatest departure; 4) Wildfire Risk map predicts the probability of wildfire occurring based on past wildfire occurrences; 5) Threat Level map combines the fire regime condition class with wildfire risk map to show the wildfire threat level; 6) Values at Risk map, identifies areas having value to humans, such as, communities, communications sites, hydrologic features, watersheds, extraordinary wildlife habitat, etc.; 7) Risk Assessment map combines the Threat Level map with the Values at Risk map, and generates a map showing geographical areas that have the highest risk of loss of critical infrastructure; 8) Wildland Urban Interface Location map, which identifies the Wildland Urban Interface locations within the County. The map takes the many and detailed layers of the previous maps and simplifies them into three layers, ownership, structure locations, and WUI boundaries. The map essentially is an uncluttered view of the risk assessment that can be used to identify treatment priority areas.

The individual maps were generated from a variety of sources, each adding to the understanding of the threat of wildfire in Colfax County. Each map was analyzed and specific geographical areas were delineated relative to the map's specific function. Utilizing ArcGIS 9.0, data layers were incrementally combined to systematically identify the threat levels and finally the risk assessment and WUI map which was used in establishing community hazard reduction priorities.

Map Descriptions

Mapping for the CWPP is small scale because the scope of the plan covers the entire County, and was designed to identify broad areas that were a high priority for treatment when hazard, wildfire risk, and values were considered. Consequently the CWPP maps can be used for general information and planning; however, large scale mapping will need to be employed once a specific area is proposed for treatment.

1. **Base Map** - figure 2: The Base map contains geographic features of the County, and is the base on which the other maps are built. This map shows the County boundary, roads, property lines (private, USFS, BLM, tribal, and state).

2. **Vegetation Map –** figure 3: This map shows the dominant vegetation types.

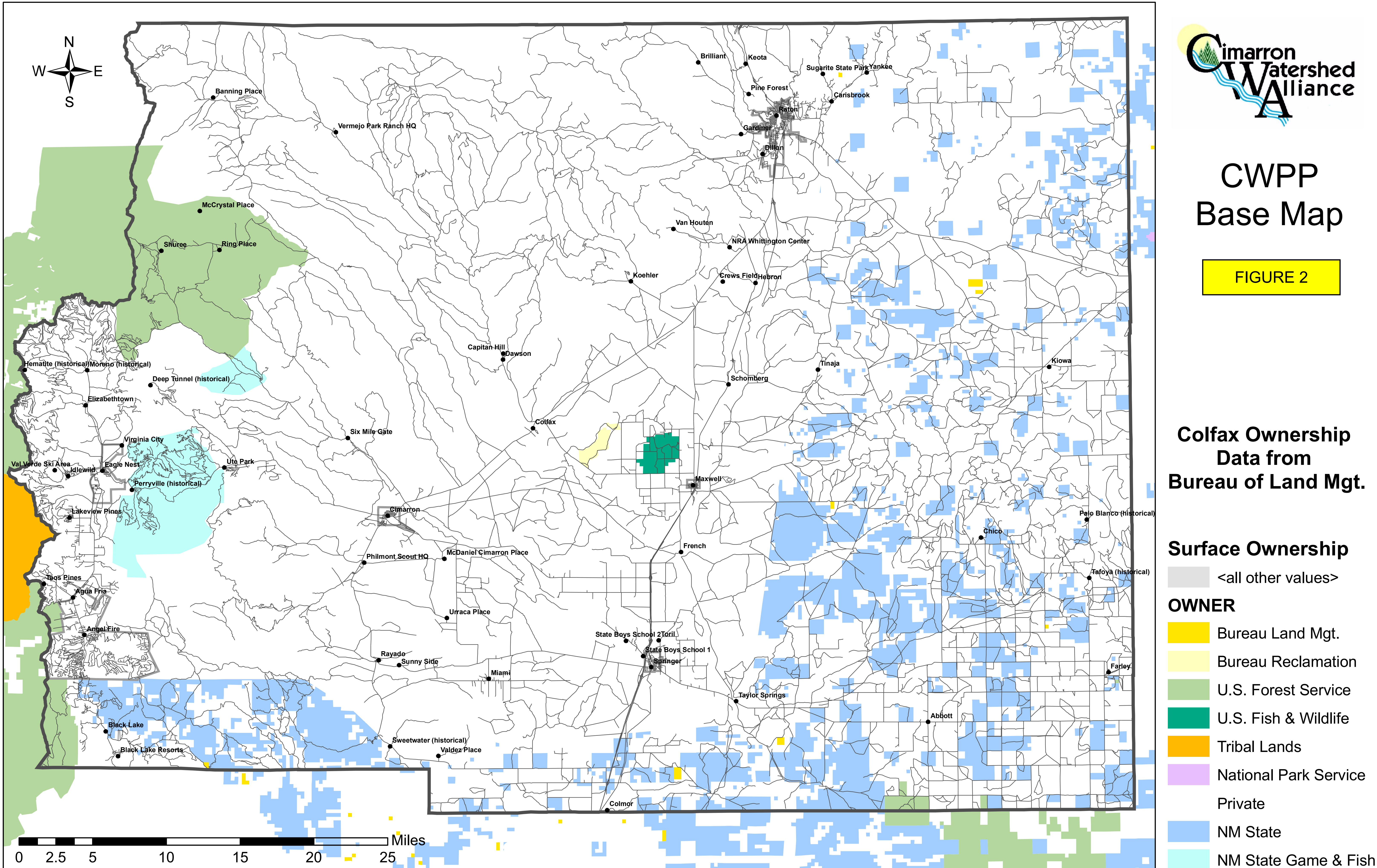
3. **Fire Regime Condition Class (FRCC): -** figure 4: This map was obtained from the U.S.G.S. Landfire web site, under the Rapid Assessment component. Landfire is a five-year, multi-partner wildland fire, ecosystem, and wildland fuel mapping project. The Landfire project objective is to provide consistent, nationwide data describing wildland fuel, existing vegetation composition and structure, historical vegetation conditions, and historical fire regimes to assist: 1) identification of areas at risk due to accumulation of hazardous fuels, 2) prioritization of hazardous fuel reduction projects, 3) improvement of coordination between agencies with regard to fire and other resource management, 4) modeling real-time fire behavior to support tactical decisions to ensure sufficient wildland firefighting capacity and safety, 5) modeling potential fire behavior and effects to strategically plan projects for hazardous fuel reduction and the restoration of ecosystem integrity on fire-adapted landscapes (www.landfire.gov, 04 April 2006).

   Landfire generates consistent, comprehensive maps and data describing vegetative, fire and fuel characteristics throughout the United States. One component of Landfire is fire regime which is a general classification of the role fire would play across the landscape in absence of modern human mechanical intervention, but including the influence of aboriginal burning. There are five natural (historical) fire regimes based on average number of years between fires (fire frequency) combined with the severity (amount of replacement) of the fire on the dominant overstory vegetation, table 1 describes fire regime.

Table 1. Fire Regimes

I --- 0-35 year frequency and low (surface fires most common) to mixed severity (less than 75% of the dominant overstory vegetation replaced); II --- 0-35 year frequency and high (stand replacement) severity (greater than 75% of the dominant overstory vegetation replaced); III --- 35-100+ year frequency and mixed severity (less than 75% of the dominant overstory vegetation replaced); IV --- 35-100+ year frequency and high (stand replacement) severity (greater than 75% of the dominant vegetation replace); V --- 200+ year frequency and high (stand replacement) severity.

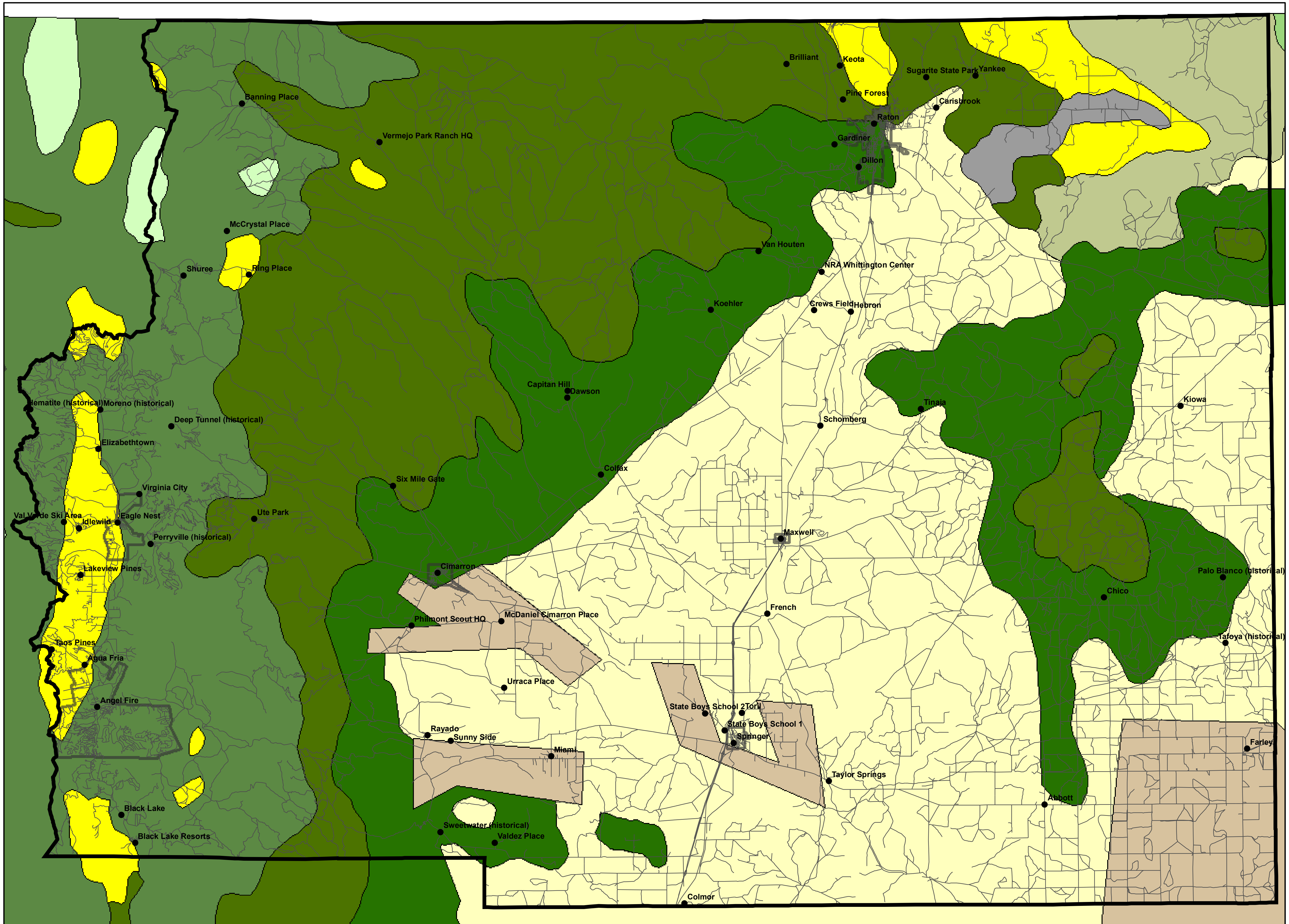
There are three possible fire regime condition classes (FRCC) for each fire regime. The three classes are based on low (FRCC 1), moderate (FRCC 2), and high (FRCC 3) departure from the central tendency of the natural (historical) regime. The central tendency is a composite estimate of vegetation characteristics (species composition, structural stages, stand age, canopy closure, and mosaic pattern); fuel composition; fire


Cimarron Watershed Alliance
CWPP
Base Map
FIGURE 2
Colfax Ownership Data from Bureau of Land Mgt.
Surface Ownership
<all other values>
OWNER
Bureau Land Mgt.
Bureau Reclamation
U.S. Forest Service
U.S. Fish & Wildlife
Tribal Lands
National Park Service
Private
NM State
NM State Game & Fish
N
W
E
S
0
2.5
5
10
15
20
25
Miles
Banning Place
Vermejo Park Ranch HQ
Brilliant
Keota
Sugarite State Park
Yankee
Pine Forest
Carisbrook
Raton
Gardiner
Dillon
McCrystal Place
Shuree
Ring Place
Van Houten
NRA Whittington Center
Koehler
Crews Field
Hebron
Capitan Hill
Dawson
Tinaja
Kiowa
Schomberg
Hematite (historical)
Moreno (historical)
Deep Tunnel (historical)
Elizabethtown
Colfax
Six Mile Gate
Virginia City
Val Verde Ski Area
Idlewild
Eagle Nest
Ute Park
Perryville (historical)
Maxwell
Lakeview Pines
Cimarron
Palo Blanco (historical)
Chico
French
Philmont Scout HQ
McDaniel Cimarron Place
Tafoya (historical)
Taos Pines
Agua Fria
Urraca Place
Angel Fire
State Boys School 2
Toril
State Boys School 1
Rayado
Springer
Sunny Side
Miami
Farley
Taylor Springs
Abbott
Black Lake
Sweetwater (historical)
Black Lake Resorts
Valdez Place
Colmor

Cimarron Watershed Alliance

Generalized Vegetation from Dick-Peddie Veg. Map of NM

FIGURE 3



veg0001-Dick_PeddieNMVegMap

<all other values>

VEG_NAME

- ALPINE TUNDRA
- CHIHUAHUAN DESERT SCRUB
- CLOSED BASIN SCRUB
- CONIFEROUS AND MIXED WOODLAND
- DESERT GRASSLAND (ECOTONE)
- GREAT BASIN DESERT SCRUB
- JUNIPER SAVANNA (ECOTONE)
- LAVA BEDS
- MONTANE CONIFEROUS FOREST
- MONTANE GRASSLAND
- MONTANE SCRUB
- PLAINS-MESA GRASSLAND
- PLAINS-MESA SAND SCRUB
- SAND DUNES
- SUBALPINE CONIFEROUS FOREST
- URBAN, FARMLAND OR OPEN WATER

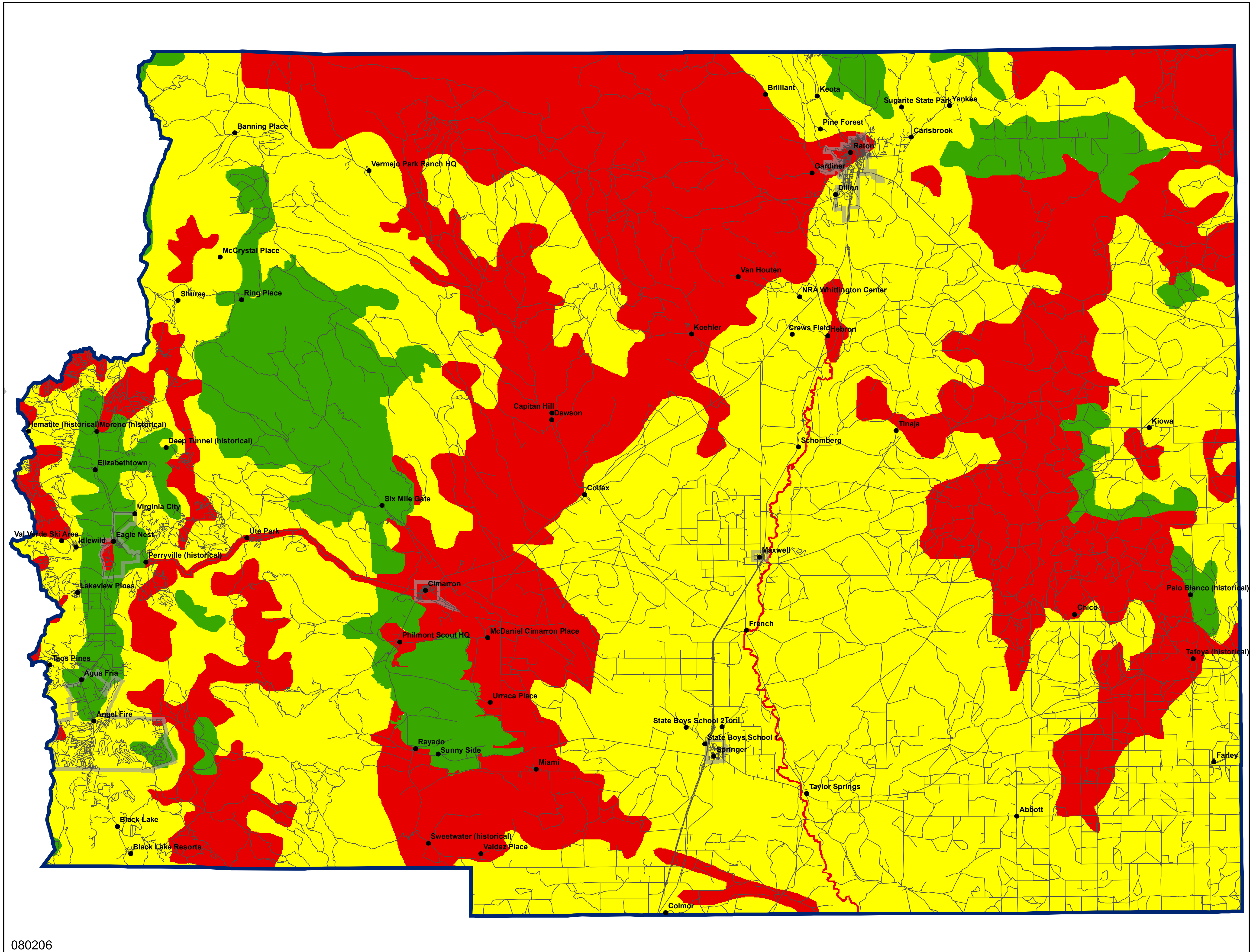
N

5 2.5 0 5 Miles

Cimarron Watershed Alliance

CWPP Fuel Hazard FRCC

FIGURE 4



FRCC Fuel Hazard

<all other values>

hazard

- 1 - Low
- 2 - Medium
- 3 - High

N

5 2.5 0 5 Miles

frequency, severity, and pattern; and other associated natural disturbances. Low departure is considered to be within the natural (historical) range of variability, while moderate and high departures are outside. Characteristic vegetation and fuel conditions are considered to be those that occurred within the natural (historical) fire regime. Uncharacteristic conditions are considered to be those that did not occur within the natural (historical) fire regime, such as invasive species (e.g. weeds, insects, and diseases), "high graded" forest composition and structure (e.g. large trees removed in a frequent surface fire regime), or repeated annual grazing that maintains grassy fuels across relatively large areas at levels that will not carry a surface fire. Determination of amount of departure is based on comparison of a composite measure of fire regime attributes (vegetation characteristics; fuel composition; fire frequency, severity and pattern) to the central tendency of the natural (historical) fire regime. The amount of departure is then classified to determine the fire regime condition class (Hann, Wendel, Havlina, Doug, Shilisky, Ayn et. al. 2003. Interagency and the Nature Conservancy forest regime condition class website. USDA Forest Service, US Department of the Interior, The Nature Conservancy, and Systems for Environmental Management [frss.gov]).

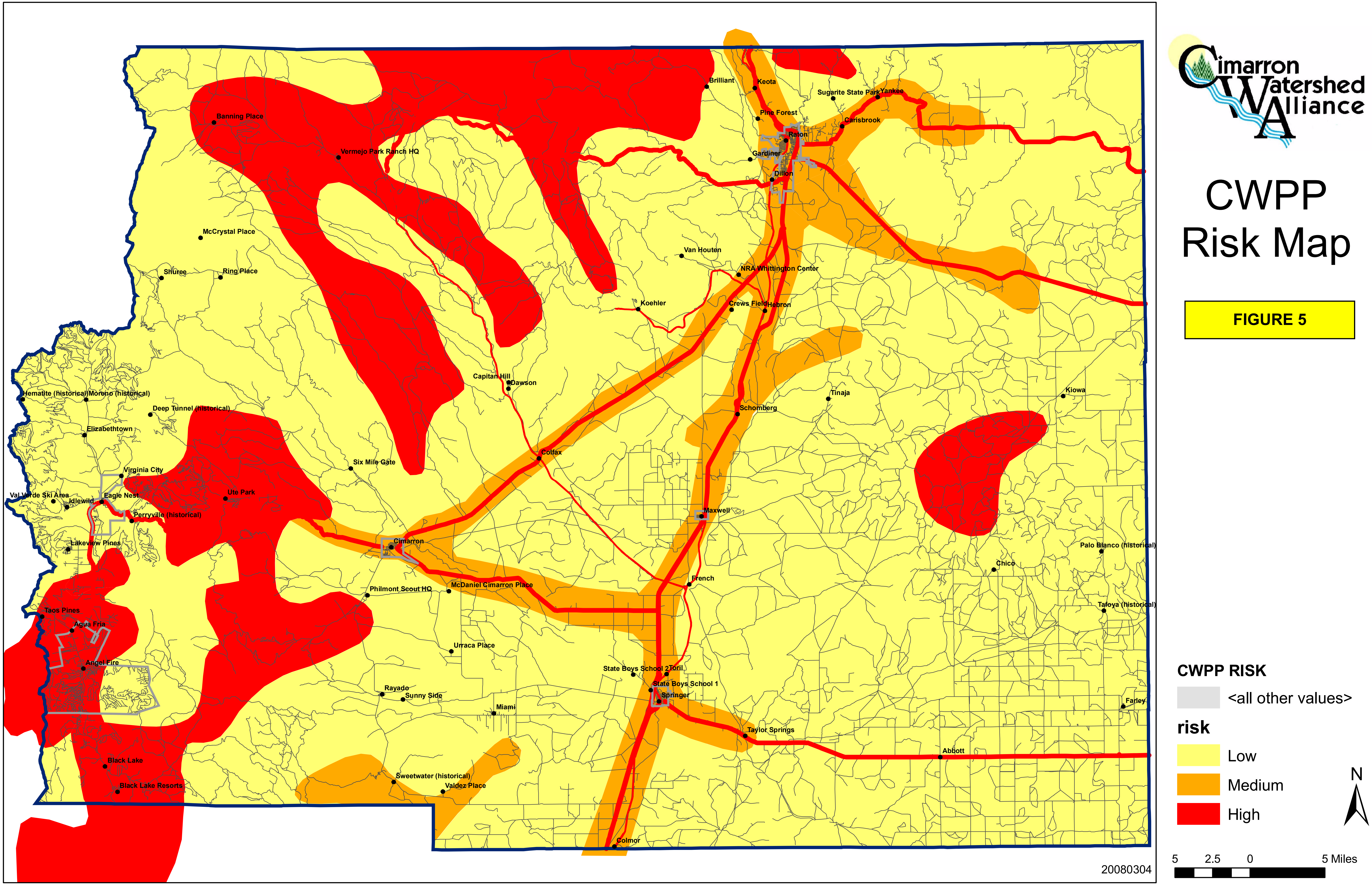
A simplified description of fire regime condition classes and potential risks are listed in table 2.

Table 2. Fire Regime Condition Class

Fire Regime Condition Class	Description	Potential Risks
Condition Class 1	Within the natural (historical) range of variability of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances	Fire behavior, effects, and other associated disturbances are similar to those that occurred prior to fire exclusion (suppression) and other types of management that do not mimic the natural fire regime and associated vegetation and fuel characteristics. Composition and structure of vegetation and fuels are similar to the natural (historical) regime. Risk of loss of key ecosystem components (e.g. native species, large trees, and soil) is low. Fire behavior, effects, and other associated disturbances are moderately departed (more or less severe).
Condition Class 2	Moderate departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances	Composition and structure of vegetation and fuel are moderately altered. Uncharacteristic conditions range from low to moderate; Risk of loss of key ecosystem components is moderate.
Condition Class 3	High departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances.	Fire behavior, effects, and other associated disturbances are highly departed (more or less severe). Composition and structure of vegetation and fuel are highly altered. Uncharacteristic conditions range from moderate to high. Risk of loss of key ecosystem components is high.

While FRCC is an ecological restoration concept and is not intended to be used as a measure of fire hazard, the potential risk attributes describe fuel characteristics that have a relationship to wildfire hazard. Using FRCC as a measure of fire hazard has a correlation with the Federal agencies mandate to reduce the number of acres in condition classes 2 and 3. Therefore, FRCC 1, 2, and 3 were assigned hazard ratings of low, moderate and high, respectively.

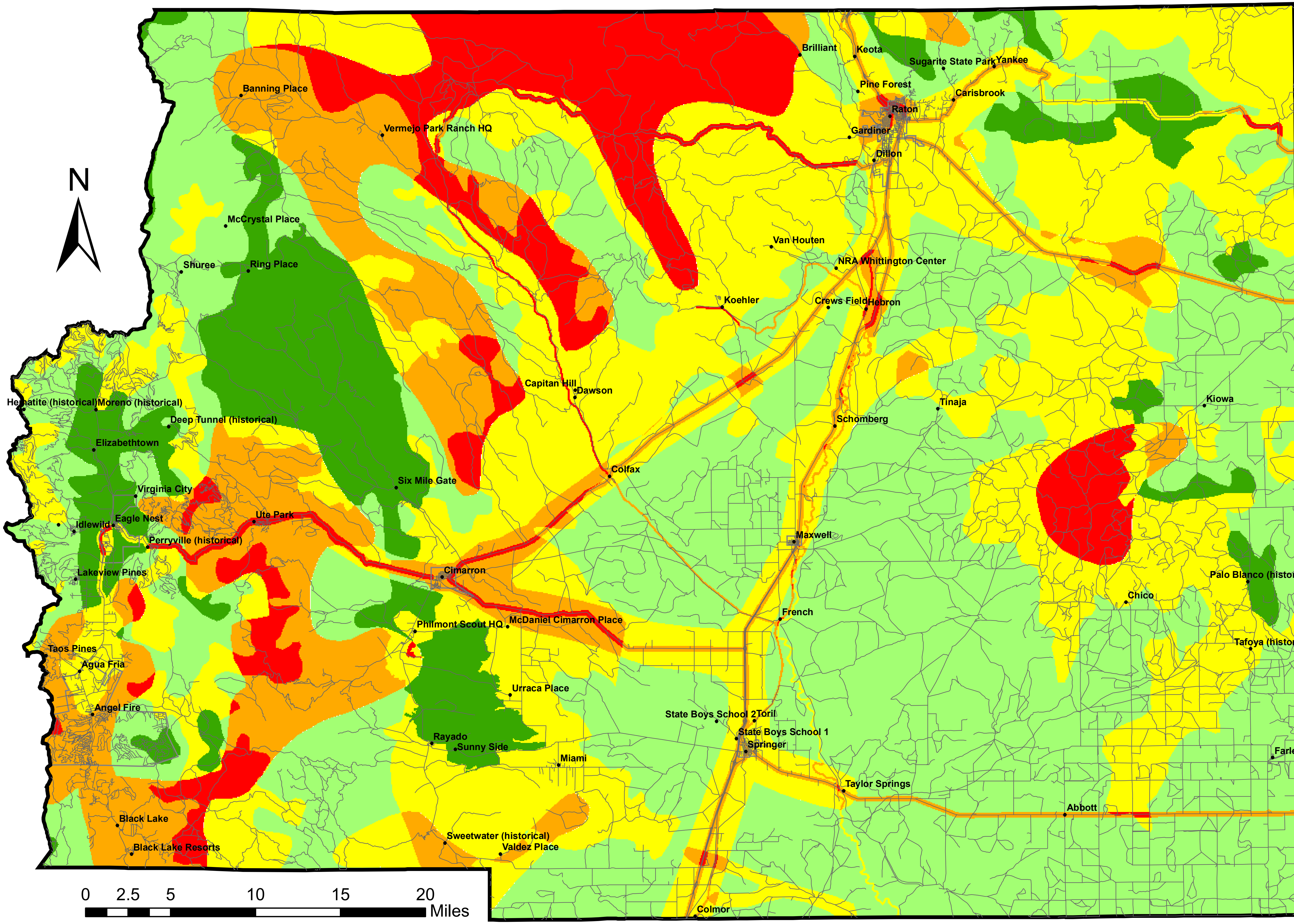
4. **Wildfire Risk -** figure 5: The wildfire risk map reflects the history of fire starts (both natural and human caused ignition) as reported by the New Mexico State Forestry Division (2004 to 2007), and by the Carson National Forest (1996 to 2006). The County was delineated into areas of high, medium, and low risk based on the frequency of fire starts in an area.
5. **Threat Level -** figure 6: The threat level map is the result of overlaying the hazard maps and the wildfire risk map to form a map showing the various combinations of high, medium and low ratings. The threat level map identifies the areas that have a greater chance of experiencing a severe wildfire by using a numerical score method. A numerical score of 1, 2, or 3 was given to the low, medium, and high ratings, respectively, for all areas on the risk map, and on the hazard map. When the risk map is overlaid with a hazard map, every area on the combined map has a combined score that will range from 2 to 6. Areas with scores of 6 were labeled very high, a score of 5 was labeled high, and a score of 4



Cimarron Watershed Alliance
CWPP
Risk Map
FIGURE 5
CWPP RISK
<all other values>
risk
Low
Medium
High
N
5 2.5 0 5 Miles
20080304
Brilliant
Keota
Sugarite State Park
Yankee
Pine Forest
Carisbrook
Raton
Gardiner
Dillon
Banning Place
Vermejo Park Ranch HQ
McCrystal Place
Van Houten
NRA Whittington Center
Shuree
Ring Place
Koehler
Crews Field
Hebron
Capitan Hill
Dawson
Tinaja
Kiowa
Hematite (historical)
Moreno (historical)
Deep Tunnel (historical)
Schomberg
Elizabethtown
Colfax
Six Mile Gate
Virginia City
Val Verde Ski Area
Idlewild
Eagle Nest
Ute Park
Perryville (historical)
Maxwell
Cimarron
Lakeview Pines
Palo Blanco (historical)
Chico
French
Philmont Scout HQ
McDaniel Cimarron Place
Taos Pines
Agua Fria
Tafoya (historical)
Urraca Place
Angel Fire
State Boys School 2
Toril
State Boys School 1
Springer
Rayado
Sunny Side
Miami
Farley
Taylor Springs
Abbott
Black Lake
Sweetwater (historical)
Valdez Place
Black Lake Resorts
Colmor

CWPP Threat Level Map

FIGURE 6



Threat

- 2 - Very Low
- 3 - Low
- 4 - Medium
- 5 - High
- 6 - Very High

080211

was labeled medium. The scores of 3 and 2 were labeled low and very low, respectively.

6. **Values at Risk** - figure 7: Values are generally considered to be those of human infrastructure; however, values may include but are not limited to watersheds for clean water, stable soils, wildlife habitat, natural aesthetics, recreation opportunities, economic capital, protecting vegetation in healthy condition, privacy, protecting community infrastructure, health, human life, livestock in rural areas, financial assets and seclusion (i.e., narrow roads) (Southwest Community Wildfire Protection Plan Guide).

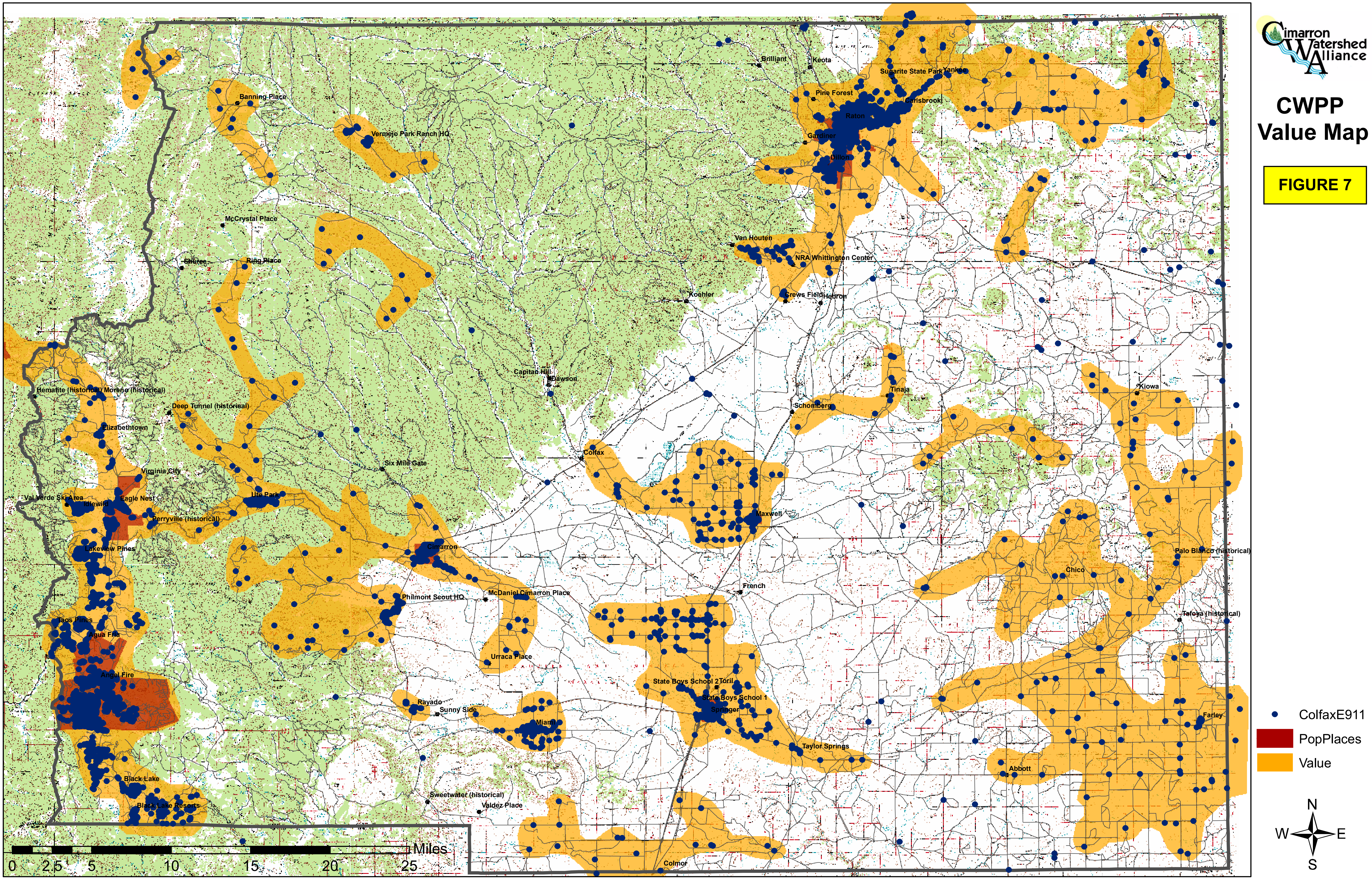
   The values map was developed from the Colfax E911 locations supplied by the county, and the county was delineated into high, medium and low concentrations of E911 locations. The core team members as well as the public were given the opportunity to examine the map and suggest needed changes and adjustments. One specific change was to classify all of the Cimarron River from Eagle Nest Dam to the town of Cimarron as a high value.

7. **Risk Assessment** - figure 8: This map brings together the values at risk and threat level layers to create a risk assessment. Values at risk occurring within areas identified as having a high or greater threat level would be considered the highest priority for available financial and human resources.

8. **Wildland Urban Interface –** figure 9: In absence of a CWPP, the Healthy Forest Restoration Act defines the extent of the wildland-urban interface. Utilizing the county-wide risk assessment and input from stakeholders, the wildland-urban interface was defined. It extends beyond the identified risk assessment areas taking into account threat levels, prevailing winds, topography, etc. Within the WUI boundaries, site-specific treatment recommendations and priorities can be set which will maximize hazardous fuels mitigation.

C. RISK ASSESSMENT

Community assessment involves quantifying the fuels hazard as well as the risk of wildfire ignition in order to assign a rating for each community. The quantifying process involves combining the scores (1 is low, 2 is medium, and 3 is high) from the FRCC and risk maps to develop a combined score, called the threat level. The communities are then scored for threat level and rated as extreme, high, medium or low as to the risk of wildfire in or near the community. Table 3 is a list of Colfax County communities and the wildfire risk rating.



Cimarron Watershed Alliance
CWPP
Value Map
FIGURE 7
ColfaxE911
PopPlaces
Value
N
W
E
S
Miles
0
2.5
5
10
15
20
25
Brilliant
Keota
Sugarite State Park
Yankee
Pine Forest
Carisbrook
Raton
Gardiner
Dillon
Banning Place
Vermejo Park Ranch HQ
McCrystal Place
Ring Place
Van Houten
NRA Whittington Center
Koehler
Crews Field
Hebron
Capitan Hill
Dawson
Tinaja
Schomberg
Kiowa
Hematite (historical)
Moreno (historical)
Deep Tunnel (historical)
Elizabethtown
Six Mile Gate
Colfax
Virginia City
Val Verde Ski Area
Eagle Nest
Perryville (historical)
Ute Park
Maxwell
Lakeview Pines
Cimarron
Palo Blanco (historical)
Chico
Philmont Scout HQ
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Sunny Side
Miami
Farley
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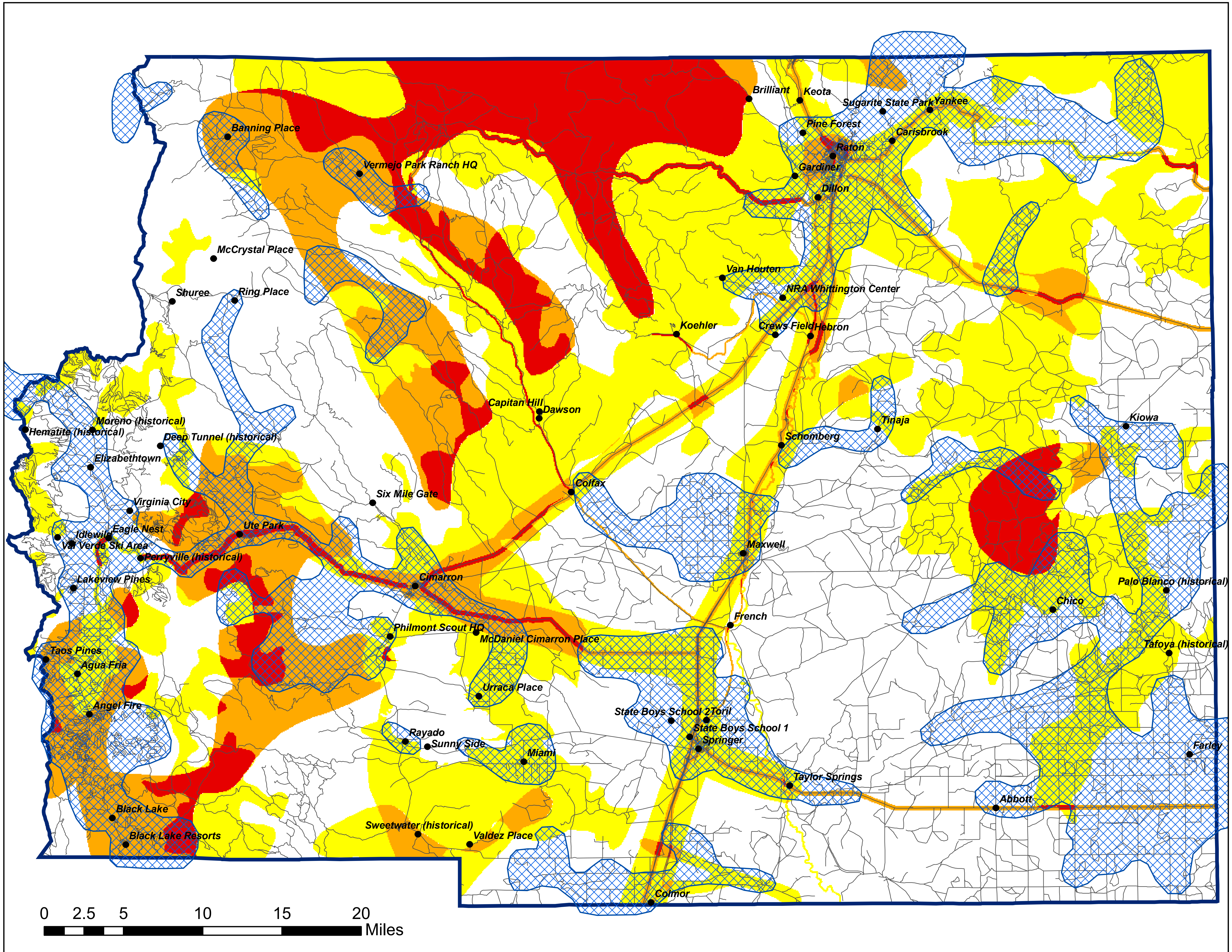
Black Lake
Black Lake Resorts
Sweetwater (historical)
Valdez Place
Colmor

Cimarron Watershed Alliance

CWPP Risk Assessment Map

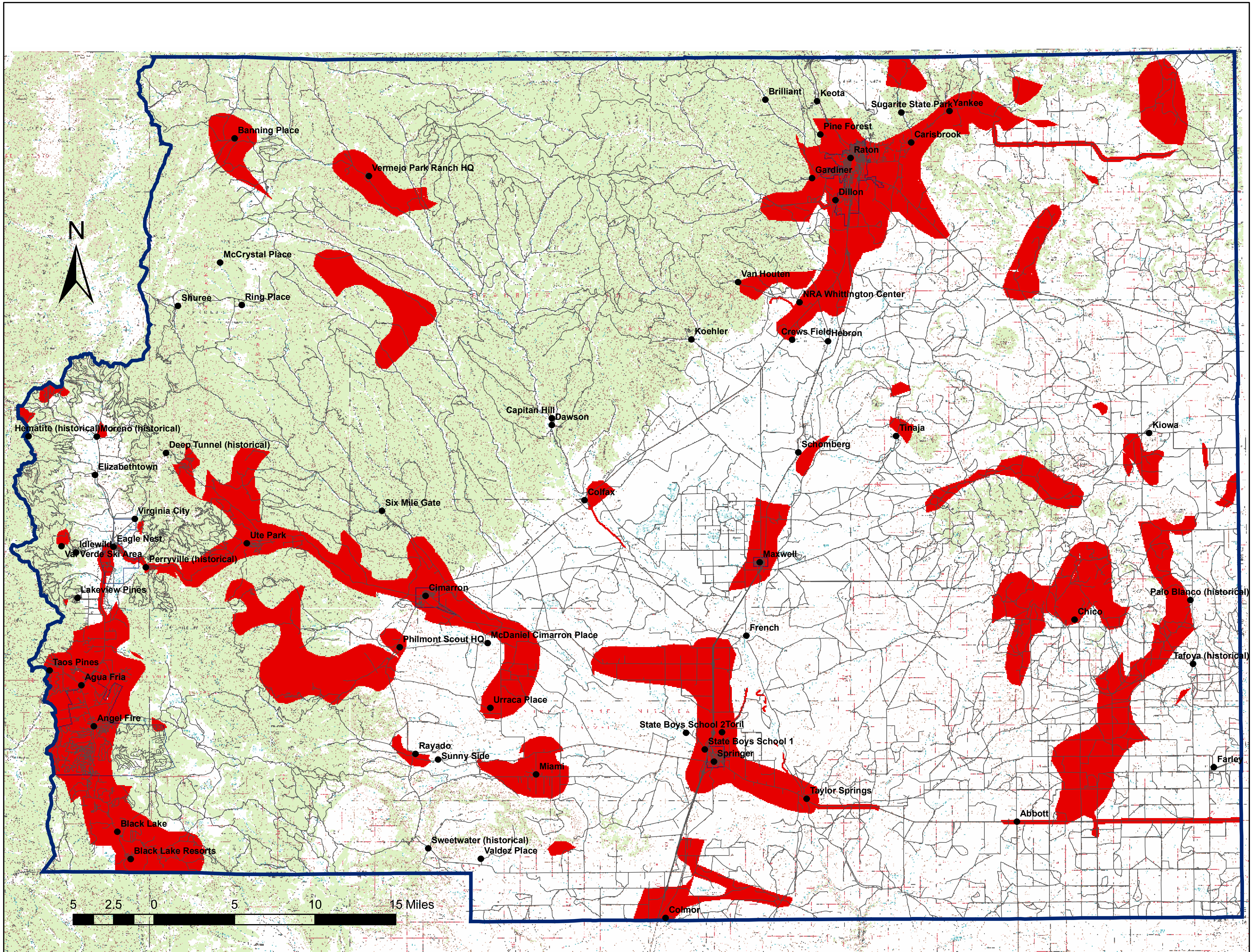
FIGURE 8



Threat Level

- 4
- 5
- 6
- Area of Human Value

N



CWPP WUI Map

FIGURE 9

- WUI
- Colfax County

Table 3. Community Wildfire Risk Rating.

COMMUNITY	HAZARD	RISK	THREAT SCORE	RISK OF WILDFIRE RATING
Abbott	Medium	Low	3	Low
Agua Fria	Low	High	4	Medium
Angel Fire	Medium	High	5	High
Bartlett	Medium	Medium	4	Medium
Black Lake	Medium	High	5	High
Black Lake Resorts	Medium	High	5	High
Carisbrooke	Medium	Medium	4	Medium
Cimarron	High	Medium	5	High
Colfax	Medium	Medium	4	Medium
Eagle Nest	Low	Low	2	Low
Elizabethtown	Low	Low	2	Low
Elk Ridge	Medium	High	5	High
Farley	Medium	Low	3	Low
Gardiner	High	Low	4	Medium
Hidden Lake	Medium	High	5	High
Idyllwild	Medium	Low	3	Low
Lakeview Pines	Medium	Low	3	Low
Linwood	Medium	Medium	4	Medium
Maxwell	Medium	Medium	4	Medium
Miami	High	Low	4	Medium
NM Boys School	Medium	Low	3	Low
Philmont Headquarters	High	Low	4	Medium
Pine Forest	High	Low	4	Medium
Raton	High	Medium	5	High
Rayado	High	Low	4	Medium
Springer	Medium	Medium	4	Medium
Sugarite	Medium	Low	3	Low
Sugarite State Park	Medium	High	5	High
Taos Pines	Medium	High	5	High
Taylor Springs	Medium	Medium	4	Medium
Tinaja	Medium	Low	3	Low
Ute Park	High	High	6	Very High
Vermejo Park Ranch Headquarters	High	High	6	Very High
Whittington Center	Medium	Medium	4	Medium
Yankee	Medium	Medium	4	Medium

Very High Risk Communities
The communities that are rated very high in risk of wildfire are Ute Park, and Vermejo Park Ranch headquarters. These communities should be the highest priority for wildfire fuels mitigation treatment. Ute Park developed a community wildfire protection plan in 2006, and this plan adds to that information with an intensive evaluation of wildfire conditions in the area. A supplement to this plan, the CWA Communities CWPP, provides community-specific descriptions and recommendations for Cimarron, Eagle Nest, Miami, and Ute Park.

High Risk Communities
The communities of Angel Fire, Black Lake, Black Lake Resorts, Cimarron, Elk Ridge, Hidden Lake, Raton, Sugarite State Park, and Taos Pines were all rated as high risk of wildfire in this Colfax County CWPP. Elk Ridge and Hidden Lake completed CWPPs in 2006 which are posted on the New Mexico Forestry website.

Sugarite State Park consists of a high threat level in the northern part and a low threat level in the southern part of the park. In 2006 and 2007, considerable fuels reduction took place in the northern part of the park, and at present those treated areas would be rated as a medium threat; however, as the vegetation grows up in those areas, the rating will return to high.

Special consideration is given to Idyllwild and Lakeview Pines, which are rated as low risk based on the evaluation criteria used in the Colfax County CWPP. However, both communities were frequently mentioned during the public meetings as communities at risk because of heavy fuel conditions on the adjacent Taos Pueblo lands. For this reason, they are also considered as high risk communities and displayed in figure 10.

Enchanted Circle Communities
The Enchanted Circle Community Wildfire Protection Plan includes some of the communities listed in this Colfax County CWPP. They are the communities of Angel Fire, Black Lake, Eagle Nest, Idyllwild, and Lakeview Pines.

Several communities which received a risk of wildfire rating in the Colfax County CWPP also received ratings in the Enchanted Circle CWPP and the NM Communities at Risk Assessment Plan. Because different evaluation criteria were used, many communities received different risk ratings. Table 4 displays those communities which had risk ratings in multiple plans.

Table 4. Community Wildfire Rating Comparison

COMMUNITY	Colfax CWPP	Enchanted Circle CWPP	NM Communities at Risk
Angel Fire	High	High	--
Bartlett	Medium	--	High
Black Lake	High	High	--
Carisbrooke	Medium	--	Low
Eagle Nest	Low	Low	--
Gardiner	Medium	--	Medium
Idyllwild	Low	High	--
Lakeview Pines	Low	High	--
Linwood	Medium	--	High
Pine Forest	Medium	--	High
Raton	High	--	High
Sugarite	Low	--	High
Sugarite State Park	High	--	High

D. WATERSHEDS

Several watersheds within the County have been identified as having special value or concern, and are discussed in this plan.

Moreno Valley Watershed

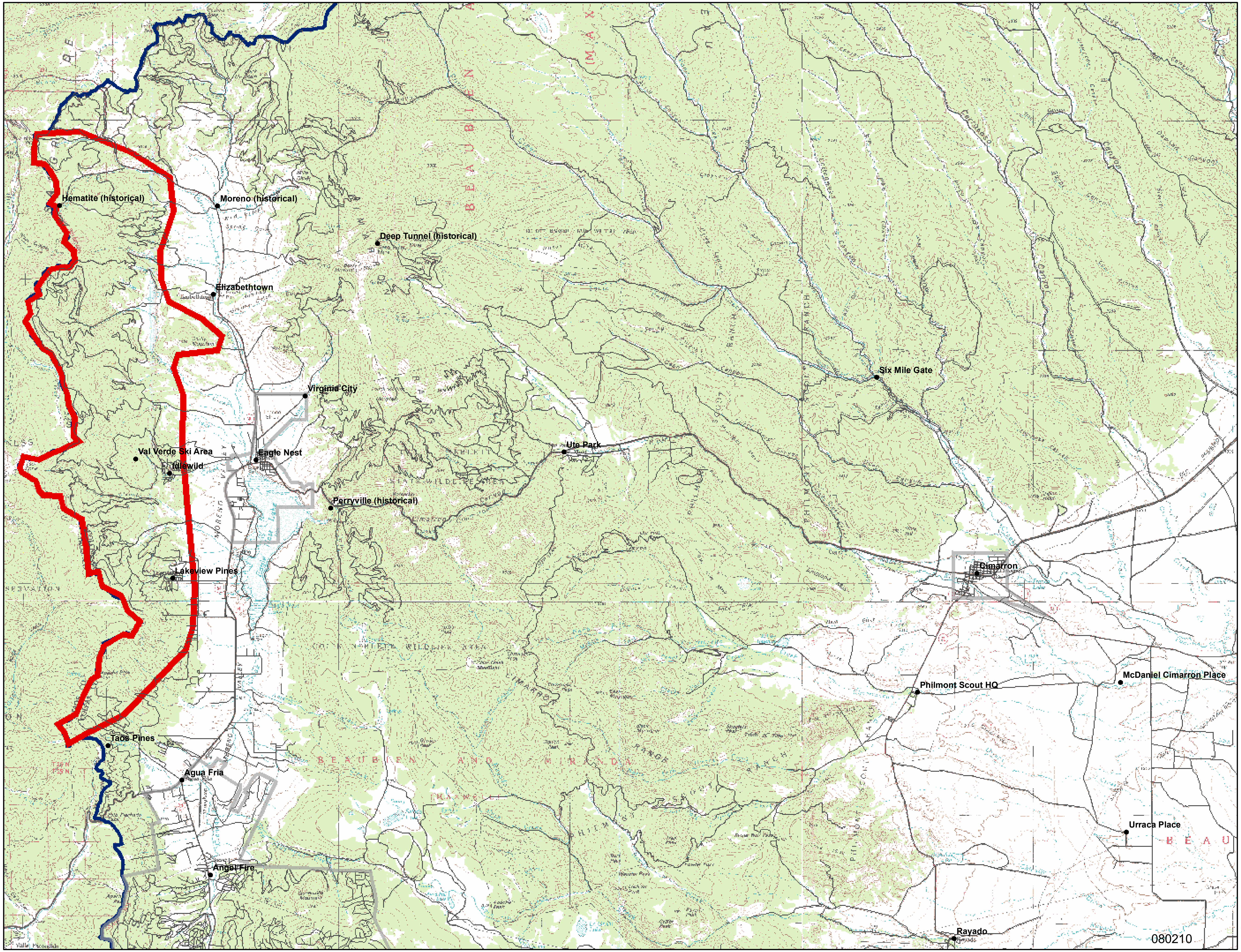
The entire Moreno Valley watershed, as shown in figure 11, is identified as a concern because of the potential degradation of water quality in Eagle Nest Lake. Because of the recreation associated with the lake, it is an important economic factor for the area. The lake is the major source of stream flow for the Cimarron River, which also is a major economic factor within the County. The communities of Raton, Cimarron, and Springer have rights to, and do use the Cimarron River as a source of domestic water.

A major wildfire in the Moreno Valley Watershed would adversely affect the water quality of Eagle Nest Lake, and could result in economic hardship and stress within the County. An overall assessment and inventory of the watershed should be undertaken. The assessment and inventory information and data would be invaluable in evaluating need and design for future projects within the watershed.

Several water quality monitoring projects are currently in place on streams feeding the lake, and there have been several wildfire fuels mitigating projects within the watershed, but many more are needed in order to protect water quality.

Sugarite Canyon Watershed (Upper Chicorica Creek)

This watershed is very important as a recreation area and as a municipal water source. Figure 12 shows the watershed boundary in Colorado and New Mexico. Because of this importance, the watershed has received considerable attention in wildfire fuels reduction plans and treatments. The city of Raton is dependent upon this watershed for domestic water, and consequently there is strong incentive for maintaining the quality of water



Cimarron Watershed Alliance

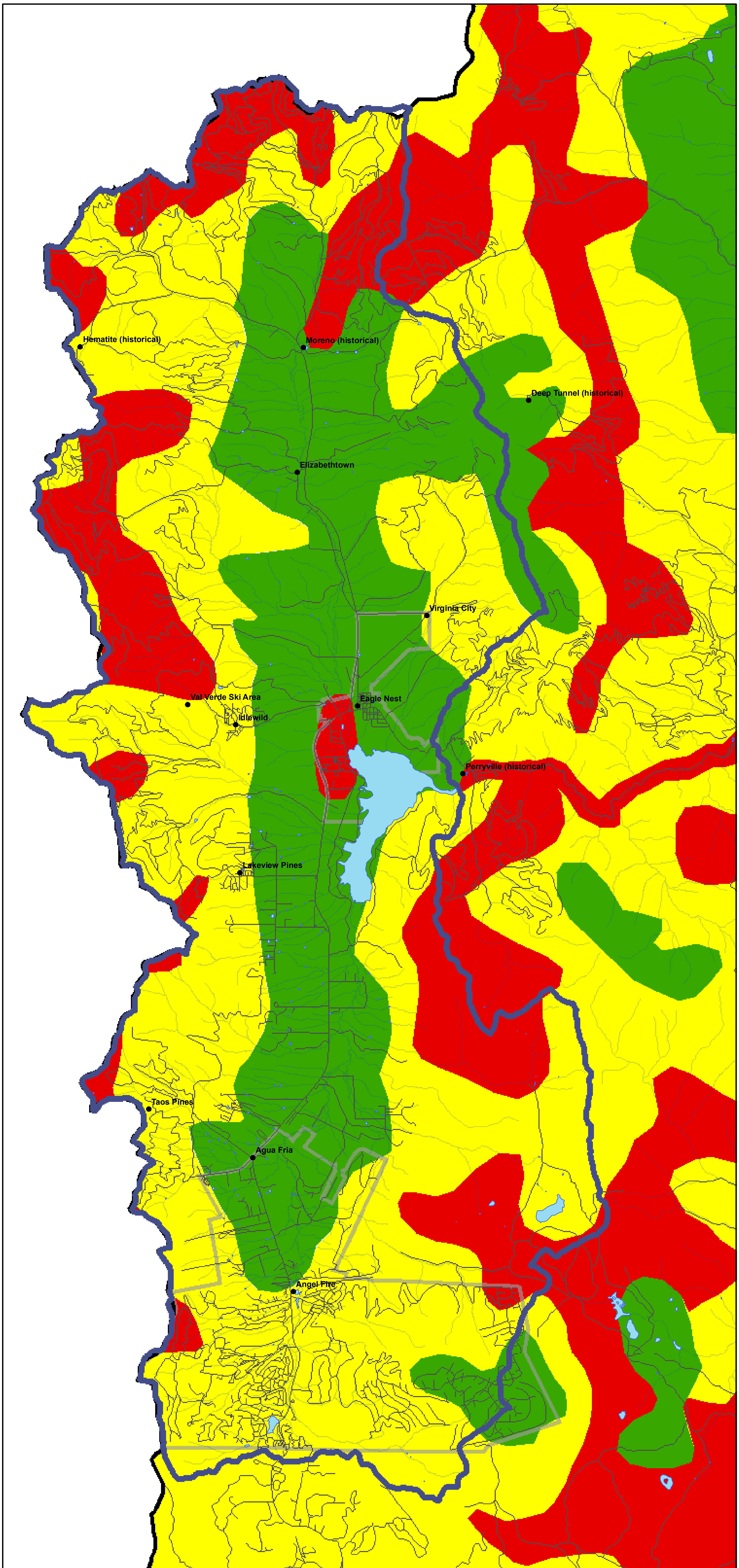
Idlewild and Lakeview Pines WUI

FIGURE 10

WUI Boundary
Colfax County

N

2.5 1.25 0 2.5 Miles



Moreno Valley Subwatershed

CWPP Fuel Hazard FRCC

FIGURE 11

Moreno Valley Subwatershed

NHDWaterbody

NHDFlowline

FRCC Fuel Hazard

<all other values>

hazard

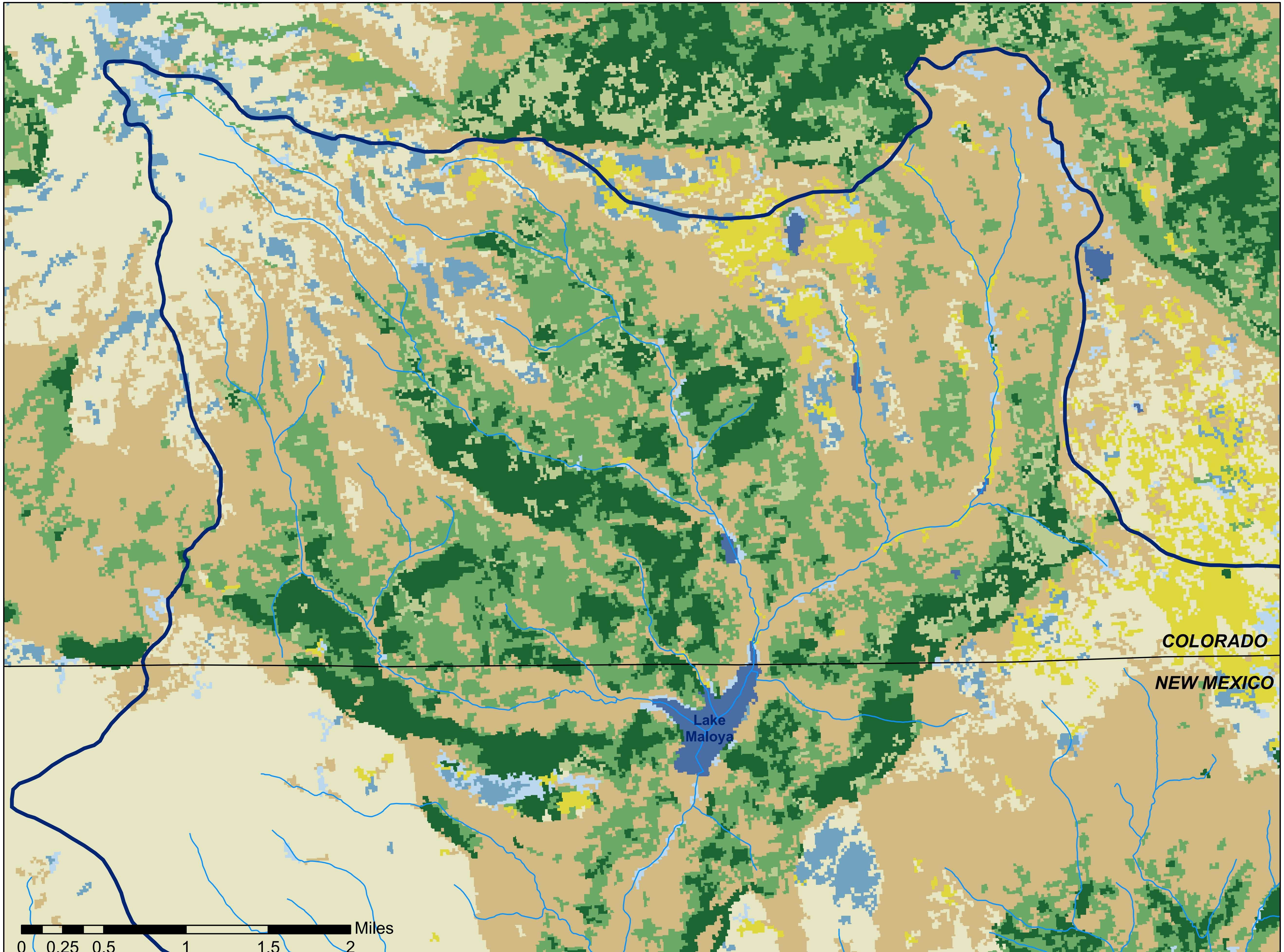
1 - Low

2 - Medium

3 - High

1 0.5 0 1 Miles

N



Cimarron Watershed Alliance

Sugarite Canyon Watershed Map

USGS National Landcover 2001

FIGURE 12

NHDFlowline
UpperChicoricaWatershed
NLCD Landcover Types
- Open Water
- Deciduous Forest
- Evergreen Forest
- Mixed Forest
- Shrub/Scrub
- Grassland/Herbaceous
- Pasture/Hay
- Woody Wetlands
- Emergent Herbaceous Wetlands

N

from the watershed. This watershed lies in both New Mexico and Colorado, and as such presents a unique opportunity for this community wildfire protection plan to include parts of two states.

The City of Raton, New Mexico holds title to a sizable portion of the watershed in both states, and has arrangements with the Colorado Division of Wildlife to manage the approximately 5,500 acres it owns in Colorado. The approximately 3,000 acres of City owned land in the New Mexico portion of Sugarite Canyon is managed as a state park by the State of New Mexico.

The City of Raton has used a collaborative planning process to identify and initiate Sugarite watershed activities, and currently a stewardship plan is under development for the Sugarite Canyon area. Considerable fuel reduction treatments have already been completed, and the new stewardship plan will identify additional treatment areas. Figure 13 displays the history of treatments in both Colorado and New Mexico. The Sugarite Plan objectives include: 1) reducing ladder and ground fuels, 2) removing small-diameter materials, where cost effective, while crushing or reducing the remaining slash to lower fuel load, 3) protecting and enhancing the grassy and forb under story to protect and stabilize soils while retaining natural diversity, 4) protecting wildlife and recreation interest on a landscape scale in Sugarite Canyon State Park and the Dorothy Lake Wildlife Area, and 5) creating long-term fire-safe forest conditions by preventing the buildup of unnatural fuel loads.

For the purpose of reference, figure 14 displays the hazard areas in the Sugarite Canyon Watershed as developed using the procedure employed for the Colfax County CWPP.

Ponil Creek Watershed

The Ponil Creek Watershed, displayed in figure 15, suffered from a wildfire in 2002, which burned 92,500 acres, and covered much of the watershed. Restoration activities designed to stabilize the soil and reestablish vegetation need to be considered as part of this wildfire protection plan. The Ponil fire burned U.S. Forest Service land (Valle Vidal), State Wildlife Area (Elliot Barker) as well as private land.

Ponil Creek, because of the confluence location with the Cimarron River, is a source of domestic water for the town of Springer. The Ponil Complex Fire was the cause of considerable ash in the water supply for Springer, and any future wildfire in the Ponil Creek Watershed could also be the cause of ash in the municipal water supply.

About one-half of the Ponil Creek Watershed was burned during the wildfire of 2002, and the unburned portion still has the potential for a wildfire. Citizens of the area are concerned about additional wildfires in the watershed.

Cimarroncito Reservoir Watershed

This watershed, which is the drainage of Cimarroncito Creek upstream from Cimarroncito Reservoir is a major part of the municipal water supply for the town of Cimarron. The watershed is displayed in figure 16. Any wildfire within the watershed has the potential of seriously degrading the water quality, which can in turn have a negative impact on the town of Cimarron's ability to supply domestic water. Measures to minimize the threat of wildfire within the watershed are of a high priority.

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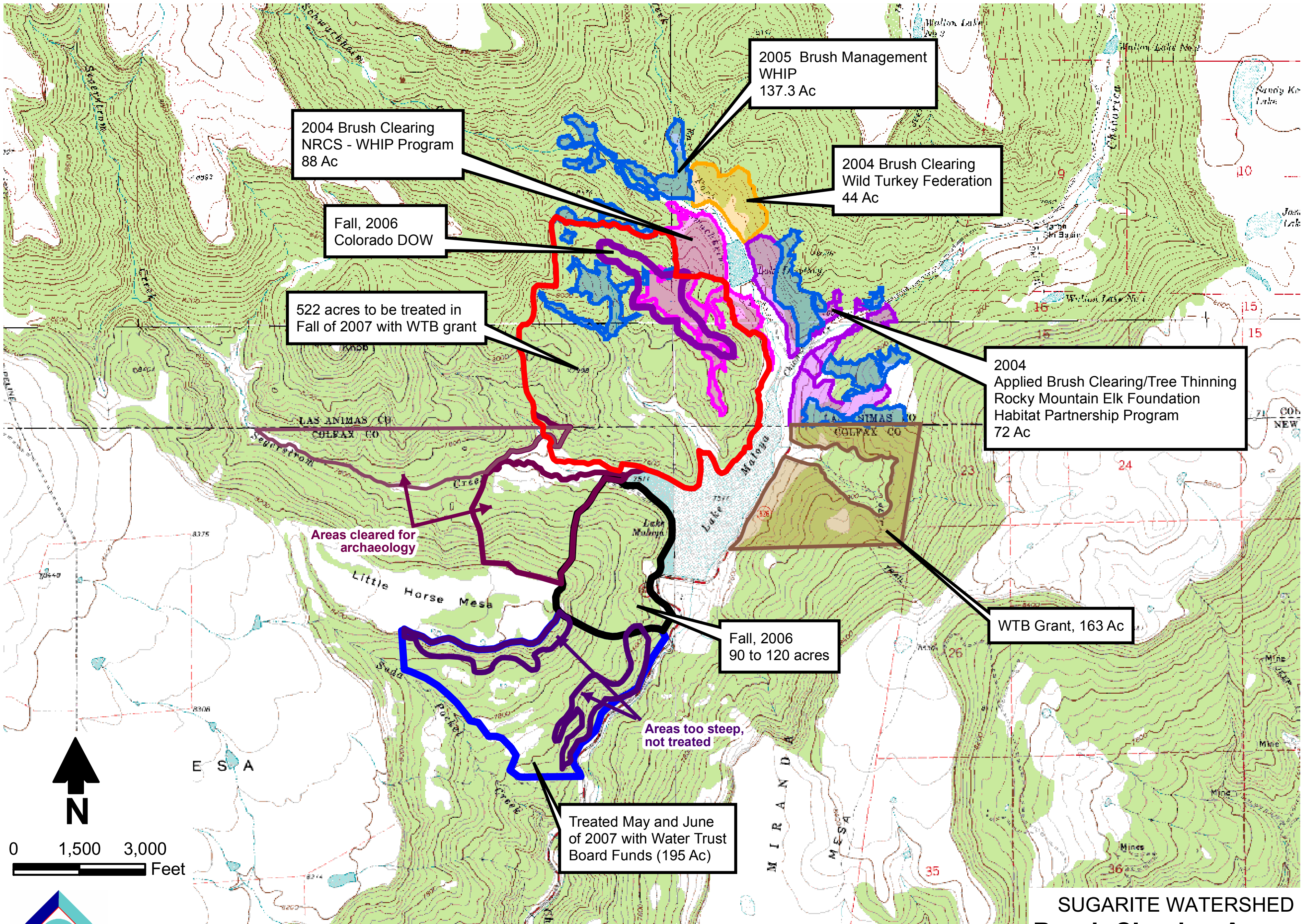
PRELIMINARY SUBJECT TO REVISION



SUGARITE WATERSHED

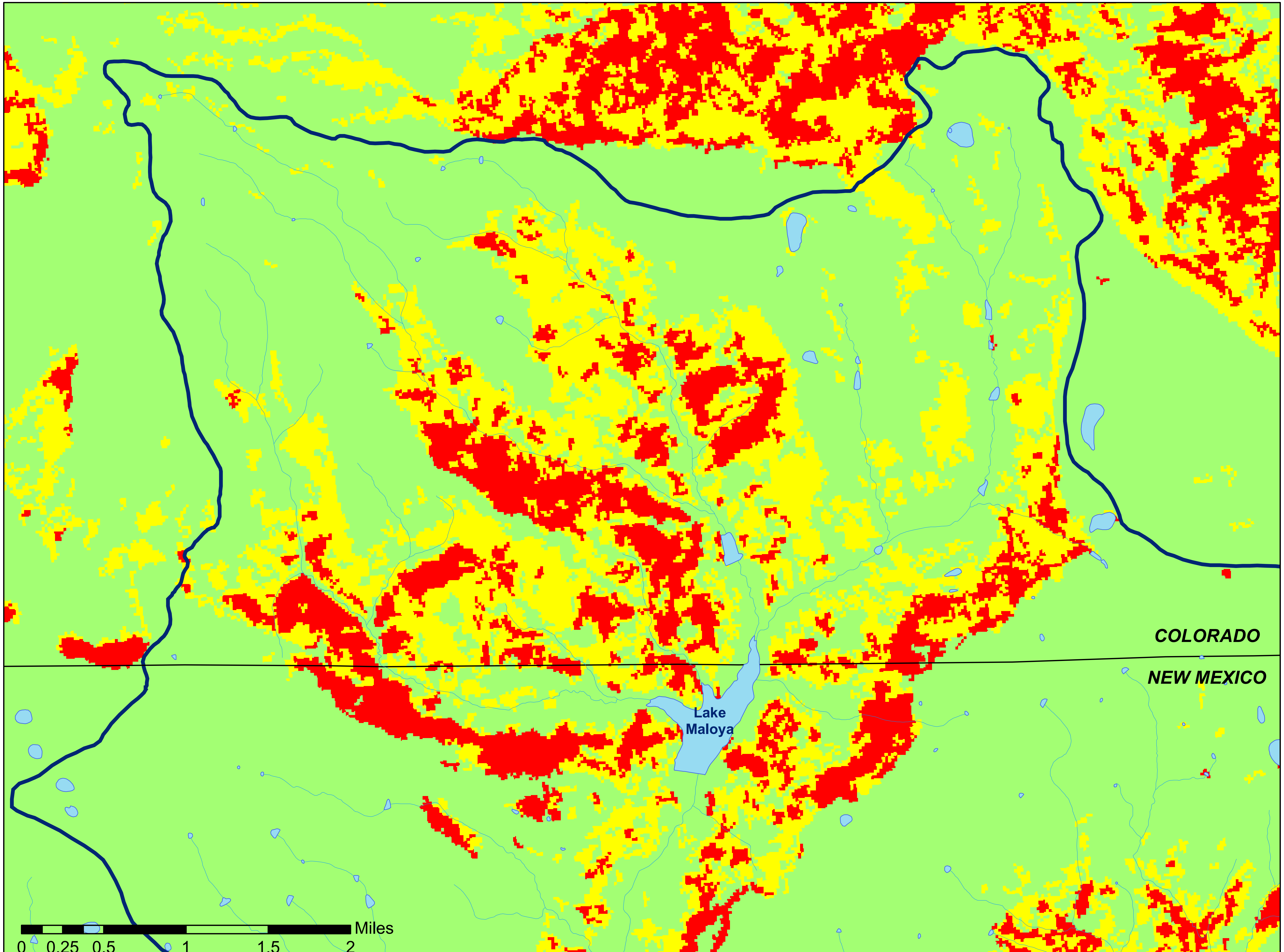
Brush Clearing Areas

Daniel B. Stephens & Associates, Inc.

01/17/2008

JN WR07.0043

FIGURE 13



Cimarron Watershed Alliance

Sugarite Hazard Map

CWPP Fuel Hazard

reclassified from USGS National Landcover 2001

FIGURE 14

UpperChicoricaWatershed
NHDFlowline
1-Low
2-Medium
3-High
NHDWaterbody

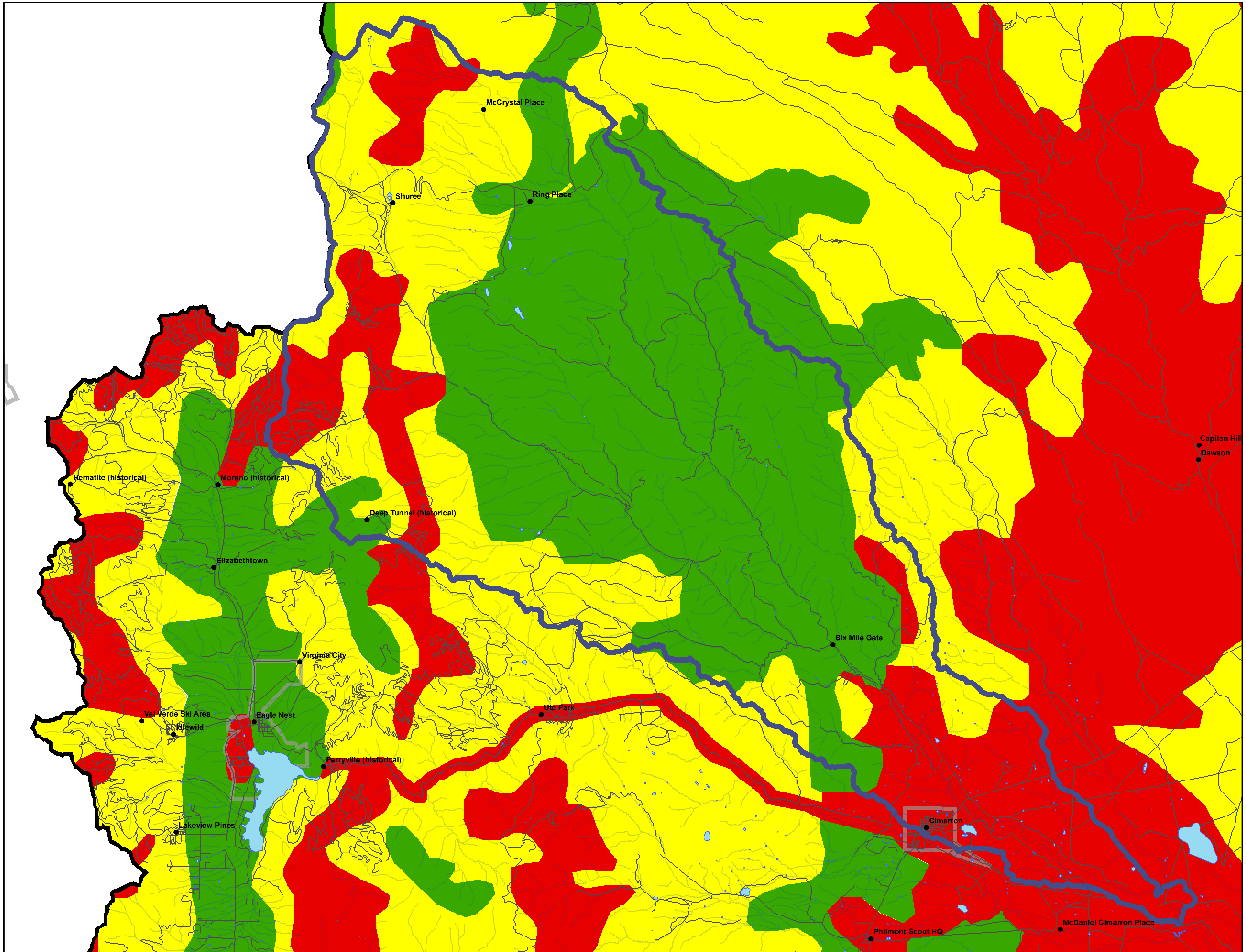
N

Cimarron Watershed Alliance

Ponil Creek Subwatershed

CWPP Fuel Hazard FRCC

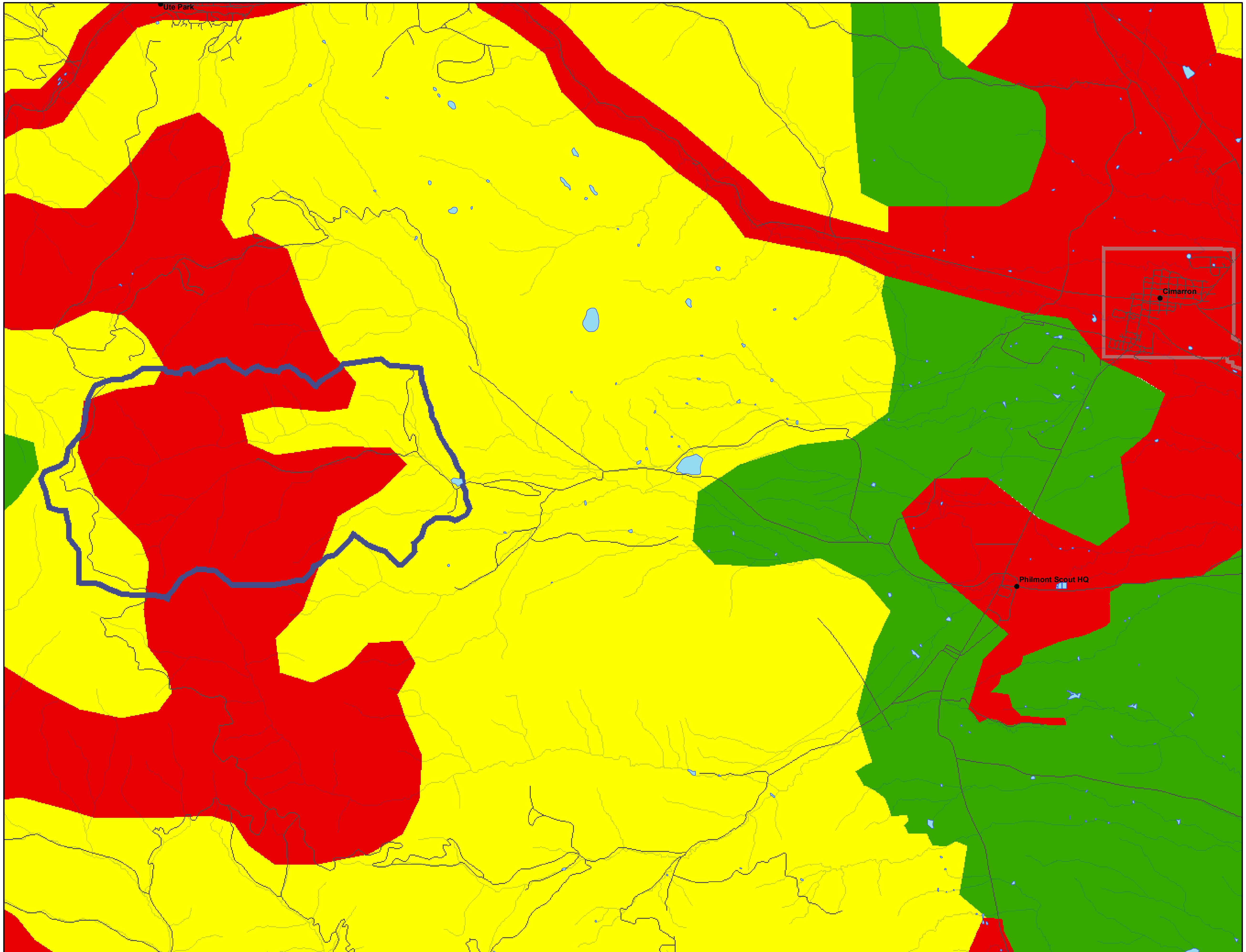
FIGURE 15



Ponil Creek Subwatershed
NHDWaterbody
NHDFlowline
FRCC Fuel Hazard
<all other values>
hazard
1 - Low
2 - Medium
3 - High

N

2 1 0 2 Miles



Cimarron Watershed Alliance

Cimarroncito Res. Subwatershed

CWPP Fuel Hazard FRCC

FIGURE 16

Cimarroncito Subwatershed
NHDWaterbody
NHDFlowline

FRCC Fuel Hazard

<all other values>

hazard

1 - Low
2 - Medium
3 - High

N

0.7 0.35 0 0.7 Miles

E. MISCELLANEOUS VALUES

Canadian River

The Canadian River spans the entire county and is a major geographical feature influencing considerable area. Salt cedar invasion has changed the natural vegetation composition to one that is much more flammable and burns with more intensity. A wildfire in the Canadian River bottoms has the potential of spreading through many areas outside the river bottom.

Cimarron Canyon

The recreation value of the canyon is very high, and a wildfire within the watershed could drastically impact the recreation potential within the canyon. Mud and rock flows as an aftermath of catastrophic wildfire within the watershed could destroy much of the beauty of the canyon as well as the river fishery. Wildfire fuels mitigating projects are necessary within the watershed if a disaster is to be averted.

Coal-bed Methane

The infrastructure associated with the extraction of coal-bed methane on the Vermejo Park Ranch is becoming increasingly complex and valuable. In most cases the infrastructure is located in high hazard areas and could be threatened by wildfire.

CHAPTER THREE – WILDFIRE SCIENCE

A. WILDFIRE SCIENCE AND DISCUSSION

In order to change potential wildfire conditions and impact the associated fuels, it is necessary to understand the various types of wildfire and the conditions in which they exist. The following description of the various types of wildfire was taken from USDA Forest Service Research Paper RMRS-RP-29. 2001.

Fire scientists and managers recognize three general types of wildland fire, depending on the fuel stratum in which the fire is burning.

1) A ground fire is one that burns in the ground fuels such as duff, organic soils, roots, rotten buried logs, and so forth. Ground fuels are characterized by higher bulk density than surface and canopy fuels. Ground fires burn with very low spread rates, but are sustainable at relatively high moisture contents. Fuel consumption through ground fire can be great, causing significant injury to trees and shrubs. Although ground fuels can be ignited directly, they are most commonly ignited by a passing surface fire.

2) A surface fire is one that burns in the surface fuel layer, which lies immediately above the ground fuels but below the canopy, or aerial fuels. Surface fuels consist of needles, leaves, grass, dead and down branch wood and logs, shrubs, low brush, and short trees. Surface fire behavior varies widely depending on the nature of the surface fuel complex.

3) A crown fire is one that burns in the elevated canopy fuels. Canopy fuels normally consumed in crown fires consists of the live and dead foliage, lichen, and fine live and dead branch wood found in a forest canopy. They have higher moisture content and lower bulk density than surface fuels. We generally recognize three types of crown fire: passive, active, and independent.

A passive crown fire, also called torching or candling is one in which individual or small groups of trees torch out, but solid flame is not consistently maintained in the canopy. Passive crowning encompasses a wide range of fire behavior, from the occasional tree torching out to a nearly active crown fire. The increased radiation to surface fuels from passive crowning increases flame front spread rate, especially at the upper end of the passive crown fire range. Embers lofted during passive crowning can start new fires downwind, which make containment more difficult and increases the overall rate of fire growth. Passive crowning is common in many forest types, especially those with an under story of shade-tolerant conifers.

An active crown fire, also called a running or continuous crown fire, is one in which the entire surface/canopy fuel complex becomes involved, but the crowning phase remains dependent on heat from the surface fuels for continued spread. Active crown fires are characterized by a solid wall of flame extending from the fuel bed surface through the top of the canopy. Greatly increased radiation and short-range spotting of active crown fires lead to spread rates much higher than would occur if the fire remained on the surface.

Medium and long-range spotting associated with active crowning leads to even grater rates of fire growth.

An independent crown fire is one that burns in canopy fuels without aid of a supporting surface fire. Independent crown fires occur rarely and are short lived, requiring a combination of steep slope, high wind speed, and low foliar moisture content. Many apparently independent crown fires may actually be active crown fires in which the canopy phase is momentarily pushed ahead of the surface phase under the influence of steep slope or strong wind (Scott, Joe H, Reinhardt, Elizabeth D. 2001. Assessing crown fire potential by linking models of surface and crown fire behavior. USDA Forest Service, Rocky Mountain Research Station, research paper RMRS-RP-29. 3-6).

Covington, while speaking about western forest conditions, stated that of particular concern is the occurrence in recent years of widespread crown fires that are dangerous to human lives, damaging to human communities, and ecologically harmful (Covington, W.W. 2000. Helping western forest heal. Nature 408(6809):135-163).

With that in mind and based on the collective ideas of the core group and stakeholders, the Colfax County CWPP is primarily directed at crown fire potential, and treatments that minimize crown fire occurrence, than with other types of wildfire. Dealing with crown fires requires knowledge of fuel conditions requisite for a crown fire to begin and sustain itself.

Fire behavior and severity depend on the properties of the various fuel (live and dead vegetation and detritus) strata and the continuity of those fuel strata horizontally and vertically. The fire hazard for any particular forest stand or landscape can be characterized by the potential for the fuels to cause specific types of fire behavior and effects. Understanding the structure of fuelbeds and their role in the initiation and propagation of fire is the key to developing effective fuel management strategies (Graham, Russell T, McCaffrey, Sarah, Jain, Theresa B. 2004. Science basis for changing forest structure to modify wildfire behavior and severity. USDA Forest Service, Rocky Mountain Research Station, General Technical Report RMRS-GTR-120. 8-12).

Fuelbeds are classified in six strata: (1) tree canopy, (2) shrubs/small trees, (3) low vegetation, (4) woody fuels, (5) moss, lichens, and litter, and (6) ground fuels (duff). Each of these strata can be divided into separate categories based on physiognomic characteristics and relative abundance. Modification of any fuel stratum has implications for fire behavior, fire suppression, and fire severity (Graham. 2004).

The categories within the fuelbed strata that the Colfax County CWPP is concerned with are the surface fuels and the canopy fuels. Graham (2004) describes surface fuels as consisting of grasses, shrubs, litter, and woody material lying on, or in contact with the ground surface, and he describes crown fuels as those suspended above the ground in trees or vegetation (vines, mosses, needles, branches, and so forth). He further states that high surface fire intensity usually increases the likelihood for igniting overstory canopy fuels, but surface fuel types with longer residence times can contribute to drying aerial fuels in a forest canopy, which also leads to torching (when a tree's or group of trees' foliage ignites carrying the fire into the canopy).

Graham (2004) describes crown fuels as the biomass available for crown fire, which can be ignited from a surface fire via the understory shrubs and trees, or from crown to crown. The shrub/small tree stratum is also involved in crown fires by increasing surface fireline intensity and serving as "ladder fuels" that provide continuity from the surface fuels to canopy fuels, thereby facilitating crown fires. These essentially bridge the vertical gap between surface and crown strata. The size of this gap is critical to ignition of crown fire from a surface fire below.

Aerial fuels separated from surface fuels by large gaps are more difficult to ignite because of the distance above the surface fire, thus requiring higher intensity surface fires, surface fires of longer duration that dry the canopy before ignition, or mass ignition from spotting over a wide area. Once ignited, high density canopy fuels are more likely to result in a spreading crown fire (active crown fire) than low density canopies (Graham 2004).

The nature of crown fires--- intense, fast moving, and destructive---suggests that potential for damage is great whenever a crown fire occurs. Assessing the hazard posed by crown fire is therefore a matter of assessing the potential for their occurrence—of identifying the physical situations that lead to crown fire occurrence (Scott 2001).

The most effective strategy for reducing crown fire occurrence and severity is to (1) reduce surface fuels, (2) increase height to live crown, (3) reduce canopy bulk density, and (4) reduce continuity of the forest canopy (Graham, 2004).

B. TYPES AND IMPACTS OF TREATMENTS

Fire behavior responds to fuels, weather, and topography. Changes to fuels, for example from prescribed fire burning or thinning, are related to potential fire behavior at that site and have resulted in reduced severity of wildfires where fuel treatments have occurred. For many fuel management objectives, the goal is to limit surface fires from becoming crown fires (Finney. 2003).

The Colfax County CWPP has as one of its objectives, minimizing severe wildfire, and because crown fires are the main contributor to a wildfire being considered severe, fuel conditions that are conducive to crown fires must be modified in order to eliminate severe wildfire.

The three basic categories of tools available to forest managers for altering vegetative conditions are prescribed fire, mastication or mowing, and thinning. The effectiveness of each of these methods in altering the structure of or reducing the amount of ground and ladder fuels, and reducing crown bulk density is different. Consequently, each of these leaves residual stands with different vegetative characteristics and environmental effects. Each type of treatment also has a different set of financial costs, and in times of tight budgets the choice of which method to use is important in achieving the best combination of risk reduction and environmental effects within the available budget (Fight, Roger D, Barbour, James R. 2005. Financial analysis of fuel treatments. USDA Forest Service, Pacific Northwest research Station, General Technical Report PNW-GTR-662. 1-2).

Prescribed fire is generally used to remove ground fuels, under story vegetation, and small trees, and sometimes to kill larger trees. It is not a precise way of reducing stand density, and several prescribed fires spread over many years are often necessary to accomplish management objectives. Prescribed fire is, however, often seen as more environmentally benign than other methods for modifying vegetation.

Mastication or grinding is a special case of thinning without removal of the thinned materials. In the case of mastication, the thinned materials are ground and left on the site. This does not remove the biomass, but cuts it into smaller pieces leaving the material distributed on the ground, adding to the surface fuel load. If the masticated material exceeds 2 or 3 inches, there is a potential to alter the moisture regime adversely affecting tree growth and survival.

Thinning is also quite precise and, like prescribed fire, can include removal of biomass from the site, some of which may be in the form of merchantable trees. Thinning is not particularly useful at reducing under story plants or ground fuels, and it typically adds to the surface fuel load in the form of tops and limbs if not removed. In the Southwest it is generally recommended to pile and burn thinned trees, chip or remove from the site. Like mastication, the precision of thinning makes it useful for accomplishing large changes in vegetative structure and composition in one entry (Fight 2005).

There is no one-size-fits-all recommendation for how mechanical thinning or prescribed fire should be used at a given location in order to reduce wildfire risk, but thinning of both canopy and ladder fuels is generally needed to reduce crown fire potential (Lowe, Kimberly. 2006. Northern Arizona University, Ecological Restoration Institute, Working papers in southwestern ponderosa pine forest restoration, number 15).

In trying to determine how much to reduce canopy density and ladder fuels, land managers have available several fire behavior prediction software packages that can model fire behavior given a set of forest conditions, such as fuel load, fuel moisture, canopy bulk density, slope, elevation, and wind speed. The programs can then predict the speed and direction of the fire, flame length, rate of spread, fuel consumption, smoke production, and crown fire indices (Lowe 2006). By using several different scenarios in a fire behavior computer model, a plan for fuels reduction that best meets the needs of the areas values can be determined. Also, the cost of treatment and the treatments long-term effectiveness must be considered.

In 2003 a publication titled “Reducing Crown Fire Hazard in Fire-Adapted Forests of New Mexico” reported the results of an analysis of three different fuel reduction treatment prescriptions in the ponderosa pine and dry mixed conifer forest types to test the impact on fire behavior and long term effectiveness.

The three prescriptions were: (1) thin from below; remove all trees smaller than 9 inches in diameter at breast height (acronym of DBH and is 4.5 feet above ground level), (2) Diameter limit; reserve all trees greater than 16 inches DBH; however, if reserve basal area (acronym BA, and is defined as the square feet per acre of solid wood) is less than 50, reserve additional trees less than 16 inches DBH until the BA equals 50, and (3) Restoration; ecologically-based restoration of sustainable structure and composition, reserve a target BA of 40 to 50, primarily comprised of larger trees, although trees remain throughout the diameter distribution (Fiedler, Carl E, Keegan, Charles E. 2003. Reducing crown fire hazard in fire-adapted forests of New Mexico. USDA Forest Service Proceedings, RMRS-P-29. 39-48).

The three different prescriptions were put into a computer fire behavior computer model, and the analysis showed that hazard reduction treatments differ substantially in their potential to reduce crown fire potential. Of particular interest to this CWPP and severe wildfire potential were the treatment effects on the crowning index. The crowning index is defined as the wind speed, in miles per hour (mph), necessary to sustain a crown fire once a fire has reached the main canopy.

In a dense canopy, as one tree crown torches and burns, it will be close enough to other trees to pre-heat and ignite those crowns. In a less dense canopy (trees further apart) the trees will not be close enough together for a tree that is torching to pre-heat and ignite the neighboring trees without the aid of wind. In general the denser the canopy the lower the wind speed necessary to sustain the crown fire, and vice versa. The design of treatments that modify canopy density should consider anticipated wind speeds during fire seasons.

Fiedler reported that the pre-treatment crowning index for all three prescriptions was 16. The thin from below treatment moved the crowning index from 16 to 39. The diameter limit treatment resulted in a crowning index of 61, and the comprehensive treatment resulted in a crowning index of 66.

The study further used crowning index as the primary variable in quantifying forest hazard conditions into high, medium, or low. Fiedler defined high-hazard forest conditions as having a crowning index less than 25 mph, moderate hazard from 25 to 50 mph, and low hazard as greater than 50 mph.

Each prescription moved a percentage of the treatment area from high hazard into low hazard. The thin from below prescription moved 18 percent of the treated area into low hazard. The diameter limit and comprehensive prescriptions moved 72 percent and 79 percent of the treated area into the low hazard category, respectively.

Also of concern is the time period for which the treatment is effective in retaining an area in the low hazard category. Fiedler used a 30 year time frame, and the results were that the thin from below treatment was effective in retaining 13 percent of the area as low hazard. The results were much better for the other two treatments, with diameter limit retaining 62 percent and comprehensive retaining 62 percent of their respective areas in low hazard.

Table 5 shows the results of the treatments.

Table 5. EFFECTIVENESS OF HAZARD REDUCTION TREATMENTS

TREATMENT IMPACT ON CROWNING INDEX

Hazard Reduction Treatment	Average Crowning Index Before Treatment	Average Crowning Index After Treatment	Average Crowning Index 30 Years After Treatment
	(MPH)	(MPH)	(MPH)
Thin-from-below	16	39	37
Diameter limit	16	61	57
Restoration	16	66	56

TREATMENT EFFECTIVENESS ON AREAS TREATED

Hazard Reduction Treatment	Acres Rated Low Hazard After Treatment	Acres Rated Low Hazard 30 Years After Treatment	
	(percent)	(percent)	
Thin-from-below	18	13	
Diameter limit	72	62	
Restoration	79	62	

In referring to the study, Fiedler concluded: Results of this study show that the fire hazard problem in New Mexico is best addressed by forest restoration approaches that recognize the broader ecological context within which hazard occurs. Whether degraded, fire-adapted forests are viewed from the standpoint of hazard reduction or ecological condition, an approach that centers on the density, structure, and species composition of the reserve stand is superior to prescriptions that focus only on the size of trees removed. The restoration prescription evaluated in this analysis achieves greater hazard reduction, and creates more sustainable conditions than alternative treatments. It is particularly superior when compared prescriptions with a singular focus on removal of small trees (Fiedler 2003).

Mastication modifies the form of ground fuels, understory plants of various sizes, and sometimes fairly large trees (15 to 20 inches in diameter). Mastication is more precise than prescribed fire because human judgment is used to target particular trees and shrubs. Accordingly, managers can use mastication to achieve specific stand density and vegetative composition goals in a single entry. Mastication changes fuel structure by grinding or chopping vegetation into smaller pieces that lay close to or on the ground, but it does not reduce fuel loads, it only rearranges the fuel (Fight 2005).

In ecosystems where high-intensity fire is not acceptable, the routine use of prescribed fire should change the wildfire regime such that it will be characterized by smaller and less severe fires from both the ecological and economic perspective. The best results of prescribed fire application are likely to be attained in heterogeneous landscapes and in climates where the likelihood of extreme weather conditions is low. Prescribed fire impacts the behavior and effects of large wildfires, but it is unlikely that the fuel effect will override extreme weather conditions to the extent of actually inhibiting fire spread (Fernandes, Paulo M, Botelho, Herminio S. 2003. A review of prescribed burning effectiveness in fire hazard reduction. International Journal of Wildland Fire. 117-124).

While managing fire-adapted forests with prescribed fire is often the least expensive option to reduce hazardous fuels when utilization opportunities are limited, there are many areas and times where prescribed fire cannot be used. High fuel loadings, air quality restrictions, short windows of appropriate weather, and risk of escaped fire in the wildland-urban interface are some of the factors that limit application of prescribed fire (USFS, Research and Development. 2003. A strategic assessment of forest biomass and fuel reduction treatments in western states).

Prescribed fire is likely to be effective in stands that have moderate or low tree densities, little encroachment of ladder fuels, moderate to steep slopes which preclude mechanical treatment, and expertise in personnel to plan and implement such large prescribed burns. (Pollet, Jolie, Omi, Philip N. Effect of thinning and prescribed burning on wildfire severity in ponderosa pine. The joint fire science conference workshop. 3). Depending on the site and vegetative conditions, the effectiveness of prescribed fire is generally 2 to 4 years.

In forests that have not experienced fire for many decades, multiple fuel treatments are often required to achieve the desired fuel conditions. Changing crown structure, while ignoring surface fuels, will only affect the likelihood of active crown fires---it will not necessarily reduce the likelihood of surface fires severe enough to damage soils or intense enough to ignite tree crowns. Therefore, it cannot be emphasized enough that all fuel strata need to be managed (over time and space) to minimize the unwanted consequences of wildfires (Graham, 2004).

Severe fire weather conditions coupled with a forest structure of dense stands place limitations on prescribed fire as a primary fuels treatment tool for preventing crown fires. These limitations indicate that prescribed fire should be used as a supplement to mechanical thinning wherever the treatment objective is prevention of crown fire.

C. WATERSHEDS

Many of the unique features of forest soils, and consequently watersheds, such as the forest floor, decaying debris, and cycling of nutrients, can be dramatically altered by severe wildfire. When soils and vegetation change within a watershed, the very nature of that watershed also changes. Abrupt and large scale changes within a watershed can so alter the characteristics of the watershed that the outputs that were so valued now become a liability.

Wildfire is the forest disturbance that has the greatest potential to change watershed conditions. It is not fire per se, but the intensity and duration of burning that influences the severity of soil and hydrologic effects (Ice, George G., Daniel G. Neary, and Paul W. Adams. 2004. Effects of wildfire on soils and watershed processes. Journal of Forestry (September): 18-20).

Ice et al. (2004) stated that several key watershed processes can be significantly altered by wildfire, such as dry ravel, infiltration and runoff, surface erosion, slope failure and debris torrents, and stream sediment. Of particular importance to community wildfire protection plans are infiltration and runoff, and surface erosion, because these are integral with flooding and sedimentation, especially with the occurrence of high intensity thunderstorms after the fire.

The impact of a wildfire in a watershed can be described as changing the 100-year flood interval from a pre-fire 100 years to a post-fire 5 year interval. In other words, a watershed suffering a severe wildfire will probably experience a 100-year flood within five years after the wildfire (Kuyumjian, Greg. 2006. U.S.D.A., Forest Service, Los Alamos, NM. Personal conversation May 9, 2006).

Studies have shown that after a wildfire the sedimentation rate increases considerably. An example is the report on New Mexico's Cerro Grande Fire of 2000, where, during the first year after the fire, sediment was deposited into the Los Alamos Reservoir at a rate 450 times greater than the pre-fire sedimentation rate (Lavine, Alexis, G.A. Kuyumjian, S.L. Reneau, D. Katzman, and D.V. Malmon. A five-year record of sedimentation in the Los Alamos Reservoir, New Mexico, following the Cerro Grande Fire. Los Alamos National Laboratory and U.S. Forest Service. Paper presented at the joint eighth federal interagency sedimentation conference and third federal interagency hydrologic modeling conference. April 2-6, 2006. Reno, Nevada).

Such flooding and sedimentation can reduce the storage capacity of a reservoir quickly and dramatically as experienced by the approximately 33 percent capacity reduction in the Strontia Springs Reservoir in Colorado after the 1996 Buffalo Creek Fire, (Benavides-Solorio, Juan and Lee H. MacDonald. 2001. Post-fire runoff and erosion from simulated rainfall on small plots, Colorado front range. Hydrological Processes. 15: 2931-2932).

Because of the effect an intense long burning wildfire can have on the soil and the potential losses from an unusually severe flood, protecting critical watersheds from intense wildfire is important to downstream resource users and residents. Considering that wildfires do occur regardless of efforts to prevent them, protection of the critical watersheds is best accomplished by creating and maintaining conditions that minimize the duration and intensity of a wildfire.

An evaluation of a watershed in relation to potential loss from severe wildfire must consider at the very least: 1) presence of human structures, 2) reservoirs and uses of water, 3) total area of the watershed, 4) area of the various threat levels, 5) percentage of watershed in the various threat levels, 6) topography and soils, 7) potential natural vegetation, and 8) potential downstream impacts from flooding.

D. COMMUNITY PROTECTION

1. **Land Area and Vegetation:** The WUI areas identified through the risk assessment process are the highest priority for treatment in order to reduce the occurrence of catastrophic wildfire and protect community values. Within WUI areas, specific treatment areas can be selected that best respond to financial, political and agency constraints.

   As identified during the public meetings, the treatment areas adjacent to communities should be treated for a distance of at least one-half mile, and up to two or more miles depending on conditions such as slope, prevailing winds, and forest canopy continuity.

   As a matter of practicality, any mechanical treatment will be limited to slopes of less than 40 percent because of the difficulty and safety of machines operating on steep slopes. Hand thinning and prescribed fire are the treatments most adaptable to the steep slopes.

2. **Evacuation:** Of primary concern in community preparedness is an oncoming wildfire. Those in the path of a wildfire must take some kind of action, and knowing ahead of time what action to take is of great importance in protecting human life. The action can take several forms, and the two most commonly used are evacuation and safe haven or safety zones.

   The traditional evacuation strategy is to remove all living beings, especially humans, from an area threatened by wildfire. This approach has been well documented to take a long time to implement and complete, and it requires tremendous human resources to be effective. In many cases, the human resources and equipment involved in these evacuations must be diverted from initial attack of the fire event, thus allowing the fire to grow beyond an early controllable size.

   Contemporary evacuation strategies center on what is known as “sheltering in place”. This practice relies on creating relatively safe havens for people (and animals) to go to until the main front of a fire passes. The idea is based on the theory that in many cases it is safer for evacuees to move to a safe place, such as a structure with defensible space, than it is for them to escape a fast-moving fire. There has been adequate research conducted most recently by Jack Cohen of the U.S. Forest Service that shows that the front of a passing wildfire is generally a relatively short-term event. Depending on slope and wind, the flaming front of a wildfire can pass a building within a 15-to-30 minute period. Cohen’s research also shows that with a clearance of only 110 feet, a passing wildfire will not significantly ignite a structure (many of the structures lost in a wildfire are actually ignited by a creeping surface fire long after the catastrophic crown fire has passed by the area).

The size requirements for an open area to be considered a safety zone will depend on several factors. Wildland fire fighters use safety zones when the behavior of the wildfire causes them to abandon the fire line, and they use the following guidelines to determine an adequate size for the zone. For radiant heat only, the distance separation between the firefighter and the flames must be at least four times the maximum flame height. The distance must be maintained on all sides, if the fire has the ability to burn completely around the safety zone. Remember, convective heat from wind and/or terrain influences will increase this distance requirement (Madden, Gene, Guidelines for selecting a safe escape area, Wildland Firefighter, December 2006, Volume 10 Number 12, pages 9 and 10).

These guidelines would be the minimum requirements when considering safety zones to be used by the public in lieu of evacuation.

3. **Defensible Space:** The traditional defensible space focuses on vegetation and the structure's roof. Two factors have emerged as the primary determinants of a home's ability to survive wildfire. These are the home's roofing material and the quality of the "defensible space" surrounding it (Rogstad, Alix. 2002. University of Arizona, Cooperative Extension, College of Agriculture and Life Sciences, Creating wildfire-defensible space for your home and property).

   Roofing Material: Use Uniform Building Code Class C or better (preferably Class A) rating fire-resistive materials, not wood or shake shingles, to roof homes in or near forests and grasslands (Rogstad, 2002). A much more detailed construction code can be found in the International Wildland-Urban Interface Code published by the International Code Council, Inc.

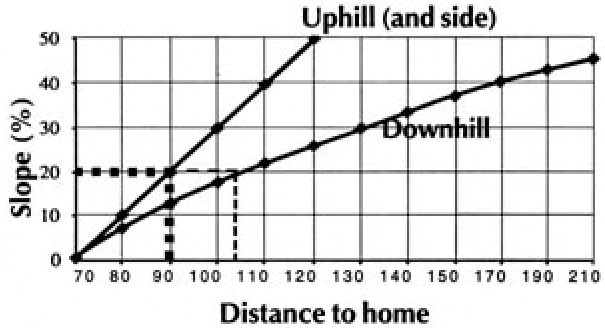
   Defensible space: Defensible space is an area around a structure where fuels and vegetation are treated, cleared or reduced to slow the spread of wildfire towards the structure. It also reduces the chance of a structure fire moving from the building to the surrounding forest. Defensible space also provides room for firefighters to do their jobs (Rogstad, 2002).

   The design of defensible space depends on several factors: size and shape of buildings, materials used in their construction, the slope of the ground on which the structures are built, surrounding topography, and sizes and types of vegetation on the property (Rogstad, 2002).

   Creating defensible space involves developing a series of management zones in which different treatments are used. Zone 1 is the area of maximum modification and treatment. It consists of an area of 15 feet around the structure where all low growing flammable vegetation is removed, but in which larger trees can be retained provided ladder fuels are removed or absent. The 15 feet is measured from the outside edge of the home's eaves and any attached structures, such as decks.

Zone 2 is an area of fuel reduction designed to reduce the intensity of any crown fire approaching structures. The size of Zone 2 depends on the slope of the ground where the structure is built. Typically, the defensible space should extend at least 75 to 125 feet from the structure. Table 6 can be used to determine appropriate distance for the structure's defensible space where the structure is on sloping ground.

Table 6. Defensible Space By Slope Percent



Within this zone, the continuity and arrangement of vegetation is modified. Remove stressed, diseased, dead or dying trees and shrubs.

Zone 3 is an area of traditional forest management and is of no particular size, and extends from the edge of the defensible space to the property boundary. Tree spacing usually depends on the species involved and factors such as susceptibility to windthrow or damage from heavy snow loading. For most tree species a good rule of thumb for stem spacing is "diameter + 7 feet". Measure tree diameter in inches, substitute feet for the inches measured and add the 7 feet. The resulting figure is the approximate desirable distance between trees. An example would be an 8 inch tree, add 7 to the 8 and the result is 15 foot spacing. (Rogstad, 2002). An objective for Zone 3 would be to thin the trees to the extent that the crowns are not touching.

A tool that can be used in determining the risk from wildfire to a specific structure is the Wildland Home Fire Risk Meter published by the National Wildfire Coordinating Group in 1990. With this simple meter a homeowner can quickly assess the home's risk from wildfire.

Table 6 also can be used for determining defensible space treatments. Although the zone distances and widths are different than those of Rogstad, the information is more detailed and will also help in preparing defensible space. Table 7 is from the Flagstaff Fire Department (Flagstaff, Arizona July 2002) and has been slightly modified to make it applicable to multiple communities.

Table 7. Defensible Space Fuel Management Standards

Firewise Environment	Requirements	Recommendations	Comments
Zone 1			
0-10 feet from structure	• Remove all pine needles and flammable ground materials. • Remove all ladder fuels. • Min. 10 feet between crowns of native trees or "clumps" (max. 4 trees/clump). • Prune trees extending over eave of roof. • Remove branches within 15 feet of chimney. • Use only approved decking materials. • Use non-flammable landscape material (ex: no wooden fences, railroad ties, etc.). • Prune limbs to min. 8 feet from ground or 25% of tree height, whichever is less.	• Minimize flammable vegetation in this zone. • Maintain non-combustible ground material 2-3 feet around structure (planting beds, rock gardens, gravel or bare soil). • Keep roof and rain gutters clear of needles and leaves	Wildfire is the number 1 threat to many communities of the Southwest and Intermountain West. The goal in this zone is to reduce creeping ground fire. What is done now will greatly enhance structure survivability and firefighter safety.
Zone 2			
10-50 feet from structure	• Remove pine needles and flammable ground materials. • Remove all ladder fuels. • Min. 10 feet between stems of native trees or "clumps" (max. 5 trees/clump). • Crowns of stems or between "clumps" do not touch. • 10-15 feet between planting islands and groups of shrubs.	• Maintain low combustible ground covers. • Keep lawns watered (as conditions allow). • Consider planting beds, rock gardens, xeriscaping, and fire resistant plants. • Use bedding plants (less 18 inches high). • Consider non-flammable landscape material. • Prune native tree limbs min. 8 feet from ground or 25% of tree height, whichever is less.	The goal in this zone is to reduce radiant heat and short-range spotting.
Zone 3			
From 50 feet to property boundary	• Max. densities for native trees per local fire department, state forestry, or other "expert" (dependent upon site). • Remove all ladder fuels. • 15 feet between stems of native trees or "clumps" (max. 5 trees/clump). • 20 feet between planting islands.	• Consider coordination with neighboring properties. • Prune native tree limbs min. 8 feet from ground or 25% of tree height , whichever is less. • Store firewood and other combustibles in this zone.	Treatment in this zone will create conditions unfavorable to crown fire.

4. **Home Ignition Zone:** The home ignition zone consists of the home and the area ten feet from the home. This is the area in which falling embers can cause ignition of the home, and defenses should be geared to stopping embers from contributing to the ignition of the home. In general, anything flammable should be removed from the home ignition zone. The Zone 1 information of Table 7 applies to home ignition zone.

   Wood shake roofing should be replaced with a Class-A non-flammable roofing material. Gutters need to be kept clean of debris, and all dry grass, brush, pine needles, leaves, and other flammable materials must be removed from the zone. Eaves and vents (foundation and roof) need to be covered with $^1/_8$ to ¼ inch mesh metal screen. Decks and porches should be enclosed, and window screens made with metal mesh installed. Wooden fences and bark walkways might act as a conduit for wildfire to reach the house. Within the home ignition zone, flammable fences and walkways should be replaced with a non-flammable material.

5. **Grass Wildfire:** Although all communities in wooded areas are susceptible to damage and loss from wildfires, and the fact that some structures are more vulnerable than others, susceptibility to wildfire damage is not limited to wooded areas. Grass fires of short duration and low flame length can also ignite homes.

   The Texas grass fires of early 2006 burned 1.6 million acres and destroyed 440 homes. Stone and brick homes with metal roofs burned, homes that at first glance would be classified as low risk. It was not a 50 foot wall of flames destroying the homes; it was flames from one or two inch tall grass (Weaver, Traci. 2006. A word to the firewise. Wildland Firefighter. July 2006, Volume 10, Number 7, 25-30).

   Weaver said that the losses were truly an example of the home only being as strong as its weakest link. Primarily the weakest links were wooden porches with no screening underneath, cedar posts and landscape timbers. Most of the losses occurred in areas with minimal amounts of vegetative fuels, and almost every loss was associated with conduction from firebrands entering open areas like attic vents, eaves and soffits, or radiant heat from short grass igniting combustible material, such as wooden decks or landscaping timbers, on or adjacent to the home (Weaver. 2006).

   With availability of the latest defensible space information gleaned from the Texas grassfires, the Colfax County CWPP adds "weakest link" information to the defensible space dialogue. Homeowners should screen open areas (using $^1/_8$ to ¼ inch wire mesh) where firebrands can collect, such as wooden decks and open attic vents. Use non-flammable materials like river rock or pea gravel adjacent to any wooden aspects of the home, including decks and fences. Also cover the first few feet around the home with river rock or similar non-flammable material (Weaver. 2006).

6. **Homeowners:** The New Mexico State Forestry Division should be contacted for technical assistance with defensible space, home ignition zone, forest fires, and grass fires.

CHAPTER FOUR – RECOMMENDATIONS AND PRIORITIES

A. LOCATION OF WUI

The location of the wildland urban interface in Colfax County has been determined through a process of identifying threat level coupled with values. The priority of proposed and planned treatments should be first in the identified WUI, then adjacent to communities not located in the identified WUI and the high value watersheds, and finally all other areas.

B. TREATMENTS

One of the objectives of treatments recommended in the Colfax County CWPP is to reduce the chance of a surface wildfire becoming an active crown fire, which is a wildfire that travels through the crowns of the trees in addition to traveling on the surface. Changing the threat level of an area from the highest categories to one of the lower categories will accomplish that objective; however, some treatments and methods are more effective than others in changing conditions. Eliminating or reducing risk by the prevention of wildfire ignition would be very effective, but is not practical because ignition, whether natural or man caused, will eventually happen. The more practical approach would be to change the hazard level in any given area. Treatments to change hazard conditions can be extensive and expensive; consequently recommending treatments that are cost effective with long term benefits requires an understanding of the various types of wildfires and the various conditions in which they exist.

The collaborative efforts coupled with forest and wildfire science has lead this plan to recommend that all land within the high priority WUI be treated to change existing hazard conditions so as to minimize the threat of crown fire. Type of land ownership or who owns the land is less of a factor, in determining what type or intensity of fuels reduction treatments should take place, than the vegetative type and values at risk located within the ownership. However, landownership is important in that it dictates what funding, what process is needed to plan, organize and execute a project. Each forest or vegetation type responds to wildfires in its own unique way, but is consistent within the type.

For a forest that is fire-resilient, such as ponderosa pine type and dry site mixed conifer, the treatment objective should seek to achieve the four principles listed by Richard T. Brown in the August 2004 issue of Conservation Biology. The principles are: 1) manage surface fuels to limit flame length of a wildland fire, 2) make it more difficult for canopy torching to occur by increasing the height to flammable crown fuels, 3) decrease crown density by thinning overstory trees, making tree-to-tree crowning less probable, and 4) keep large trees of fire-resistant species.

The land around structures should be treated according to the guidelines set forth in the Community Protection, Defensible Space section (pages 49-52), and pertains to all land up to 125 feet distance from structures. The lands that are located between 125 feet and two miles from structures should be treated according to the woodland or forest type present on that land. In some instances, the upwind threat is so great that the WUI distance from a structure is greater than two miles, and in such cases the woodland or forest fuels treatment prescription would continue to the WUI boundary.

The following forest/vegetation types should be treated for fuels reduction as described in the following paragraphs.

The **pinyon-juniper woodland** should be thinned to about thirty feet between trees with no special consideration for ladder fuels. Pinyon trees should be favored as the species to leave. For areas deemed to be experiencing juniper invasion, the spacing between trees may be much greater, up to and including eradication of the invading species.

For the **dry mixed-conifer and ponderosa pine forest**, a restoration prescription should be applied with ladder fuels being removed, and the remaining forest basal area reduced to a level of 40-50 square feet per acre. For maximum benefits, the fuels reduction thinning should be followed with slash removal using a prescribed burn and/or mastication of the slash.

The **spruce-fir forest** within the WUI areas react differently to thinning and prescribed fire than do the previously mentioned forest types, and require treatment tailored to each individual stand. Wind throw of the residual stand is a concern anytime trees are removed from the canopy, as well as the fire susceptibility of the spruce and true fir species. The plan recommends that each proposed project that includes spruce-fir forest type be subjected to independent review by a Society of American Foresters certified forester (www.safnet.org) or the New Mexico State Forestry Division (www.emnrd.state.nm.us). Treatment should proceed upon agreement between the land manager and the reviewer.

The **river and creek bottoms** of Colfax County normally are not of great concern when planning for wildfire because the natural vegetation associated with the river and creek bottoms are not particularly flammable; however, a crown fire entering a river or creek bottom from the outside could have devastating effects, particularly on wildlife habitat. The river and creek bottoms are important and unique wildlife habitat and should be treated so as to retain the wildlife habitat characteristics.

The primary fuels treatment for the benefit of the river or creek bottoms should be concentrated on the adjacent lands that contain coniferous trees. These adjacent lands should receive the same treatment as woodlands and forest lands receive in the WUI areas. Treatment should extend out one-half mile. This distance will be sufficient to turn an approaching crown fire into a surface fire. In addition to treating the adjacent area, the river or creek bottom itself should be treated by removing accumulated dead fall trees and limbs, and more importantly, invading junipers and other coniferous trees should be removed, as they are more flammable and could accelerate the spread and intensity of a wildfire that travels into a river or creek bottom from adjacent areas.

C. INTERNATIONAL WILDLAND URBAN-INTERFACE CODE

The core team recommends that the Board of County Commissioners review the 2006 International Wildland-Urban Interface Code as published by the International Code

Council, Inc., and consider adopting the portions of the code that would facilitate the efforts to protect communities and infrastructure in the County. The International Code Council (ICC) is a membership association dedicated to building safety and fire prevention, and has the stated purpose of developing the International Wildland-Urban Interface Code to establish minimum standards that prevent the loss of structures, even if fire department intervention is absent. The Wildland-Urban Interface Code bridges the gap between the International Building Code and the International Fire Code, both developed by the ICC.

Chapter 3, Wildland-Urban Interface Areas, of the International Wildland-Urban Interface Code, which deals with establishing baseline criteria for determining wildland-urban interface areas, is already covered by using the Wildland Urban Interface Location Map (figure 9) of this CWPP.

Specifically the Board of Commissioners should consider Chapter 4, Wildland-Urban Interface Area Requirements, of the International Wildland-Urban Interface Code to facilitate emergency vehicle access and fire fighting water supply. Chapter 5, Special Building Construction Regulations, of the International Wildland-Urban Interface Code should be considered for developing minimum standards to locate, design and construct buildings and structures for the protection of life and property, to resist damage from wildfires, and to mitigate building and structure fires from spreading to wildland fuels.

Chapter 6, Fire Protection Requirements, of the International Wildland-Urban Interface Code deals with defensible space, and should be considered by the Board of Commissioners, specifically for the responsibility of maintaining defensible space, once established.

D. DEFENSIBLE SPACE

Evaluation

In the Community Assessment Chapter, Risk Assessment Section of this plan, are listed several communities with a high or very high risk of wildfire rating. Every home or structure within these communities should be evaluated for defensible space (125+ feet from structure), using an evaluation format similar to that recommended by Firewise Communities. The evaluation could be conducted by respective fire chiefs, or by qualified examiners funded by a grant. The inventory of defensible space should be completed as soon as is practical. Each fire district will calculate the number of homes that are defensible, and plan to improve that number by ten percent each year.

Priority

It is important for homeowners to create defensible space around their homes regardless of the WUI priority rating of their community or the type of vegetation in the area. For the communities of Angel Fire, Black Lake, Black Lake Resorts, Cimarron, Raton (west side), Taos Pines, and Ute Park which were identified as being in the high priority WUI of the Colfax County CWPP, the priority for completing the defensible space inventory is high.

E. HOME IGNITION ZONE

The potential for a wildfire that has entered defensible space to destroy homes is high if the home ignition zone has been ignored. The communities listed as high or very high risk of wildfire, and those with a rating of medium should have homes and structures evaluated for home ignition zone (10 feet from structure) risk. The communities with a medium rating often are located in grasslands, and home ignition zone is extremely important for those communities.

The evaluation of such a large number of structures is a difficult undertaking, and evaluations should be conducted by a competent contractor, under the direction of the County Manager.

Priority

The home ignition zone evaluation is a high priority for all of the communities listed in Chapter Two with a medium, high or very high community wildfire rating. However, all homeowners should evaluate their own home ignition zone regardless of the WUI rating associated with their community.

F. TAOS PINES COMMUNITY

Future Evaluation

Through the efforts of the Cimarron Watershed Alliance, the Taos Pines subdivision had an extensive fuels reduction project during the years 2006 and 2007. Assuming that trees and other vegetation grow taller and thicker with each passing year, the Taos Pines area could outgrow the fuels mitigation treatment in about ten years. The area should be evaluated in the year 2016 for wildfire potential and fuels conditions. This plan recommends that Cimarron Watershed Alliance accept the responsibility for scheduling and securing funding for the 2016 evaluation of Taos Pines wildfire conditions.

Priority, Taos Pines

The Taos Pines community was identified as high priority WUI in the Colfax County CWPP, and as such should be monitored for changes in fuel conditions.

G. MORENO VALLEY WATERSHED

Master Plan

The Moreno Valley Watershed has been a concern to the citizens of Colfax County for some time, and several localized projects have been completed with several others ongoing or proposed. It is recommended that the entire watershed be placed under a master plan for protecting water quality. The Cimarron Watershed Alliance should in cooperation with the New Mexico Environment Department Surface Water Quality Bureau and the New Mexico Forestry Division undertake developing the master plan for the Moreno Valley Watershed. An evaluation and inventory should be developed with the participation of all landowners within the watershed, and should be completed within eighteen months of securing adequate funding for the project.

Priority, Moreno Valley Watershed
Much of the south end of the watershed was identified as WUI through the Colfax County CWPP, and this coupled with the importance of the watershed makes this project a high priority.

H. IDYLLWILD AND LAKEVIEW PINES COMMUNITIES

Background
The 2007 New Mexico Communities At Risk Assessment Plan shows the communities of Idyllwild and Lakeview Pines with a high risk rating. Comments from the Colfax County CWPP core team and from interested public indicated that the communities of Idyllwild and Lakeview Pines were at risk of experiencing a catastrophic wildfire.

The immediate area surrounding the communities of Idyllwild and Lakeview Pines did not score as a high priority WUI in the mapping process of the Colfax County CWPP. The reason for the lower priority WUI rating is that the Fuel Hazard score was a medium and the Risk (wildfire ignitions) score was low. There probably were wildfire ignitions in the general area that were quickly suppressed and subsequently not reported, and had ignitions occurred and been included in the data available for the CWPP, the Idyllwild Lakeview Pines area would have scored in the high priority WUI category.

The Colfax County CWPP considers the communities of Idyllwild and Lakeview Pines as high priority WUI, and fuels treatment should cover an extensive area around the communities.

Fuels Reduction
The forested area within the Idyllwild and Lakeview Pines WUI should be thinned according to the guidelines outlined in the treatments section of Chapter 4 of the Colfax County CWPP. The objective of the thinning is to reduce the canopy density to a level that will not support a crown fire. The New Mexico State Forestry Division should be contacted for thinning recommendations and technical assistance.

Priority
Fuels reduction in the Idyllwild and Lakeview Pines WUI is a high priority. The entire area shown in Figure 10 should be evaluated for fuels reduction need, and should be started as soon as possible.

The Idyllwild and Lakeview Pines WUI will be included in the proposed Moreno Valley Watershed inventory and evaluation.

I. PONIL CREEK WATERSHED

Restoration
Much of the watershed was impacted by a wildfire in 2002 and the efforts to stabilize the soil and reestablish vegetation in the burned areas should continue. The planning for Ponil Creek watershed restoration should be coordinated with the Cimarron Watershed Alliance and New Mexico Forestry Division.

Priority, Ponil Creek Watershed
The majority of the watershed was not identified as a WUI; however, the lower part of the watershed that was not in the wildfire, particularly near the community of Cimarron (which is identified as high priority WUI), should have fuels reduction treatments. Because of the proximity to community of Cimarron, the fuels reduction project for the lower part of the Ponil Creek Watershed is a high priority.

J. CIMARRONCITO RESERVOIR WATERSHED

Thinning
The watershed that supplies Cimarroncito Reservoir has considerable area with a high fuel hazard rating. The high hazard part of the watershed should be thinned as per the guidelines of this plan (Chapter 4).

Priority, Cimarroncito Reservoir Watershed
In addition to being a municipal water supply, a portion of the watershed was identified as a WUI in the Colfax County CWPP, and as such is a high priority for treatment.

K. SUGARITE CANYON WATERSHED

The recommendation of this plan is for the City of Raton to continue with the stewardship plan they have been developing. The Sugarite Canyon area was identified as WUI in the Colfax County CWPP, and as such is a high priority.

L. CIMARRON CANYON

Most of the watershed is very steep and fuels reductions treatment options are limited; however, the river bottom is relatively level and therefore is treatable. The coniferous species that have invaded the bottom lands of the river are much more flammable than the indigenous cottonwood and willows. The presence of more flammable coniferous species in the river bottom increases the potential for a severe wildfire. The recommended fuels reduction treatment for the river bottom is; removal of all juniper, removal of other coniferous species less than fifteen feet tall, and removal of any species of dead and down trees. Because the canyon is a very high use recreation area and a wildfire will so drastically impact the aesthetic beauty, the priority for such fuel treatments is a high priority.

M. CANADIAN RIVER

An invasive species eradication program should be initiated for the Canadian River bed in order to return the wildfire fuels to a more natural condition. An eradication plan should include the tributaries to the river, and address the method and direction of seed travel as well as the potential value of the invasive species as wildlife habitat.

N. COAL-BED METHANE INFRASTRUCTURE

Coal-bed methane gas extraction is an important part of the County economy, and the loss of infrastructure to a wildfire could have an impact on the local economy. Because most of the gas extraction occurs in a high threat level area, wildfire mitigation projects are important. With cooperation of the landowner, the gas extraction infrastructure sites should be evaluated for catastrophic wildfire potential, and where appropriate, action taken to reduce the wildfire fuels.

O. COMMUNICATION AND EDUCATION

All proposed fuel mitigation projects should be should be designed in conjunction with the New Mexico Forestry Division, County Manager and Fire Chiefs, and the benefits and justification of each project communicated to the citizens of Colfax County. Communicating and educating will be the joint responsibility of the Fire Chiefs, County Manager, and New Mexico State Forestry Division.

A change in evacuation procedures at Ute Park will necessitate communication to every property owner and occupant in Ute Park. The communication will be the responsibility of the County Manager, and will include at least one public meeting in Ute Park and a direct mailing to property owners and residents. The communication of a sheltering in place option for wildfire evacuation in Ute Park should be communicated to the residents when a decision is made.

P. FIRE DISTRICTS AND EQUIPMENT NEEDS

The detailed information developed by this plan, about threats, risks and hazards to communities in the County show a need for fire districts to be capable of making the initial attack on a wildland fire. In order to meet that need, each organized fire district should be at least minimally equipped and trained to perform initial attack on wildfire occurring within their district boundary.

The plan recommends that each fire district become “initial wildfire attack ready” and that each year two fire districts acquire the “initial wildfire attack ready” status until all fire districts are equipped and trained to make the initial attack on a wildland fire. It is further recommended that the County Fire Marshal Office work with each district to secure funding necessary to achieve the status of “initial wildfire attack ready”.

There are 13 organized fire districts within the County, and each would respond to a wildfire within their respective boundaries, if they had the appropriate wildland fire training and equipment. Without appropriate wildfire fighting equipment, a fire district crew responding to a wildfire could place themselves and their equipment at risk. Table 8 displays each fire district’s current needs in order to become minimally prepared as an effective wildland fire initial attack force.

Specifically related to training, the majority of the personnel are trained to the minimum of SB 130-190, to a level of 80%. The greatest training need is for the availability of the 200 series training and refresher courses for the 130-190. Because of the difficulty for volunteers to travel for training, local training is needed possibly through an adjunct program utilizing "train the trainer." In addition, Districts 2 through 5 need to be red carded.

There is a need for additional water tenders. The County has been using their fire excise tax and Fire Fund Grants to purchase tenders, but need additional funding in order to acquire tenders for all districts.

Table 8. Fire District and Equipment Needs

FIRE DISTRICT	TRAINING	WILDLAND PPE	HAND TOOLS	TYPE 6 VEHICLE	TYPE III PUMPER	COMM. SYSTEM	GPS RECEIVER
District 1 Philmont	X						
District 2 Miami	X				X		X
District 3 Ute Park	X				X		X
District 4 Farley	X				X		X
District 5 French Tract	X						
District 6 Moreno Valley	X						
District 7 Vermejo	X				X		
Cimarron Fire Department							
Eagle Nest Fire Department							
Maxwell Fire Department					X		X
Raton Fire Department							
Springer Fire Department					X		
Angel Fire Fire department							

X Indicates item needed

Priority, Wildland Fire Initial Attack Ready
Equipping each fire district with the equipment and training to make each district wildland fire initial attack ready is a high priority.

Q. PROPOSED PROJECTS SUMMARY

Table 9 lists the above mentioned proposed projects in order from high priority to low priority.

Table 9. Proposed Projects Summary

PROJECT NAME	GENERAL LOCATION	DESCRIPTION	PRIORITY	START DATE	END DATE
Community Protection	County Wide	Create defensible space, 125 feet to 2 miles from structures in all communities	High	4^{th} Qrt 2008	4^{th} Qrt 2013
Mixed Conifer and Ponderosa Pine Forest Thinning Guidelines	County Wide	Remove ladder fuels and thin to 40-50 basal area, dispose of the slash	High	4^{th} Qrt 2008	4^{th} Qrt 2018
International Wildland-Urban Interface Code, 2006	County Wide	County to adopt portions of code that facilitate protection of communities and infrastructure	High	4^{th} Qrt 2008	4^{th} Qrt 2009
Defensible space	Angel Fire, Black Lake, Black Lake Resorts, Cimarron, Raton (west side), Taos Pines, Ute Park	Evaluate and inventory all structures for defensible space	High	3^{rd} Qrt 2008	4^{th} Qrt 2008
Home Ignition Zone	Communities with medium, high, or very high wildfire rating	Evaluate structures for ignitability	High	3^{rd} Qrt 2009	4^{th} Qrt 2011
Lambert Hills	Cimarron	Pinyon-Juniper thinning	High	4^{th} Qrt 2008	4^{th} Qrt 2009
Mountain Meadows	Cimarron	Reduce dry grass fuels, obtain mowing machine	High	4^{th} Qrt 2008	Annually
Eagle Nest State Park	Eagle Nest	Reduce grass fuel load	High	4^{th} Qrt 2008	Annually
Lakeview Pines and Idyllwild Evacuation	Eagle Nest	Develop an evacuation plan and a plan for improving emergency vehicle access	High	4^{th} Qrt 2008	4^{th} Qrt 2009
Miami Home Ignition Zone Evaluation	Miami	Evaluate home ignition zone for all structures	High	4^{th} Qrt 2008	4^{th} Qrt 2010
Idyllwild and Lakeview Pines WUI	Lakeview Pines and Idyllwild	Thin forest and reduce fuels within communities and on adjacent lands	High	4^{th} Qrt 2008	4^{th} Qrt 2013
Ute Park Evacuation Plan	Ute Park	Develop alternative sheltering in place plan	High	4^{th} Qrt 2008	4^{th} Qrt 2009
Ute Park Canopy Density	Ute Park and Cimarroncito Ranch	Reduce canopy density in Ute Park and on Cimarroncito Ranch	High	4^{th} Qrt 2008	4^{th} Qrt 2010
Ute Park Canopy Base Height	Ute Park and Cimarroncito Ranch	Increase canopy base height in Ute Park and on Cimarroncito Ranch	High	4^{th} Qrt 2008	4^{th} Qrt 2010
Colin Neblett State Wildlife Area	Ute Park	Thin and increase canopy base height adjacent to Ute Park community	High	3^{rd} 2009	4^{th} Qrt 2019

PROJECT NAME	GENERAL LOCATION	DESCRIPTION	PRIORITY	START DATE	END DATE
Moreno Valley Watershed	Moreno Valley	Develop master plan for protecting water quality	High	3rd Qrt 2009	1st Qrt 2011
Ponil Creek Watershed	Cimarron	Thinning in lower watershed, restore burned area	High	3rd Qrt 2008	4th Qrt 2013
Cimarroncita Reservoir Watershed	Cimarron	Fuel reduction	High	4th Qrt 2008	4th Qrt 2012
Sugarite Canyon	Raton	Support development of stewardship plan	High	3rd Qrt 2008	3rd Qrt 2009
Cimarron Canyon	Ute Park	Fuels reduction, juniper removal and small conifer removal	High	4th Qrt 2008	4th Qrt 2018
Communication and Education	County Wide	All projects, inform and educate public	High	3rd Qrt 2008	Ongoing
Fire District Needs	County Wide	Each district to become wildfire initial attack ready	High	4th Qrt 2008	4th Qrt 2010
Pinyon-Juniper Woodland Thinning Guidelines	County Wide	Thin to 30 feet between trees	Medium	4th Qrt 2008	4th Qrt 2018
River and Creek Bottoms, Fuels Treatment Guidelines	County Wide	Remove invading species including native coniferous trees	Medium	4th Qrt 2008	4th Qrt 2013
Cimarron River and Ponil Creek Bottoms	Cimarron	Remove invading junipers along with dead and down material	Medium	4th Qrt 2010	4th Qrt 2015
Sawmill Site Residue	Cimarron	Facilitate removal of material	Medium	4th Qrt 2008	4th Qrt 2010
Canadian River Invasive Plants	County Wide	Remove invasive salt cedar from river bottom and tributaries	Medium	3rd Qrt 2009	4th Qrt 2024
Coal-Bed Methane Gas Extraction Infrastructure	Vermejo Park Ranch	Evaluate infrastructure sites and plan fuels reduction	Medium	3rd Qrt 2009	4th Qrt 2009
WUI Areas Fuels Treatment	County Wide	Reduce fuels to minimize threat of crown fire	Medium	4th Qrt 2008	4th Qrt 2018
Spruce-Fir Forest Thinning Guidelines	County Wide	Wind throw potential after thinning, tailor treatment to individual stand	Low	3rd Qrt 2010	4th Qrt 2018
Taos Pines Evaluation	Taos Pines	Post treatment defensible space evaluation	Low	3rd Qrt 2016	4th Qrt 2016

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